MEDICINAL SECRETS OF YOUR FOOD

BY

AMAN

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DEDICATED TO

ALL WHO HAVE SACRIFICED THEIR LIVES

TO LESSEN THE PANGS OF

HUNGER AND DISEASE

AUTHOR'S PRAYER

Lord of universe; all praise is due to Thee!
Lord of moons, skies, sun and stars,
Unasked Thou givest me.
Thee we all seek and eagerly implore,
To forgive our sins, respected Lord from yore.
Merciful God ! exalt me to high position,
Grand as Thou art, accept my humble prostration.
The Giver of knowledge, the most Benevolent;
This unworthy book yet expresses my true sentiment.
Of love, humility and implicit devotion;
None of Thy creature can equal Thy perfection.
Hence, a mistake, knowingly or unknowingly done,
May be ignored, pray extend Thy Gracious pardon.
Merciful God, I pray with all humility;
To bless Dr Kline, the printer, the publisher, the referred and the reader;
With knowledge, health and longevity.
My lord, when I leave this world,
Pray ! grant me eternity.

AMEN



AUTHOR



DR. M. A. KLINE (Vienna

adopting the approved scientific methods of contraception and understanding the nutritive and medicinal value of the common foods.

The early attempts to commence and conclude a detailed study of the various foods remained for some time more, or less a dream as the various other demands on the time and services of the author deprived him from concentrating his attention on the subject matter of this volume alone. His stay abroad, though a sort of interruption in the process of this study, however, provided an opportunity in discussing the problem with such experts in the field as: Sir Alexander Flemming, Sir John Weir of London, Profs. J. K. Feeney, R. G. Gross, Cunningham of Dublin etc. The stimulating discussions with these intellectuals formed the source of constant encouragement and enthusiasm in the preparation of the present work which is certainly carrying an indelible impression of the views of all these experts in the science of medicine. The work would have lacked all the richness which it now exhibits, if it had been without such interruption.

The author, after many years of observation found that a physician can play a major role in advising his patients about the nutritive value of the common foods both during the treatment and convalescent time. This sort of advice really produces a remarkable effect in the understanding and the use of the common foods by the common man. Therefore, the earlier idea in presenting a handy compedium on the subject matter, mainly for the fresh entrants in the field of medicine was entertained by the author. Naturally, the first manuscript contained descriptions in the language of Journalism enriched by many technical words. This approach was reinforced by the strong indication the author had from his colleagues about the ignorance of the science of nutrition and clinical dietetics amongst the fresh entrants in medical profession. Whatever be the cause of such ignorance, the work was obviously intended to supplement their knowledge so that the treatment of various physical ailments could be based on the valuable contributions made by the science of nutrition.

The author owes a debt of gratitude to Dr M. A. Kline of Vienna for his suggestions at this stage. When Dr Kline who so kindly went through the manuscript, rightly suggested that such a work could be of greater utility to the people in general if the approach to the subject matter was changed and if the material was presented not only in non-technical but also in a simple language. The rearrangement of the matter on the lines of the advice and suggestions offered by Dr M. A. Kline formed the basis of the scheme of organisation of the work from giving details of nutritional and medicinal values of the various foods that are commonly consumed all over the world.

A study of this kind can never be claimed as final and complete. The paucity of research material on the subject matter was felt considerably at every stage of the preparation of this book. The author could not and cannot lay claim to such scholarship and authority in supplementing the requirements in various areas. At times it is obvious that

PREFACE

In presenting this volume on the medicinal values of various foods the author does not have any pretentions to the exclusive originality of any kind. The problems of 'Population Explosion' faced by the developing countries, during the post war period are so very closely connected with the basic problem of nutrition that the solution of the population problem cannot be finally attempted with definiteness of success unless the problems of nutrition are also studied with equal amount of zeal. India, after independence, has grown economically, but, this economic gain has to a large extent been neutralised by the unexpected rise in India's population which is roughly 2.5 per cent per year. This unprecedented rise in India's population has created a number of problems inclusive of the problem of Nutrition.

In the post-independent era, India embarked upon a programme of planned economic development commencing its first economic plan in 1952. The first plan did place emphasis on Agricultural Development. It is however to be mentioned with regret that in the subsequent two five year plans, emphasis on agricultural production was reduced considerably, possibly due to the increasing pressures of industrial development. The problem of feeding the teeming millions became apparent in the subsequent years. The realisation of this problem was the chief reason for the author to make an attempt in placing this kind of volume in the hands of the readers.

The common man's ignorance about the science of nutrition and dietetics has, in the main, lead to the mistaken understanding that the traditional food, in the form we are accustomed to consume, is the only source of energy and strength. Though the author was, from the early period of his work in the field of medicine and dietetics, aware of this commonly mistaken notion, it was only during the treatment of 75 per cent of the undernourished women and children for their physical ailments, that the author realised the apparent but very close connection between the problems of nutrition and physical ailments.

This phenomenon led the author to discuss the problem in great detail with various authorities in dietetics and medicine in India and abroad. After many years of close observation, the author feels that the generalised malnutrition in India is not due to acute food shortage but, it is to be attributed to the common man's ignorance of nutritive value of many common foods that are cheap and abundantly grown all over India but unfortunately these foods are criminally wasted. Also, plenty of food is wasted by unscientific storage of the food grains that are eaten in large quantities by the rodents. Hence, the author desires to educate the common man in controlling population explosion by

FOREWORD

Everything that lives requires food or nourishment, in some form, to maintain life. And, since the beginning of Mankind, this always has and will always apply. His health depends on the amount and kind of food ingested. On the walls of caves discovered in the Southern parts of Europe and the Near East, it is noteworthy that drawings and carvings made by prehistoric man are composed only of edible animals. These pictures helped formulate Hippocrates' three outstanding concepts, accurate observation, careful examination and codification by means of written records.

In primitive times when food was seldom overabundant, man's attention was focused largely on the quantity of food available. As civilization advanced and food became more abundant, its flavour became more important, and the art of cookery developed. Increasingly, however, Medicine began to be interested in the physiological effect of various foods and how best to obtain nourishment from them. From these vague and empirical beginnings, nutrition has emerged into an exact science which embraces some of the most complicated and advanced aspects of biochemistry. Much of this nutritional chemistry concerns the enzyme systems that are instrumental in the release of energy from foods and in the utilization of this energy to carry out vital processes. It is now becoming more and more evident that many of these enzyme systems require one or more organic substances that the body cannot synthesize, such as the vitamins, etc. Thus Man's age-old feeling that this diet in part controls his destiny, is being justified on scientific grounds.

The explosion of interest in foods and nutrition has now become a science in itself. In this modern world, where special diets are being evolved for Astronauts on the Moon, whereas millions are starving in Africa and Asia, the value of food is significantly indicated. In view of the available land area on earth which can be cultivated and the almost fantastic populatic explosion, our present technical progress demands even grea sources for food and more knowledge concerning them.

Six of the most important and frequently deadly diseases: arterio-sclerosis, arthritis, heart disease, hypertension, cholecystitis, and diabetes, have in a great measure been directly attributed to improper diet, in an affected individual. Ferrero wrote: It seems to be true of all societies, that where pleasure and money are Gods of the multitude, there is a slow but steady weakening of the fibre of character. Unfortunately, this applies increasingly to the eating habits in most of our more highly developed countries.

The way of the reformer is more difficult than the way of the transgressor. Knowledge comes, but wisdom lingers. The acceptance of any new concept always meets with vigorous resistance. Accordingly even in these modern times, myriads of humans have literally written their own epitaphs with their teeth. They died prematurely, from ingestion of deleterious foods!

New nomenclature on vitamins, minerals, enzymes and other nutritive essentials has been startling in their discovery and numbers. The advances in nutrition have been even as rapid and startling. The constant discovery of new vital qualities of nutritives have required an almost monthly revision of terminology and the knowledge concerning foods, in general. We have newer knowledge concerning the storage and processing of foods and can now measure the losses in nutrients.

Diet in disease has become part of our medical armamentarium, especially in deficiency diseases. Feeding of infants and of geriatrics has now become a science in itself, and nutrition in 'Industry', likewise, has also become a Science. Practically all major industries maintain kitchens for their employed, and trained dietitians and cooks to staff them.

People in the developed countries, however, are plagued by the systematic ingestion of fattening foods. These cause degenerative diseases that lead to early death. Unlike the major causes of death, the ingestion of foods is considered exclusively the problem of the individual and he is allowed to dig his own grave—with his teeth. Compulsive eaters are, like alcoholics, aware of the consequences of their habits and they try to avoid the penalties of overindulgent feeding, by knowledge of the properties of foods and by dieting.

The purpose of this book is to provide its readers a thoroughly adequate and up-to-date review of the essentials and the secrets

INTRODUCTION

Food

The word *food* is derived from the word *feed* the prime source that keeps all the living things to continue their healthy living. The existence of food is as old as the creation of living beings in the universe.

Diet

The word diet is taken from *Latin Dieta* or the space of a day and *Diaita* means a way of living in *Greek*. Technically, diet means a mixture of several foods in different proportion and the same is consumed in an appointed hour according to one's convenience and custom.

The methodic consumption of food took its birth many thousand years ago in various countries like Egypt, Babylon, China and India.

Dietetics

The study of the effects of diet in *health* and *sickness* is known as *dietetics*. The beginning of this science dates back to many thousand years, perhaps, from the time of the *Java man* who lived 400,000 years ago and the *pre-historic man* who dwelled in the caves about 500,000 years ago. However, a picture of 17,000 years old *Arignacian* witch doctor on the wall of *Trois Freres* caves in *Pyrenees* and the existence of *Sekhat*, *Imhotep* etc., as court physicians of *Pharaoh*, proves that Egyptians were interested in treating diseases with medicines and diets as long as 5000 years ago. Mesopotamians and Chinese also practiced medicine employing fruits, spices, flowers, garlic, roses, tamarind, oats, minerals and animal substances about 4000 years ago.[1, 2, 7] Even *Vedas*, that are believed to be older than 5000 to 8000 years speak as:

प्राणाः प्रणभृतामन्नमन्नं लोकोऽभिधावति।

Prāṇaha prāṇabṛta mannamannam loco ābhidhavati.

वर्णः प्रसादः सौस्वर्यं जीवितं प्रतिभा सुखम्।

Varnaha prasādaha sausvaryam jivitam pratibhā sukham.

तुष्टिः पुष्टिर्बलं मेधा सर्वमन्ने प्रतिष्ठितम्।

Tushtihi pushtirbalam meghā sarvamanne pratishthitam.

Charaka Samhita, Vol. II, p. 557, Sh.: 349–349½.

'The life of all living things is food and all the world seeks food, complexion, clarity, good voice, long life, understanding, happiness, satisfaction, growth, intelligence etc., are all established in food'.

This message was given by *Lord Bramha* to a sage by name *Daksa*, who in turn delivered the science of life to *Ashwini twins*. After many centuries, when the sages found that the exponents of the science of life were short of new knowledge, they requested the holy sage *Bharadvaja* to go to Himalayas and win the favour of *Lord Indra* by his Divine power and learn the art of healing. After many years of penance *Bharadvaja* had the vision of *Lord Indra* who then taught the sage the art of healing. Returning from Himalayas, the holy sage spread the Divine knowledge for the benefit of human race, his first disciple being sage *Atreya* who it is believed, lived during the time of *Mahabharata:* i.e., 3000 years ago.

After many centuries, another sage-physician by name *Charaka* who lived in the second century A.D. as a court physician of king *Kanishka;* collected the *Vedic hymns* and reproduced them on palm leaves in the form of *Charaka Samhita* describing all the major branches of medicine including *Dietetics*. After 3 centuries, another sage by name *Susruta* flourished in ancient India who practiced Medicine, Surgery, and Dietetics with a great success. The writings of *Susruta* in the form of *Susruta Samhita* are still known as a classic in Medicine and Surgery. But, many western authors who out of ignorance of the Indian cultural heritage, believed that Greeks and Romans were the pioneers in clinical medicine and dietetics. Among them *Aristotle* (384-322 B.C.) *Hippocrates* (460-377 B.C.) are worth mentioning. *Celsus* (53 B.C.—7 A.D.), *Galen* (130-200 A.D.) etc., also gave much importance to *Diet* during Health and Disease. *Socrates* who lived much earlier said *Diet is health and 'Diet' is medicine*. However, Dietetics gained more popularity during the time of *Mohammad the Prophet* (Peace be on Him). *The Holy Quran* speaks very high of the health and medicinal value of various fruits like: pomegranate, figs, dates, and other food articles such as: olives, milk, honey, ginger, etc., and forbids certain harmful foods like blood, putrefied and unslaughtered meat etc.[8-19, 42]

Later, other Arabian physicians like, *Rhazes* (850-923 A.D.) *'The Galen of Arabs'*, improved dietetics and advised, *When you can heal by diet prescribe no remedy*. After *Rhazes*, another Persian by name *Aviceena* (989-1036 A.D.) *'The Persian Galen'* gave much more importance to diet in sickness and health. His noted book 'Qhanoon' (Cannon of Medicine) remained a classic medical text book for many centuries all over Europe and Arabia. Even today, his name is spoken with respect by medical men all over the world.[5, 6, 20-23]

Until the beginning of 20th century, dietetics was empirically practiced with a limited knowledge of certain foods considering them either *good* or *bad* for health.

This concept underwent a complete change after the discovery of *vitamins*, their value in health and sickness, their requirement, absorption, assimilation and excretion with other life giving foods

and components (that are described in detail in forthcoming pages) laid the foundation of scientific study of *Nutrition and Dietetics*. The progress in the field of study of nutrition and dietetics made during the past 50 years undoubtedly is unparalled in the history of medical science.

Today, physicians can cure and prevent many diseases of malnutrition and overnutrition by adjusting one's diet suitably. Still, the problem of developing countries has assumed an importance in the field of nutrition. Although the developed countries have controlled the diseases of malnutrition, in these countries many degenerative diseases like: *diabetes, cancer, urinary calculi, cardio-vascular diseases* etc., are increasing day by day and their successful aetiology and therapy has remained ununderstood in spite of extensive research. However, the author is optimistic and feels that if nutrition and dietetics are compulsarily taught in medical colleges along with the other subjects, their products will be better equipped in their professional career and therefore, in all probability they would help the prevention of above mentioned diseases and prescribe special diets in the treatment of many simple diseases instead of drugs.

To begin with the chapter of food, the author has mentioned the common name of the food under description in *English* and the common names in various languages such as: *Sanskrit, Hindi, Urdu, Dakhini, Arabic, Persian, Kannada, Tamil, Telugu, Malayalam, Marathi, Gujrati, Sindhi, Punjabi, Oriya, Bengali* etc., are mainly mentioned with a view to help the reader to know the various vernacular names or to identify the food-articles easily by persons residing in different language zones. The botanical name and the family of each food would help the student and teacher in finding quick reference in technical terms. Hence, great pains are taken to collect these names and the errors found in many text books are rectified.

Zodiac sign of food

In Sanskrit, *Astrology* is called '*Jyotisha*' (the science of time). It is the study of the movements and the influence of celestial bodies on the living and non-living bodies[28, 29].

The ancient Greeks, Mohammadans and Indians such as: *Hippocrates, Galen, Ibn-e-Betar, Aviceena, Umer Qhiyam, Varāhmihira, Bhaskara* etc., after intensive study, divided the entire cosmos into 12 equal divisions of 30° each. The broad band in the heavens extends 9° on either side of the sun's path (*Ecliptic*). This circle of light is known as *Bhachakra* or *Apamandala* in Sanskrit. In order to measure the 12 equal parts of the *Ecliptic* the ancient Indians the poineers of Astrology, established the first part as *Aries* starting at 0° and the entire cosmos having these 12 divisions is called as *Zodiac: Rasi:* (Sans.) *Burj:* (Arab.) Again, the Zodiac is subdivided into 27 parts each having 13.5° and each division is known as *constellation* or *Nakshatra*.[28, 29, 41]

The following table describes the passage of the sun, its extent and duration in each sign:

No.	Zodiac	Sanskrit	Arabic	Constitution	Extent	Period
1	*Aries*	Mesha	Hamal	Fiery	0°- 30°	22 Mar.-20 April
2	*Taurus*	Vrishabha	Saur	Earthy	30°- 60°	21 April-21 May
3	*Gemini*	Mithuna	Joza	Aiery	60°- 90°	22 May-21 June
4	*Cancer*	Kataka	Sartan	Watery	90°-120°	22 June-23 July
5	*Leo*	Simha	Asad	Fiery	120°-150°	24 July-23 Aug.
6	*Virgo*	Kanya	Sambula	Earthy	150°-180°	24 Aug.-23 Sep.
7	*Libra*	Thula	Mizan	Aiery	180°-210°	24 Sep.-23 Oct.
8	*Scorpio*	Vrischika	Aqrab	Fiery and Watery	210°-240°	24 Oct.-22 Nov.
9	*Sagittarius*	Dhanus	Qhous	Fiery	240°-270°	23 Nov.-22 Dec.
10	*Capricorn*	Makara	Jaddi	Earthy	270°-300°	23 Dec.-20 Jan.
11	*Aquarious*	Kumbha	Dalu	Earthy	300°-330°	21 Jan.-19 Feb.
12	*Pisces*	Meena	Hauoot	Watery	330°-360	20 Feb.-21 Mar.

According to the Indian sages and other astrologers it is believed that Sun and other planets* exert a greater influence on the living and non-living things. Particularly the cosmic influence is much more on the human beings. In astrology (the study of the influence of celestial bodies on man) a horoscope is prepared on the basis of the exact time of birth and the location of different Planets in the *Zodiac*. A well versed master in this science can predict by the help of horoscope about the development, health, progress, education and longevity of the child. The correctness of the predictions entirely depend on the exact time when the child touches the ground or the labour table after the completion of 2nd stage of labour. An error of a fraction of a minute can alter the prediction to a great extent[28-36].

Since astrology is considered as an occult science, the author after confirming the claims of many scholars like: Prof. B. V. Raman[28,29] and Dr Jagannath Rao,[31] M.B.B.S., M.A.A.S. of Bangalore, Dr D. V. Nadkarni,[31] M.S., F.R.C.S. (Eng.), F.I.C.S. (U.S.A.) of Dharwar etc., is hopeful that astrology can be very successfully employed in the prognosis and the prediction of diseases many years before one gets sick.

* *Sun:* Ravi (Sans)., Shams (Arab)
Moon: Chandra (Sans)., Qhamar (Arab)
Mars: Kuja (Sans)., Mirriq (Arab)
Mercury: Budha (Sans)., Atarad (Arab)
Venus: Sukra (Sans)., Mushtari (Arab)
Jupiter: Guru (Sans)., Zahara (Arab)
Saturn: Shani (Sans)., Zohal (Arab)
Dragon's Head: Rahu (Sans)., Zanāb (Arab)
Dragon's Tail: Kethu (Sans)., Ras (Arab)

The science of medical-astrology can be proved as an applied science if a fully qualified physician learns it from an experienced qualified medical-astrologer and does research in the art of our ancient heritage. Dr T. M. A. Pai, M.B., B.S. of Manipal has created a new faculty of Astrology in his institution to help the interested scholars to learn this science. If medical graduates who are interested in Astrology take a post-graduate course there, and can prove how useful is this in the practice of medicine.

It is found that even foods having different *Rasis* (Zodiac signs) have a great influence on the health and sickness of human beings. Therefore, after many years of research by author the zodiac of each food is mentioned to help the *interested reader* in this science. Persons having the following zodiacs get much benefited by eating the foods mentioned in brackets and they will not get any benefit by those that are mentioned in **bold letters.**

Aries (Leo, Libra). **Scorpio and Taurus.**
Taurus (Virgo). **Libra.**
Gemini (Sagittarius, Aquarious).
Cancer (Scorpio).
Virgo (Capricorn and Pisces). **Aries.**

For detail scientific study of *Medical Astrology* read 'Your Health and Stars' by author and DR. JOHN F. BROWN, M.D., F.A.C.P. (U.S.A.), F.R.A.S. (London), Missouri (U.S.A.) (*Under preparation*).

Constitution of food material

The constitution of a food means its effect in the healthy body (Pharmacodynamics). Every food or a drug produces certain perceptible and non-perceptible symptoms when the same is administerd in various concentrations. This *food* or *drug-effect* is described in terms of one's feelings in different intensity.

To mention a couple of examples, if a drug or food is consumed in a certain quantity and after its assimilation, one does not notice any effect or change in his body, is considered as *Moderate:* or Motidil (Pers.). On the other hand if it produces a slight effect of *heat*, or *cold* or *dryness* and the same passes off without leaving any feeling after 4 hours, is considered as the food having its constitution of either *hot, dry, cold,* or *wet* in *The first degree.* If the intensity of the effect is slightly more and remains in the body for more than 8 hours, and does not harm the body, is known to be having *2° constitution.* If the effect of the given substance produces a remarkable but tolerable effect that remains in the system for more than 18 hours but does not endanger one's life is considered as *3° constitution group.* Lastly, if the consumed substance produces intense effect immediately after half to one hour and endangers one's life is known as having *4° constitution.*

All foods and drugs, in their proper doses, produce an effect according to their constitutions between 1° and 3° having a combined effect such as: *cold and wet, cold and dry, hot and dry* and *hot and wet.* All poisons are in *4° constitution* with *hot* and *dry* effect.

The intensity of the effects of foods or drugs depends on one's own constitution having a normal health. According to *Tridosha* or *Iqhlath* theory of *Ayurveda* and *Unani* system of medicine, the normal health of a person depends on the proper combination and physiological functions of three humours: 1. *Vata* or *Sauda* (Wind); 2. *Pitta* or *Safra* (Bile); 3. *Kapha* or *Balgam* (Phlegm).

Many scholars of modern medicine redicule this theory because they derive a different meaning from these words considering their literary aspect. The real meaning of these terms is however totally different*.

This theory of the 'sage-physicians' of the hoary past is similar to our present biological study of the cell.

The micro-biology reveals that each cell of a living organism is an Universe itself. The cell energy is developed by the conversion of various food-components into *ATP* (Adenosinetriphosphate) and *ADP* (Adenosinediphosphate) etc.[40] As long as these energy giving chemicals are in a sound condition, the health of the cells continues. If there is any dishormony of these chemicals, infection and degenarative diseases are caused. [For details read author's book *Practice of Clinical Dietetics* (under print)]. For any human being, it is therefore, necessary to try to understand the various physiological, biological, and

* **Vata** means *will to be* i.e. the nervous system that governs the *consciousness* and controls ones *emotions* like: *sensitivity, impulsivity, congenitive mental activity* and stimulates *motive-power.*

Vata physically manifests in the form of *colourlessness, dryness, roughness, hollowness, lightness, motility, transparency, conductivity* and *permeability.* The physiological manifestations of *vata* are *cerebro-spinal, Bio-motor-factor, autonomous nervous motility* and *perception of pain.*

Pitta represents *will to assert.* It is the effort that governs the *catabolic functions,* accelerates the *energy* and produces *anger, jealousy* etc. Pitta manifests *heat, colour, brilliance, non-viscidity, liquidity* and *mobility* in its physical sphere. *Metabolic, digestive, heat-producing* and *catabolic-process, sympathetic nervous group, perception of heat* etc., as its physiological manifestations.

Kapha means *'will to pleasure':* It is the satisfaction that controls *anabolic functions.* It is the regulator of the resistance and the mass. The higher sphere of its action is *cool wisdom, effective mental activity, love, sympathy forbearance, endurance, desire for peace* and *rest.* The physical manifestations are: *coldness, whiteness, smoothness, viscidity, lubricity, immobility, thickness, heaviness.*

The physiological manifestations of Kapha govern the *parasympathetic nerves, regulate* the *cardiac rhythm, sexual-stimulation,* guide the perception of *heaviness* and *coolness.*[20, 23, 25, 35, 39]

pathological aspects of life and keep the cell-chemistry normal by eating and living sensibly to live healthy, strong and long.

The food value of each food described is taken from the authoritative sources and some of them are analysed at C.F.T.R.I.,Mysore[13, 14, 34, 37, 38]. The exact concentration of food-components however vary and depend on the types of soil, fertilizers and environment, therefore, approximate value of each food under discussion is mentioned. Also, the *digesting time* of each food varies in different persons having different constitutions.

The description of *Pharmacodynamic action, Physiopharmacology, daily requirement, absorption, excretion, clinical manifestations and therapeutics* of each food-component and food under description helps the busy practitioner to use more of them in various diseases in place of drugs and the author has recommended certain readily available selected patent preparations being based on the years of experience in general practice to help a fresh medical practitioner who can use them with confidence and safety in the treatment of curable diseases.

There are certain common impressions of food therapeutics based on unauthoritative falacies and descriptions. But these exaggerated claims of food therapy only add to the misconcepts in the field rather than help a layman live a better life. The author after several years of clinical research in Nutrition and Dietetics, has arrived at certain basic conclusions, and therefore, would confirm that *no food has any specific curative value in severely acute infections.* Hence, all infections and surgical emergencies should be treated with specific drugs by an experienced physician or a surgeon. However, *citrus fruit juices, honey, tender-coconut water* etc., when given liberally during the treatment not only help the quick absorption of the drugs but also eliminate them due to the diuretic action, strengthen the cells by the action of vitamin C etc., and cure the disease quickly without much weakening the sick person. Suitable energy-giving foods after the recovery, help one to continue to live healthy and prevent the relapse of the disease. (Please refer to the pharmacodynamic action of vitamin C, pp. 144-146).

In chronic degenerative diseases, a suitable diet plays a very important role in maintaining the health of an individual and forms the backbone of the successful treatment and prevention of such diseases in a healthy man.

The reader finds that there is a repetition of certain statements in the book which is deliberately done according to their importance.

In spite of all these useful considerations in this book, yet the author does not claim that this book is *Perfect*, because *Perfection is only to God, and never to anything that is created by human hand.* The author does realise that to write such a book, one must be an expert physician, surgeon, dietitian, biochemist, astrologer, physiologist, agriculturist, cook, teacher and literary artist. The author neither lays claim upon any of

these areas as a specialist but he humbly wishes to suggest that his experience in these areas may be of some use to others, nor, does he claim that all that is mentioned in this little book is his. The author has only selected the gems, pearls, diamonds, rubies, emeralds etc., from the various mines and has given a shape of an ornament according to his experience with one sincere desire to adore the reader live healthy and long. Sixteen years of ceaseless efforts in the preparation of this book could be considered to have been adequately rewarded only, if this work helps you to emerge triumphantly in the struggle of life. May you all be benefited and blessed.

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14-4-1969

REFERENCES

1. Ian Lenox-Smith, 'Nothing New', The Indian Practitioner Special number '*History of Medicine*', Vol. XVII, No. 1, pp. 57-60, (1964).
2. Kanwark, *Medicine in Ancient India*, J.I.P. Vol. XVII, No. 1, pp. 87-92. (1964).
3. Garrison, F. H., *History of Medicine*, Sander Co., (1929).
4. Dawson, Warren, R., *Magician and Leech*, A study in the Beginnings of Medicine with special reference to ancient Egypt, London, (1929).
5. Sigerist, Henry E., *History of Medicine*, Vol. 1, New York, (1961).
6. Sen, S., *March of Medicine through the ages*, J.I.M.P., pp. 145-161. No. 1, (1964).
7. Sudhoff's Archive on the *History of Medicine* (German), Vol. 42, p. 377, (1958).
8. Commentary on the Hindu System of Medicine, p. 379, Calcutta 1845 reprod. 1860, (London).
9. Neuberger, M., *History of Medicine*, Vol. 2, (1910-11), London.
10. Berriedale Keith, A., *A History of Sanskrit Literature*, pp. 505-540. Oxford University Press, Edinburgh, (1928).
11. Krishna, K. S., *Surgery in ancient India*, J.I.M.P., Vol. 1, pp. 73-75, (1964).
12. Charaka Samhita, 349 to 394, p. 557, Vol. 2, (1954).
13. Hutchison's *Food and The Principles of Dietetics*, Ed. 10, Vol. 7, (1948).
14. Wilson Eva *et al., Principles of Nutrition*, pp. 1-6, 3rd Ed. (1968).
15. Chakrabarty, C., *An Interpretation of Ancient Hindu Medicine*, Calcutta, (1929).
16. Zimmer, H. R., *Hindu Medicine*, John Hopkins Press Baltimore, U.S.A. (1948).
17. Mukhopadhyaya, G., *The Surgical Instruments of the Hindus*, Vol. 1, Calcutta University, (1913).
18. Kutumbiah, P., *Ancient Indian Medicine*, Orient Longmans, (1962).
19. Gulam Geelani, *Magzan ul advia*, Vol. 1, (1912), (Urdu), Lahore.

20. Hakeem Mohammad Najamul Gani, *Quazantal Advia.* Vol. 1, (Urdu) (1917), Lucknow.
21. Syeed Ahamed Afandi Al Rasheedi, *Umdat ul Muhtaj Fi Ilmil Advia,* (Arab), Egypt, (1880).
22. Mirza Ali Akbar Khan, *Pizshaki Nama* (Pers.), Tehran, (1860).
23. Hakeem Mohammad Azam Khan, *Moheeth-e-Azam,* Lahore, (1901).
24. Nadkarni, K. M., *Indian Materia Medica,* Vols. 1 and 2, (1954).
25. Hakeem Mohammad Hussain Aivan, *Kitab-ul Mufaradath,* (1950), Lahore.
26. Prof. Mathur, R. C., *Systematic Botany,* (1965).
27. *Astrological Signs in Medicine,* Medical Notes No. 2, pp. 7-9, Unichem Labs., Bombay, (1968).
28. Raman, B. V., *Astrology for Beginners,* 10th Edn. Raman Publications, Bangalore, (1955).
29. Raman, B. V., *A Manual of Hindu Astrology,* (1935).
30. Oak, P. N., *The Rationale of Astrology,* (1967), Delhi.
31. Jagannath Rao, *Principles and Practice of Medical Astrology,* Astro-Medical Research Publications, Raichur, (India), 1960.
32. Sufi Sajjad Hussain, *Muftah ul Nujoom* (Urdu), Kitabistan, Bombay 3, (1961).
33. Majeed, S. A., *Ilmul Nujoom,* (Urdu Mss.), (1928).
34. Antia, F. P., *Clinical Dietetics and Nutrition,* 1st Edn., Oxford Medical Publications, Bombay, (1967).
35. Baldev Sharma, *The Verdict of History,* Therapeutic Index Charak Pharmaceuticals, Ahamedabad, pp. 7-20, (1967).
36. Salhepuri Abdul Azeez, *Sirajul Nujum,* Pub., Malik Sirajuddine & Sons, Kashmiri Bazaar, Lahore, (1958).
37. Aykroyed,W. R. (Revised by Gopalan C.) *Health Bulletin* No. 23, Ministry of Health Govt., of India Publication 6th Edn. (1963), New Delhi, 1.
38. Swaminathan, M. and Bhagawan, R. K., *Our Food,* C.F.T.R.I., Mysore (1966).
39. Prof. Julius Jolly, 'Indian Medicine,' pp. 59, 33 German Translation. Publishers: C. G. Kashikar 196/27 Sadashiv Pett, Poona 2, (1951).
40. William, F. Gonong, Review of Medical Physiology, p. 35, (1963).
41. Asko Parpola, *et al.,* New light on Indus Civilisation, Deccan Herald, p. 1. May 29, 1969.
42. Holy Quran, S: XXI, 66, S: XXXVI, v. 34.

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PART I

NUTRITION

1. NUTRITION

Biochemistry of the Cell

'As you sit quietly reading these lines, a whirl of activity is taking place in your body,' says Ratcliff *et al.* This activity in the body is interlocked with the activities of the different cells. According to McElroy the Biochemistry of the cell reveals that each cell is an universe by itself which is composed of three principal parts namely: *Nucleus*, *Cytoplasm* and the *Outer membrane*. The nucleus governs the structure of the cell and aids in the production of similar cells. For example, the heart-cells make only heart-cells, the kidney-cells make only kidney-cells and so on. Cytoplasm is a jelly-like substance in which the nucleus floats; it controls the cellular growth, respiration and excretion of the waste products. Outer membrane covers the jelly; it absorbs certain chemicals in order to control cellular wear and tear, to reproduce, to grow and stay alive. It also acts as an excretory media to throw away the waste products. The energy-giving chemicals that are absorbed by the outer membrane become part of the cell, while others are broken down to provide the energy needed to synthesize new molecules. This process of cellular activity and the constant flow of the Life Force depends entirely on the regular supply of chemical nutrients which in general are called *Food.*

How is the Food Converted into Chemical En-

The process of conversion of food int- -ngs and it is very complicated process indeed. -ody is naturally fitted of living organisms. Since -es that are directly influenced *Food*, let us limit our-e form of *Hormones*, *Enzymes* etc.

Digesti- -ipal senses *Hunger* is also influenced by such

chemicals that are constantly looking after the living mechanism of the wonderful body of the man.

It is yet a mystery that how this complicated mechanism works and adjusts automatically. However, it is discovered that the sense of hunger is interlinked with the secretion of insulin which controls the optimum level of blood-sugar. It is noted that when ones blood-sugar begins to come down to it fasting level and stays there for more than three to five hours; a sensory message is sent to the brain. In response to this message the brain gives an order to the stomach to start contracting in successive waves. This rhythmic contraction of the stomach is felt as *Hunger*.

Hunger is one of the most painful sensations that makes the hungry subject to get something in the form of food. The living movements that you see all around you are only due to this wonderful urge. If it was not there, no living being would have struggled to survive.

Appetite: 'Appetite is the desire for food and it is combination, consisting chiefly the sensations of taste and smell' (Selmon). 'Appetite is one of the pleasures in life and I think one of the major duties should be to preserve it. Appetite is the keenness of living, it is one of the senses that tells, you are still curious to exist, and that you still have an edge on your longings and want to bite into the world and taste its multitudinous flavours and juices. By appetite, of course I don't mean just the lust for food, but any condition of unsatisfied desire, any burning in the blood that proves, that you hav'nt yet used up your life' (Laurie Lee). Such is the wonderful sensation of *Appetite*.

Under this influence of hunger and appetite, the living being tempts to eat various foods for which it is accustomed to. The food that we eat every day contains different types of foods like: wheat, ragi, jawar as the base. The other items like: and is chewed milk etc., are supplemented to form the vege- to it meat, eggs, fish, chicken, pork its and add various spices start eating our saliva and

this process of chewing plenty of saliva is poured over the food in the mouth and the teeth help it to grind into a paste. By the action of saliva some of the starches are converted into simple sugars and then food is swallowed. We continue to eat as long as the desire to eat persists. When once the stomach holds certain quantity of food this desire automatically goes off.

After this process of eating the food remains in the stomach from half an hour to several hours depending on the condition of the food. The coarser and fatty is the food, the longer is the stay in the stomach. Too much of spices also detain the food in the stomach. Here, the food is finely mixed by the churning process, along with the digestive enzymes and acids, mainly hydrochloric acid which softens the protein-fibres and makes the food germfree. After the food becomes fit to leave the stomach, it passes on into small intestine.

Small intestine is a muscular tube about twenty feet long which is coiled up and held in position by the help of a membrane in the abdominal cavity. It secrets various digestive enzymes to digest the mixture of the food that comes from stomach.

As soon as the food reaches the upper part of small intestine, certain digestive juices like: bile, and pancreatic juice are poured over it. The bile helps the digestion of fats and the pancreatic juice converts the semidigested starches into digestable sugars with the help of other enzymes. By the digestive action of these chemicals, enzymes etc., the food is converted into a clear fluid that begins to get absorbed and directly goes to liver.

In the liver, the liquid food is again processed; the proteins are split into amino acids, the predigested carbohydrates are converted into glycogen and fats are made into water soluble fatty acids by the action of certain hormones and enzymes that are secreted in the liver. (The digestion and absorption of individual food component is fully explained in the forthcoming pages.) The fully digested food gets converted into chemical energy and is distributed to the various kinds of cells to liberate heat, to protect their wear and tear, to promote growth and stay alive.

Large intestine receives the waste matter from the small intestine in semisolid state which decomposes due to excessive residue of protein-fibres and carbohydrates causing bad smelling gases. After the water is gradually reabsorbed the fecal matter

forms a solid stool which gets accumulated in the end of the large intestine. When this bag is full, one gets the urge to evacuate the stool. For smooth evacuation one must drink plenty of water and eat food rich in cellulose such as: leafy green vegetables, whole grain meal etc. The other waste products are eliminated through the kidneys in the form of urine and through the skin as perspiration. The lungs remove the unwanted gas in the from of carbon-dioxide.

Why should one eat a mixture of Foods?

The human body is mostly made up of four types of cells namely: *The Nerve Cells*, *The Bone Cells*, *The Epithelial Cells* and *The Connective Tissue Cells*. Each group of cells is made up of different types of chemicals and it must be supplied with the same kind of chemicals for its sound physiological daily functions. For this purpose The Maker of this mysterious body has provided all these necessary chemicals in various proportions in almost all the foods that one commonly eats. Take for example, the nerve cells require phosphorus, magnesium, vitamin B_1 etc., the bone cells need calcium, phosphorus, vitamin C etc., the epithelial and connective tissue cells function only in the proper combination of proteins, vitamin A etc., and so on. There are other enzymes, chemicals, hormones etc., which the body automatically makes with the help of different organs that are wisely employed for the conversion of food-energy into chemical-energy and its distribution to all types of the cells. Therefore, one should eat a mixture of foods in proper proportion.

The process of digestion of the food-components like: *Carbohydrates*, *Proteins*, *Fats*, *Minerals*, *Vitamins*, *etc.*, and their absorption, assimilation, the conversion of *Food-Energy* into *Chemical-Energy* and the excretion of the waste products that are formed during all these processes is called *Metabolism*.

The process of distribution of the Chemical-Energy to all the worn out cells to prevent their wear and tear, to promote their growth, to help them to stay alive and the retention of extra energy in the body for the emergency use is called *Anabolism*.

The destructive metabolism is known as *Ketabolism*. In a healthy body, the rates of constructive and destructive processes are delicately balanced. It may be pointed out, however, that

in a young organism Anabolism over steps Ketabolism resulting in growth and the reverse occurs in an old organism, eventually leading to its death. (Prof. K. N. Rao).

What happens if there is no Regular Supply of Food in Sound Proportion?

If there is an inadequate supply of food rich in proteins, minerals and vitamins, the cellular disintegration takes place rapidly or gradually depending on the acute shortage of food. Starvation and Malnutrition are examples.

Starvation: It is a sense of severe hunger which occurs due to acute shortage of food during famine or due to any obstruction in the passage of food. During this foodless condition of the body, the cells try to utilize the stored energy in the form of fat. But the internal supply of the energy does not stop the feelings of hunger and one gradually begins to become weaker and weaker. In the absence of water and food; the condition becomes grave and the person becomes exhausted and finally the cellular function stops ending in death.

Malnutrition: It is a condition in which the body fails to receive adequate nutrition either due to poor supply of proteins, minerals, vitamins etc., or the improper absorption of these food-components due to defective condition of the gastro-intestinal tract etc., even though there is an adequate supply of nutrition.

In this condition, the cellular wear and tear is gradual and due to improper supply of the nutrients they begin to become weak and a gradual malnutrition of the cells results. It is discovered that all the disease causing germs grow and flourish well on the weak starving cells and during this process of bacterial growth their harmful toxins are released in the body causing infection. Constant toxaemia of the body-cells excite their disintegration and finally they cease to work with the same result of severe starvation. Therefore, *Malnutrition* is considered as the base for all the infectious diseases which cause the high mortality rate in the under fed nations.

Sir Robert McCarrison says, 'I emphasize these minor manifestations of malnutrition because they represent the beginnings of disease, and their recognition is, to my way of thinking, vastly more important than that of the wreckages of health which even

the man in the street can see, though his name for them may be less sonorous than our own.

'Next in importance to the *physical inefficiency* and the *minor manifestations of ill-health* induced by faulty food come those gross states of morbidity that are due to some specific food fault; the list of these increases year by year. I shall do not more than mention them, leaving you to link each to its own food fault. They are: keratomalacia, night blindness, dental caries, polyneuritis, beriberi, pellagra, scurvy, rickets, osteoporosis or slow healing of fractures, sterility, stone in the bladder, anaemias, some types of goitre, alimentary dystrophy, gastric atony and dilation, diarrhoea, constipation, intestinal stasis, colitis, unhealthy skin, disordered action of adrenal glands, and vesical irritability.

'The list of infection diseases, to which animals and man are rendered highly susceptible by faulty food, is comprehensive enough including as it does, respiratory disease, gastro-intestinal disease, heart disease, throat disease, kidney disease, and skin disease, and infections by such diverse organisms as protozoa, bacilli and invisible viruses. There is good reason, therefore, for the assumption that such death-dealing diseases as tuberculosis, leprosy, cholera, dysentery, plague, and malaria have aften in this country a malnutritional element in their genesis and course. Yet in attempting to combat them, or to ascertain the conditions favourable to their spread, how aften do we remember the prime rule of medicine that "the wrong kind of food is the most important single factor in the promotion of disease"?'

REFERENCES

1. Ratcliff, J. D., *et al.*, *Reader's Digest Human Body*, p. 30. 1st Edn. (1964).
2. McElroy, William, D., *Cellular Physiology and Biochemistry*, (1963). Pentice Hall, New Delhi.
3. Rao, K. N., *Pre-University Botany*, S. Viswanath Publishing Acton Lodge, Madras, (1957).
4. Sir McCarrison, R., *A Guide to Better Living*, pp. 17-18. Oriental Watchman Publications, Poona 1, India.

2. CALORIES

What is a Calorie?

In the previous pages it has been defined that in a living being energy in the form of heat is liberated by eating certain foods rich in carbohydrates, proteins, fats etc. This heat is measured in *Calories*.

A calorie is an unit of heat required to elevate the temperature of a litre of water from 15-16°C. (F. P. Antia), or the heat necessary to raise one lb., of water one degree F.

Daily requirement of Calories

The daily requirement of calories in man depends on age, sex, occupation and the climate.

Age:

New-born infants require	... 110–120 Cal/day
Children between 12-15 years (boys)	... 3,100–3,200 Cal/day
Children between 12-15 years (girls)	... 2,500–2,600 Cal/day

Occupation:

Labourers and pregnant women	... 3,000 Cal/day
Sedentry, diabetic and obese persons	... 2,000–2,500 Cal/day

Climate:

Hot climate require	... 10 per cent less Cal/day
Cold climate require	... 3 per cent more Cal/day

(Clinical Dietetics and Nutrition, pp. 3-6 by F. P. Antia).

3. CARBOHYDRATES

The common sources of carbohydrates are starchy foods like: rice, wheat, jawar, ragi, cane-sugar, honey, potatoes etc. They are the cheapest foods and the principal sources of energy in the ordinary human diet. Since the staple food of man is carbohydrates, its deficiency seldom occurs except during famine and acute food shortage.

Chemistry of Carbohydrates

Carbohydrates are made up of atoms of *Carbon*, *Hydrogen* and *Oxygen* and they are divided into three major groups according to the number of atoms of each element in each group. The major Saccharide Group is sub-divided into: *Monosaccharides*, *Polysaccharides*, and *Disaccharides*.

MONOSACCHARIDES: ($C_6H_{12}O_6$)

Monosaccharides contain one group of Saccharide and they are the most highly soluble sugars like: Glucose, Fructose, Galactose, Honey etc. These sugars readily absorb in the circulation without undergoing any further digestion. They supply heat and energy to body and they are the ideal sources of carbohydrates during sickness and convalescence and during growth and pregnancy.

DISACCHARIDES: ($C_{12}H_{22}O_{11}$)

In this group there are two saccharide groups per molecule. These carbohydrates must be converted into corresponding monosaccharides by the action of various enzymes before they are absorbed in the circulation. Cane-sugar, Lactose, Maltose are the examples of disaccharides.

POLYSACCHARIDES: ($C_6H_{10}O_5$)

These carbohydrates contain many molecules of monosaccharides. All starchy foods, cellulose etc., come under this group. Their digestion and absorption is more complicated

because, they must be converted into monosaccharides before they are absorbed in the circulation.

Daily Requirement of Carbohydrates

About 445 g. of mixed carbohydrates along with sufficient quantity of proteins, minerals, fats, vitamins etc., are daily required for the correct metabolism of the food.

Low Carbohydrate Foods

3 per cent carbohydrate foods: Asperagus, Bean-sprouts, (Mung), Beet greens, Cabbage, Celery, Cucumber, Endive, Lettuce, Mustard greens, Radishes, Spinach, Squash, Tomatoes, Turnip tops, Tinda, Tori, Karela, Water-cresses, and Water-melon.

6 per cent carbohydrate foods: Brinjal, Carrots, Leeks, Lady's-finger, Parsley, Peppers, red and green, Pumpkins, Soyabeans, green, Turnips, Blackberries, Gooseberries, Peaches, Plums and Strawberries.

9 per cent carbohydrate foods: Beets, Carrots, Onions, Peas, Apricots, Cherries, Currants, Grape fruit, Limes and Lemons, Oranges, Peaches, Pears and Raspberries. (Heart News, Aug. 1965.) (Note: *These foods should be taken freely in the boiled form and should not be fried.*)

Digestion and Absorption of Carbohydrates

The digestion of carbohydrates begins in the mouth by the enzymatic action of saliva. Ptyalin or the salivary maltose converts all starches into dextrose and maltose and the chemical change takes place between a pH of 4 and 9.

Then the food enters by a process of swallowing and stays in the stomach even though the digestion of carbohydrates is not much in it. The true digestion of the carbohydrates takes place in the small intestine by the combined enzymatic action of pancreatic juice which contains *amylase, trypsin, amylopsin, insulin, glucagon* etc. These enzymes convert the semidigested carbohydrates into Maltose which is again converted into glucose, fructose, galactose etc., by the digestive action of *invertase, erepsin, entrokinase* etc. These digestive enzymes are secreted

by small intestine and the whole process takes place in their mucosal cells (Miller, *et al.*).

After the conversion of carbohydrates into monosaccharides, they are carried away to the liver by the portal blood and they are stored in the liver as Glycogen. The conversion of glycogen in the liver takes place by the action of various enzymatic processes. Since our body is at constant work, the glycogen stores never remain stable and they are regularly called upon to supply glucose to the body. Formation of glycogen from glucose and conversion of glucose from glycogen are reversable chemical reactions which are constantly active in the body all round the clock to regulate the available glucose and the body's requirements of the same at various hours of the day.

RAGHUNATH explains that the formation of glucose-6-phosphate is catalysed by hexokinase. Phosphate is supplied in the reaction by adenosine-triphosphate. Phosphoglucomutase helps the conversion of glucose-6-phosphate into glucose-1-phosphate. Finally the enzyme phosphorylase removes phosphate and glycogen is synthesized by the reversable actions.

Break-down of glycogen proceeds through successive steps ending in carbon-dioxide and moisture. The degradation of glucose up to the stage of pyruvic acid can occur anaerobically but, adequate supply of oxygen is necessary for the subsequent oxidation. Lactic acid formed from pyruvic acid under unsuitable conditions may be oxidised back to pyruvic acid if conditions become favourable or carried to the liver and converted into *Glycogen.*

The whole process of conversion of glucose into glycogen is controlled by insulin, which counteracts the inhibiting effect of the anterior pituitary hormone and corticosteroids on hexokinase activity in the phosphorylation of glucose to glucose-6-phosphate. Other factors like, vitamin B-complex, B_{12}, iron, potassium-phosphate, sodium-phosphate and certain hormones of endocrine glands play a major role in the absorption of carbohydrates and the constant maintenance of blood-sugar ranging between 80-120 mg./100 ml. of blood when one is fasting, and between 120-180 mg./100 ml. of blood (non-fasting).

If there is any defect in the metabolism of carbohydrates as found in Diabetes-mellitus, the blood-sugar remains above fasting level when one is fasting and rises above 180 mg., after

the meal. Kidneys which have the power to withhold sugar under normal conditions begin to excrete it if the blood-sugar goes above 180 mg./100 ml. causing excessive urination resulting in excessive thirst the genuine symptom of diabetes.

In such defective condition of carbohydrate metabolism, one should be very careful about the diet rich in starches, sweets etc., and the daily consumption of carbohydrates should never exceed more than 150 g. a day. Regular administration of Insulin under the guidance of a physician is a worth life saving way. Excessive use of fats and carbohydrates tends to increase the blood-sugar and produces dangerous chemicals in the body which act on the brain and cause Diabetic-coma a very serious condition indeed.

Bad effects of Excessive use of Carbohydrates

Excessive consumption of carbohydrates causes obesity, dilation of stomach, diabetes, cardio-vascular derangements, hardening of the liver and shortens one's life. On the other way when carbohydrates are consumed along with sufficient quantity of proteins, minerals, vitamins etc., in the normal limits they are useful for proper digestion of proteins, give energy and strength to the body, etc., (F. P. Antia).

REFERENCES

1. Dahlquist, A., *et al.: Biochemic Jour.*, 81, 411, (1961).
2. Bose, J. P., *Hand Book of Diabetes Mellitus*, p. 29, (1949).
3. Bouchaert and De Duye, *Physiol Review*, 27: 38-71, (1947).
4. Hallas-Moller, K. K. *et al.: Ugeskr. Leag.*, 133, 1761, (1951).
5. Jersid, *et al.: Leyden, July*, (1952).
6. Murray, *et al.: B.M.J.*, 1923, (1953).
7. Lachnit, V. and Ferstl, A.: *Wien. Med. Wscher.*, 103, 292, (1953).
8. Gerritzen, F., *Brit. Med. J.*, ii: 1030, (1953).
9. Gurling, J. K., *et al.: B.M.J.*, i, 71, (1953).
10. William, D. McElroy: *Cellular Physiology and Biochemistry*, pp. 6-7, (1963).
11. Miller, *et al., Biochemic, Biophys, Acta*, 52, 281.
12. Raghunath, M. V., *Insulins in Diabetes*, pp. 11-14, DUMEX (India) 1958.

4. PROTEINS

Watch your newly born baby the treasure of your affection and see how gradually he grows from his tiny body into a beautiful figure. You will surprise how from his helplessness he begins to roll, then how he tries to sit and crawl. After some days you see him tottering behind you and by this act you feel immense happiness. As years pass, your joy finds no bounds when you see the same little helpless body has taken a gigantic shape having the same resemblance of his blessed parents. All this wonderful phenomenon about which you are wondering is due to the magic of certain chemicals which the body cells use for their growth, wear and tear. These nutrients the base of the entire structure of the cells are called *Proteins.*

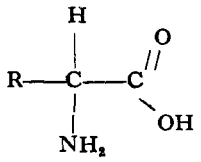
The word protein is derived from the Greek word 'Protos' i.e., First. It is aptly named to these chemicals because, the beginning of the life depends entirely on the sound protoplasm which is composed of proteins.

Chemistry of Proteins

Proteins are simple mixtures of complex chemicals of high molecular weight and contain extra molecule of NITROGEN in addition to Carbon, Hydrogen and Oxygen.

In nature the process of the synthesis of proteins is really wonderful. The plants with the help of soil nitrogen and sulphur synthesize these chemicals. The atmospheric carbon-dioxide, supplies Oxygen and Carbon, the water also supplies Oxygen with Hydrogen. Certain symbiotic bacteria and fungi exert a major role in the conversion of these elements into proteins and help the plants in the process of protein synthesis, and their conversion into *amino acids.* It is strange that animals cannot synthesize these chemicals in their bodies, but they eat the plants which have a ready-made store of amino acids and utilize them for their own growth and store them in their meat, milk etc. It is therefore, 'the primary source of all foods containing protein, including

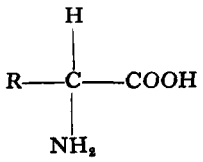
meat and fish is the vegetable kingdom' (Antia, F. P.). The formula of proteins is:



A-Class Proteins

Amino Acids

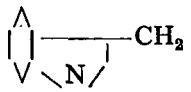
Amino acids are mixtures of proteins having undergone the process of break-down by the action of water (hydrolysis) and contain Nitrogen molecule in them. Their chemical formula is:



The NH_2 group is called as *amine group*, while the COOH is called the *acid or carboxyl group*. The *R group* can vary considerably and there are about 25 amino acids. These are called *essential amino acids* because, they cannot be synthesized in body and therefore, are very much essential for the proper functioning of the cells. Hence they are indispensable in the diet (McElroy).

Essential Amino Acids

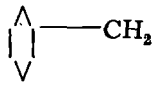
1. Threonine (CH_3CHOH): It is useful in the body along with other amino acids. Its daily requirement is 0.5-1 g.



2. L-Tryptophan: It is a very useful amino acid in the synthesis of niacin in the body. In certain abnormal cases of intestinal defects its absorption in the system fails causing

photosensitiveness with excessive scaling of the skin on exposure to sun. According to ANTIA, a congenital deffect in the absorption of tryptophan from the bowel causes Hartnup's disease. 0.25-0.50 g. of tryptophan is daily required.

3. LYSINE (NH_2—$(CH_2)_3$—CH_2—): This important amino acid controls the growth factor in the body and increases the feeling of hunger. It is therefore indispensable for children who are slow to grow and complain of lack of appetite. About 0.80 to 1.60 g. of lysine in the form of milk is very much essential for the daily needs of the body.



4. PHENYLALANINE: This amino acid is indispensable for the synthesis of adrenaline thyroxine and malanin. Its defective metabolism in the body causes a kind of congenital mental defect in the children due to failure of the formation of tyrosine from this amino acid. Its daily requirement is about 1.10 to 2.20 g.

5. METHIONINE (CH_3—S—CH_2CH_2—): Of all the amino acids this is a key substance for the health of the liver and protects it from fatty degeneration. It forms cystine which prevents the necrosis of the liver cells. It is rich in casein, but poor in cereals and pulses.

6. CYSTINE: It protects the liver cells from hepato-toxic drugs and is abundantly found in hair, nail etc.

7. HISTIDINE: The usual growth and repair of the tissues is controlled by this amino acid.

B-Class Proteins

These proteins have a minimum biological value and they are only useful in the adults to promote wear and tear and they are inferior to A-class proteins of animal origin in respect of tissue building qualities, due to absence of Vitamin B_{12} and essential amino acids. Pulses, cereals and green leafy vegetables are the common sources of this class of proteins.

C-Class Proteins

These have no biological value and they are inferior to both the above classes. Gelatine is the example of C-Class proteins.

Foods Rich in A-Class Proteins

Animal foods	*Quantity*	*Grammes of Protein*
Curds	1 Quart	40
Whole milk	1 Quart	34
Bone soup	4 Oz.	30
Dried skimmed milk	½ cup	22
Steak	4 Oz.	26
Chicken	4 Oz.	22
Cheese	½ cup	22
Beef	3 Oz.	20
Egg	One	6
Vegetable foods		
Soya beans (dried)	½ cup	37
Peas	½ cup	28
Fenugreek leaves	4 Oz.	15
Almonds	2 Oz.	12
Groundnuts	1 Oz.	7.6
Drumstick leaves	4 Oz.	6.7

Some Indian Food preparations Rich in Proteins

Stuffed wheat bread Bread with minced meat	1.88 g.	30.5
Ragi ball	336 g.	18.5
Jawar ball	427 g.	15
Maize bread	142 g.	12
Cooked unpolished rice	504 g.	12

Daily Requirement of Proteins

The daily requirement of protein differs in various countries, but according to League of National Research Council of U.S.A. and The Indian Council of Medical Research about 55 to 110 grammes of both A and B-class proteins along with normal supply of carbohydrates are essential for the upkeep of good health. Persons who work hard and women during pregnancy and lactation need more proteins than other sedentry persons. (Men and women 55-45. Pregnant and lactating women 100-110.) (Clinical Dietetics, F. P. Antia, p. 21).

Digestion and Absorption of Proteins

The digestion of all the proteins takes place in the stomach by the combined action of hydrochloric acid and pepsin and the

proteins are converted into *Synotinin.* Then peptones act on synotinin and convert it into *Proteose.*

In the duodenum, the semi-digested proteins in the form of proteose undergo a process of hydrolysis and are converted into simple polypeptides by the action of *Trypsin* and *Chymotrypsin.*

In the small intestine, these polypeptides are again converted into Peptidases and finally form into *Amino acids.*

Absorption of amino acids takes place by an active transfer process mainly from the upper part of small intestine. They are taken to liver along with digested carbohydrates via portal vein.

Amino acids are converted into creatine and purine bodies. Creatine is used in the muscle contraction and after metabolism it is excreted along with urine. Purine bodies are used in the synthesis of nucleo-proteins and for muscle contraction. The nucleo-proteins are converted into uric acid and are excreted in the urine as creatinine after they are oxidized in the liver with the help of hypoxanthine. The formation of urea, sulphates and phosphates is also linked with the oxidization of these amino acids. This process is called *Endogenous Protein Metabolism.*

In the absence of sufficient quantity of carbohydrates, amino acids are activated by liver and change into glycogen which is used as body fuel. After oxidization of proteins acetone bodies, urea, carbon-dioxide, water, sulphuric acid and phosphoric acid are formed and excreted. This process is called *Exogenous Protein Metabolism.*

Amino acids after their metabolism, reach the tissues to take the charge of protoplasmic proteins.

The excess of unabsorbed proteins enter the large intestine and they are decomposed by the bacteria. In certain diseases when there is defective absorption of amino acids particularly of tryptophane which spilts into indole due to protein putrification. The other substances that are formed due to bacterial putrification of the proteins like, ammonia, phenols etc., are absorbed along with the toxic chemical indole and cause neurological disturbances leading to coma (A. M. Asatoor). It is therefore, excessive use of pure proteins is contra indicated in certain diseases like: Gout, Hartnup's disease etc., in which uric acid excretion and absorption of proteins is impared. (HUTCHISON).

Foods rich in Purine Bodies

Beef, Becon, Chicken, Cod-fish, Crab, Ham, Heart, Liver, Mutton, Coffee, Chocolate, Cocoa, Tea, Wines, etc.

Foods free from Purine Bodies

Honey, Fruits, Butter, Cheese, Sugar, Jam, etc.

(Hutchison's *Principles of Dietetics*, pp. 612-613, 10th Edn.)

Nitrogen Balance in the Body

In the body normally, Nitrogen output is equal to input of Nitrogen in the form of proteins. This is known as *Positive Nitrogen Balance.* In certain conditions like, starvation, infections, injuries etc., the nitrogen excretion increases than the intake of nitrogen. This condition is called *Negative Nitrogen Balance.*

How is Protein Deficiency Caused?

If our body is in state of Negative Nitrogen Balance caused by the factors already explained and the blood-protein level falls below 12 per cent; deficiency of proteins occurs.

Protein deficiency is common in children than in adults and normally require 2.5 g./kg. of body weight. In under-developed countries lack of sufficient supply of milk and other A-class proteins, improper cleanliness and hygiene in their feeding leads to repeated attacks of gastro-intestinal and respiratory infections and play a major role in causing protein deficiency in them which we technically call *Kwashiorkor Disease.*

According to W.H.O. reports, protein deficiency is one of the major problems which causes Kwashiorkor disease and 30 to 60 per cent of the infants and children suffer from it in all the under-developed countries.

The name Kwashiorkor means 'the deposed child' that means, a child who has been deposed from the breast by the next succeeding sibling. The deposed child is then generally put on the diet rich in starches but deficient in good quality proteins and consequently the syndrome Kwashiorkor gradually develops. The clinical picture of this condition varies from region to region in

the world according to the prevailing pattern of staple diet, environmental stresses like infections, co-existence of other nutritional deficiencies etc. Nevertheless, there is a basic clinical picture which is unmistakable. It can be briefly described as under:

At some months after weaning, there is retardation of growth and development with loss of weight. There may be vague symptoms like indifference, gloominess, fatigue, lassitude etc. Pathological changes in colour, appearance and texture of the skin, hair and mucosa manifest themselves. They become listless, dry and wrinkled. The child looks like an old man with swelling on the feet, lacks interest in his daily routine. He does not like to play, does not like to eat and if he is forced to eat, he vomits all the food and suffers from diarrhoea due to indigestion. On clinical examinations and investigations one finds, fatty infilteration of the liver with marked dystrophy, there will be intestinal and pancreatic atrophy, deficiency of many digestive enzymes and poor absorption of albumin, nitrogen, potassium and magnesium. In severe cases, there will be marked cardiac failure and great chances to fall prey to infections which eventually end in death.

There is another condition which obscures the picture of Kwashiorkor in children is *Marasmus*, which is caused by simply under feeding. It is more after due to variety of other causes like congenital syphilis, Chronic infection of any type, chronic diarrhoea, mental defect, coelic disease, parasitic infection or even prolonged hospitalisation.

In marasmus, the child looses his weight and appears very small and puny for his age. The eyes are deeply sunkun in their sockets, the face is wrinkled as if it looks like a baby monkey, the distension in the abdomen makes it to look like pot-belly. This condition usually co-exists with Kwashiorkor and all factors that govern such conditions is poverty and ignorance of food science. (R. W. B. Ellis, 'Diseases in Infancy and Childhood', 1925, p. 251. Alembic news, No. 14.)

These deficiency diseases take a very heavy toll of death due to secondary infections in infancy and childhood. According to a report of Committee on Nutrition and infection, Geneva, 1965, 'The main reason why children of the poor die in conditions under which others survive the interaction of malnutrition and infection. It has been found that the death rate from measles is

100 to 200 times greater in poor countries than in well nourished communities. Equally significant is the fact that the symptoms of kwashiorkor are commonly brought on by acute infection and keratomalacia.

It has been suggested that the micro-organisms which ordinarily do not cause disease may become pathogenic if nutritional status is low'.

How to Prevent and Cure Protein Deficiency

Considering the cost of the animal protein-foods which is higher than any other source, it is suggested that supplementation of natural vegetable and milk-proteins are equally effective though not superior to animal-proteins. For this purpose, valuable proteins, can be extracted from the discarded leaves of pumpkin, sugar-cane, banana, drumstick etc. Any one of the leaves or a mixture of more than two varieties are finely ground into a paste and strained through a cloth. To this green nectar add some lemon juice or tamarind pulp and heat it on water-bath to coagulate the natural proteins. Filter it again and drink it as it is or with sugar or use it to mix with wheat flour while baking the bread. Skimmed milk powder is also a cheap substitute for animal proteins. For convenience sake C.F.T.R.I. has formulated a cheap Multi-Purpose-Food having the following formula:

Protein	41.9 g.	Vitamin A	3000 I.U.
Fat	8.6 g.	Vitamin B_1	1.3 mg.
Carbohydrates	35.8 g.	Vitamin B_2	3 mg.
Calcium	665 mg.	Niacin	14 mg.
Phosphorus	820 mg.	Vitamin D	300 I.U.
Iron	5.1 mg.	Calories	387 per 100 g. of M.P.F.

This product is supplied in both seasoned and unseasoned varieties in packings of 10 and 30 lb., at the rate of 75 p. per lb. I recommend this cheap food for every growing child, during pregnancy and lactation and also as a routine diet in daily meal; as a best and cheap compact food for all ages. For details write to manager, C.F.T.R.I., Mysore City, India.

The value of protein, in both sickness and health, is too well recognised and this requirement is constantly supplied by means

of food in normal circumstances. But when some abnormal condition in the body such as: high fevers, burns, ulcerative wounds, low protein deficiency syndrome, gastro-intestinal disorders, increased physiological demands etc., which set a Negative Nitrogen Balance in the body; administration of pure proteins will not help to the best extent. For this purpose, predigested proteins of high biological value supplemented with other minerals and vitamins in the form of *Protinules-Alembic.*, *Provitx-T.C.F.*, *Protinex-Dumex*, *Hepovite-Evans* etc., given according to the makers' instructions is highly appreciated. Recently certain anabolics like: Dianabol-Ciba. Adroyed-Parke-Davis etc., given 1-5 mg., t.d.s. along with predigested proteins helps the quick change over from N.N.B. to P.N.B. and retains the ingested proteins in the body.

During all protein deficiency indications, regular use of Biochemic *Kali-phos.*, *Kali-mur.*, *Calc-phos* and *Natrum-phos in* 6 x, potencies 5 grs. of each in successive alterations is recommended. These medicines when given along with predigested proteins, not only help their proper absorption but also rectify the disturbed molecular functions of the mineral constituents of the blood during such deficiency state. The (Dr D. M. Foubister, B.Sc., M.B., D.C.H., F.F.Hom. Dean: R.L.H. Hospital London).

Contra-indications of Proteins

Proteins in any form are contra-indicated in certain diseases of liver like: viral hepatitis, severe cirrhosis of the liver and kidney failure leading to uraemia and nephritis etc. However, the hypothesis that reduction of body urea may be achieved by provision of minimal amounts of essential L-amino-acids, adequate calories and a low protein diet was tested and confirmed in seven studies of 6 patients with chronic renal failure. With equivalent dietary nitrogen intakes, nitrogen equilibrium was attained while body urea nitrogen decreased in average 1.1 mg. per day with essential L-amino acid supplementation. An average decrease of only 0.3 gm. per day was observed without this addition to the diet. Essential amino acid supplementation reduced the nitrogen requirement for equilibrium in these uraemic patients. In 2 patients regression of azotemia and negative overall nitrogen

balance were accompanied by increase in lean body mass represented by increase of total body water and total exchangeable potassium. (UNICHEM medical notes, 2, 1967, April-June).

Clinical Indications of Proteins

1. *Gastro-intestinal Disorders:* In various gastro-intestinal disorders like: severe vomiting, diarrhoea, restriction of food due to gastric pain, typhoid fever, ulcerative colitis, dysentery, intestinal tuberculosis, mal-absorption syndrome, lack of appetite, malignancy or surgery of the gastro-intestinal tract etc., is always associated with great chances of infections. During all these conditions, the patient is in a state of Negative Nitrogen Balance. Hence, all such patients should be regularly supplemented with predigested proteins along with the curative treatment.

2. *Burns:* LEVENSON and EVANS, have shown that burn patients develop a state of negative nitrogen balance through urine and exudation and due to this condition severe depelation of proteins takes place. It is therefore, a routine to administer digestable proteins to counteract the shock and to heal up the tissue-injuries (LEVENSON, S. M.).

3. *Pre- and Post-Operative Conditions:* ELMAN, RADVIN and GIMBEL, CHASSIN, UDUPA and other researchers have demonstrated the importance of proteins during pre-operative preparations of the patients who are expecting a major surgical operation or those who have been already operated upon. In all such conditions the doctors found the regular administration of predigested proteins or a high protein diet is very useful to raise the vitality and endurance of the patient and thus to increase his chances of recovery, to hasten the wound healing, to lessen the risks and complications of surgery and reduce the post-operative shock, general debility and prolonged convalescence [ELMAN, R., 'Parenteral Alimentation in Surgery' (1947)].

4. *Wound Healing and Bed-sores:* RADVIN and ZINTEL have pointed out that proteins are very much essential for the normal wound healing processes and in the prevention of bed-sores. Proteins are also useful for non-healing sinuses, bed-sores, and chronic ulcers.

5. *Pregnancy and Lactation:* It is proved beyond any doubt that during pregnancy and lactation, more proteins are necessary

for the proper growth of foetus, for the proper absorption of Iron and Calcium and for the prevention of pregnancy-toxaemia etc. Deficiency of breast milk, failure to gain strength after child-birth, mental stress etc., are some of the common manifestations of protein deficiency. RUSSEL has shown the great importance of maintaining proper nutrition in pregnancy.

6. *Liver Diseases and Toxins:* Clinically it is observed that diet poor in proteins, B-complex vitamins can produce liver diseases and stimulate liver toxins. RABBI, proved that the fatty change can be related to protein and especially Choline deficiency, to and effect an alcohol in increasing fatty acid synthesis in the liver and to stimulate fat mobilisation from depots.

7. *Regular administration of proteins* is also highly appreciated by various clinicians during the convalescing period of all diseases, to increase the body resistance by quick anti-body formation, in haemorrhages, low blood pressure, toxaemic shock, increased body metabolism, general edema, impotency, sterility etc., (Applications of Protein Therapy, Alembics, 1967).

REFERENCES

1. Widdowson, E. H., MacCance, R. A. and Spray, C. M., *Clinical Science*, 10, 113, (1951).
2. Hutchison's *Food and Principles of Dietetics*, pp. 65-99. 10th Edn. (1948).
3. Jordan Lloyd and Agnes Mare, *Chemistry of Proteins*, 2nd Edn. Churchil, (1941).
4. Sherman, *Chemistry of Food and Nutrition*, Macmillan & Co., New York, (1938).
5. Ellis, R. W. B., *Diseases of Infancy and Childhood*, p. 25, Alembic News No. 14.
6. Foubister, D. M., *Clinical Lectures for Post-graduates at R.L.H. Hospital*, London, (1953-1956).
7. Unichem medical notes, 2. 1967, April-June.
8. Levenson, S. M., and Evans, E. L., *Nutritional Rev.*, 9, 257, (1951).
9. Radvin, I. S., and Gimbel, N. S., *J.A.M.A.*, 144, 979, (1950).
10. Chassin, J. L., *Surg. Gynec. and Obst.*, 91, 313, (1950).
11. Uddupa, K. N., *Ind. J. Med. Sci.*, 6, 456, (1952).
12. Radvin, I. S. and Zintel, H. A., *Christopher's Text Book of Surgery* (1945).
13. Russel, C. S., *Practitioner*, 175, 25, 1955.
14. Rabbi, A., *Minerva Med.*, 45, 371, (1954), 49, 77-82, (1958).
15. Alembics, *Applications of Protein Therapy*, (1967).
16. Antia, F. P., *Clinical Dietetics and Nutrition*, pp. 6-29, Oxford Pub. 1st Edn., (1966).

17. International Symposium on Proteins, *C.F.T.R.I.*, June-July, (1967), Mysore.
18. Pire, N. W., *Leaf Proteins as Human Food*, Lancet, ii, 961.
19. Rose, W. C., Oesterlinge, M. M. J. and Womack, M., *J. Biol. Chem.* 176, 753, (1948).
20. Radhakrishna Rao, M. V., Govt. Central Press, p. 19.
21. Phansalkar, S. V., and Patwardhan, N. V., *I. J. Med. R.E.S.*, 44, 1, (1956).
22. Astroor, A. M., Craske, J., London, D.R.
23. Milne, M. D., Lancet, i, 126 (1963).
24. Hakeem Abdulla, Lahmi Giza aur Seheth, (Flesh-food and Health). Urdu, MSS.

5. FATS

Fats

Like carbohydrates fats are also fuel-foods which are essential for the release of energy and supply about 9 calories per gramme. Fats are indispensable for manuel labourers and lean persons. For such persons, fat-rich foods, supply more calories and deposit fatty layers to guard their health. They help to absorb Fat-soluble vitamins like; A, D, E and K, impart flavour to the food and give a feeling of satisfaction after the fatty meal due to their long stay in the stomach. Moderately excess of fat in the body protects the adverse effects of starvation and hypermetabolism during acute infectious fevers. It also protects from cold effects during winter months. The extra layers of fat in the thorax of the new-born is the chief cause which prevents the infants from feeling chill even if they are exposed to cold wind.

Sources of Fats

In nature fats are available from animals and plants. The animal-fats are: Butter, Fish-oils, Lard, ghee etc. The vegetable-oils which are usually extracted from various oil-seeds like: groundnut, seasame, gingely, coconut, safflower, castor etc.

Chemically these fats are divided into *Saturated* and *unsaturated fats*. The saturated fats contain palmitic, steric and butyric acid. All animal fats, hydrogenated oils like: Dalda, Vanaspathi, Cocogem etc., come under this group. *The unsaturated* fats contain oleic, linolic, linolenic, arachidonic acid etc., in various concentration. All vegetable fats, fish-oils, and all the fats which

have double bonds come under this group. Usually, the unsaturated fats remain liquid at room temperature. But, they can be made saturated by hydrogenation and then they remain solid at room temperature.

Digestion of Fats

All fats remain longer in the stomach and they are insoluble in water. Therefore, they must be made water-soluble after they leave the stomach, because the absorption takes place in the small intestine. After leaving the stomach, the fats are made into fine emulsion by the action of bile salts and lipase in the small intestine. Again, this milky emulsion is further activated by the pancreatic enzymes and are converted into glycerols and fatty acids by a process of Hydrolysis and are made water-soluble, however, some Long-Chain fatty acids remain unsoluble.

Absorption of Fats

The proper technique of the absorption of the fats is not fully understood and there are many theories on it. It is already explained that the fatty acids and glycerols are absorbed as water-soluble fats in the small intestine. According to Frazer's Theory of Partition, fats containing Short-Chain like; butter are completely hydrolysed in the intestine than the fats of Long-Chain such as oils which are water-insoluble. The Short-Chain fatty acids after fully hydrolysed, become water soluble and enter the blood stream along with other water-soluble products via, Portal Vein. The unhydrolysed water-insoluble fatty acids undergo resynthesis to Triglycerides in the small intestine and they enter the circulation via mesentric lymphatic channel and Thoracic Duct in the form of Chyl. Then they are oxidized in the liver in the form of Lipines. Even this theory is not supported according to the Theory of Micellar's Absorption, however, our wonderful body and the process of digestion knows best how to utilise the moderately consumed fats.

The absorbed fatty substances in the blood are technitally known as *Blood-Lipids*. In a healthy adult during the post absorptive phase they are found in the following concentration in milligram per 100 ml. of blood:

Neutral Fats	140–225 mg.	Phospholipids	160–200 mg.
Free Cholestrol	40–60 mg.	Cholestrol Esters	110–190 mg.

This concentration of blood lipids may tend to increase in Nephrosis with edema, Diabetes, Arteriosclerosis, Pregnancy, Obstruction to bile passages, Gout, Sepsis, Excessive use of Cholestrol-rich-foods like; eggs, butter, meat, hydrogenated oils etc. The increase of blood cholestrol is known as *Hypercholesterolaemia*. The blood cholesterol may tend to decrease also in Severe anaemia, Pernicious anaemia, Severe Sepsis and Severe Cachexias and this condition is known as *Hypocholesterolaemia* (G. A. HARRISON).

Blood-Lipids in the form of 50 to 60g. of fats are daily essential for the synthesis of various harmones, particularly, Cholesterol which is very important for the release of Steroid hormones, bile-salts, Progesterone, oestrogen, adrenal corticoids, cholic acid which combines with amio-acids like glycine and taurine to produce bile salts sodium glycocholate and sodium taurocholate. Cholesterol estrol are formed by the liver and they are essential for the transport of fatty acids (R. H. Dastur). Mental stress and the excessive intake of cholesterol rich foods like, butter, egg-yolk, kidney, liver, meat and poultry, brain, fishroe, sweetbread etc., tend increase blood-cholesterol and its regular deposit on the inner lining of the blood vessels causes narrowing of the bore and finally it checks the free flow of the blood. To overcome this obstruction our heart tries to compensate and exerts more force to pump the blood in the narrow tubes. Using extra force for a long time, the heart begins to dilate and one day it fails. Therefore, every man who is above forty obase and living a sedentry life should restrict his *Cholesterol-Rich-Foods* and get his blood-cholesterol checked up once a year. It is noted that drinking hard water regularly checks excessive absorption of fats.

After meeting the body's needs, the fat is deposited in layers under the skin, between the muscles, over kidneys, on peritoneum, ovaries etc., totalling about 15-18 per cent of the body's weight. The extra fat is oxidized into water and carbon-dioxide. It gives up *Acetone bodies* (*Aceto-acetic acid and Beta-hydroxybutyric acid*) as its end products which are excreted through lungs and kidneys, in the presence of normal carbohydrate metabolism. It is said that 'fats burn in the fire of carbohydrates' if, as in Diabetes the carbohydrates are not metabolized due to lack of Insulin, the combustion of fats exceeds producing *Ketone bodies*. The accumulation of ketone bodies act on the brain and cause

Diabetic-Coma. Therefore, fats are contraindicated in diabetes. Excessive use of fats in the absence of carbohydrates is also bad, as it causes the same Ketosis causing cyclic vomiting in children who love to eat butter or fats. This can however be treated by giving glucose-drinks.

Indigestion of fats can be prevented by drinking warm water with a pinch of Ajwan seeds immediately after fatty-meals. Taking a tablet of *Felamine* (*Sandoz*) or a capsule of *Desicol* (*Parke Davis*) after meals is also effective.

The use of fats in any form is contraindicated in all heart diseases, jaundice, cholecystitis, myxaedema, acute fevers, gastritis, dysentery, sprue, stetorrhoea, diabetes, high blood pressure, cerebral thrombosis etc.

REFERENCES

1. Antia, F. P., *Clinical Dietetics and Nutrition*, pp. 29-45.
2. McElroy, William, D., *Cellular Physiology and Biochemistry*, pp. 8-9, Pentice Hall of India, New Delhi.
3. Hutchison's, *Food and Principles of Dietetics*, p. 19, 10th Edition.
4. Brogstrom, B., *Editorial, Gastro-entrology*, pp. 43, 216, (1962).

6. MINERALS

Minerals

The foregoing description was related to the organic food-components. For the complete absorption, mobilisation, control, regulation and direction of the food components in the body some INORGANIC substances in mineral form are essential though they play a vital role in the control of Acid-Base-Balance, regulation of body fluids and absorption of vitamins, but they do not supply any heat or energy to the body (F. P. Antia). According to SHERMAN there are about 22 minerals and they are found in the body weighing eleven stones in the following concentration:

Calcium	1050 g.	Cobalt	Trace
Phosphorus	700 g.	Silicon	,,
Potassium	245 g.	Aluminium	,,
Sulphur	175 g.	Arsenic	Mere Trace
Chloride	105 g.	Boron	,,
Sodium	105 g.	Copper	,,

Magnesium	35 g.	Fluorine	Mere Trace
Iron	2.5 g.	Nickel	,,
Manganese	0.21 g.	Zinc	,,
Iodine	0.028 g.		

(Hutchison's *Food and Principles of Dietetics*, p. 100)

In 1873, A.D. Dr Schuessler, M.D. of Oldenberg, Germany, invented a new method of treatment of diseases by administering one or more of these minerals in dynamised doses to which he named Biochemic Method of Treatment. He says, 'The dynamised or the potentised inorganic substances are sufficient to re-establish the deranged molecular movement of the same in the diseased condition of the body and are sufficient to heal all diseases which are curable at all. If these remedies are used according to their individual symptoms, the desired end will be gained by means of the application of natural Laws'. After years of clinical and chemical research he found that the following minerals in certain correct proportion are very much essential to maintain *Good Health.* They are:

Fluoride of Lime. (*Calcarea Fluor.*), Phosphate of Lime. (*Calcarea Phos.*),

Sulphate of Lime. (*Calcarea Sulph.*), Phosphate of Iron. (*Ferrum Phos.*),

Chloride of Potash. (*Kali Mur.*), Phosphate of Potash. (*Kali Phos.*), Sulphate of Potash. (*Kali Sulph.*), Phosphate of Magnesia. (*Magnesia Phos.*), Chloride of Sodium. (*Natrum Mur.*), Phosphate of Sodium. (*Natrum Phos.*), Sulphate of Sodium. (*Natrum Sulph.*) and Silicea.

These minerals enter in our blood through the food which we take, mostly in the form of green leafy and non-leafy vegetables, fruits, nuts, milk etc., and they act as body catalysts along with Vitamins. The minerals control the physiological alkaline environment of the body cells and help the Bio-current flow smoothly through them. They also control the blood alkalinity and counteract the base acids thus formed by eating excess of acid forming foods. DR J. B. CHAPMAN, M.D. of New Era Laboratories says, 'These inorganic minerals are essential for the proper growth, assimilation of the organic substances and development of every part of the body. Should a deficiency

the total daily calcium is discharged in the urine. This wastage of calcium is 'endogenous' which is directly under the control of parathyroid gland. It is estimated that the daily excretion of calcium through kidneys varies between 100-300 mg., (in men and 100-250 mg., in women). This quantity however, varies and the excretion becomes less during calcium deficiency (F. P. Antia). According to ZINN, 9-12 g. calcium is daily filtered through kidney glomeruli, of which 99 per cent is reabsorbed through tubules. Accordingly between 130-250 mg. calcium is normally excreted daily in the urine. In his opinion, patients secreting less than 130 mg. or more than 400 mg. calcium in the 24-hour urine are in need of treatment, examination or supervision. Low or excessive excretion of calcium in the urine may be caused due to various causes which are pointed in *Hypocalcaemia and Hypercalcaemia.*

Hypocalcaemia

After the absorption of calcium it is distributed in the blood-serum in the form of protein-bound and ionized calcium. It is astonishing that the calcium plasma level is remarkably constant in a healthy person and lies between 9.5 and 10.5 mg. per 100 ml. (ZINN). Out of this total calcium, 4.5 mg. of *Ionized-calcium* per 100 ml. is distributed in blood serum influenced by parathyroid gland. COURVOISIER demonstrated that anything that causes *Hypoparathyroidism* also causes subnormal plasma calcium level. It is found that any fall in ionized serum calcium directly influences the nerves and muscles causing hyperexcitability of the nerves and irritability of the muscles as seen in *Tetany.*

Causes: Hypocalcaemia is usually caused by malnutrition due to inadequate supply of food rich in proteins, vitamin A, B_{12}, D, C and Phosphorus. According to NORDIN defective absorption of calcium in the small intestine due to poor intake of fats, anything that hastens food along the intestines such as: saline purgatives, rough fiberous food having certain phytic acids (inositol hexaphosphate) etc., also causes calcium deficiency. Similarly, certain vegetables which contain more oxalates such as: spinach though contains high concentration of calcium but much of the calcium is not absorbed due to formation of calcium oxalate (F. P. Antia). Restricted use of milk and other dairy products, fresh green vegetables and fruits either for social or religious

reasons also causes hypocalcaemia. Sun-shine is essential for the formation of Vitamin D in the body which directly helps the absorption of calcium. Therefore, lack of sun-shine also causes calcium deficiency.

Apart from the above said factors the following causes also lower serum calcium: they are; certain kidney disorders in which impairment of phosphorus excretion or failure to acidify the urine leading to systemic acidosis or calcium loss is common. Acute pancreatitis, transient hypoparathyroidism in the neonatal period, careless use of Viomycin-Parke-Davis in the treatment of tuberculosis and use of sodium fluoride, after effects of chilling the body during heart surgery etc., (F. P. ANTIA).

ZINN points that calcium deficiency occurs very slowly and it takes at least ten years or more if a small quantity of 100 mg. calcium is lost daily. If this loss is continued for more than ten years it amounts only to 360 g., a third of the total amount of the body, and it is not until this stage has been reached that the loss is visible on X-ray. However, under the influence of ALBRIGHT that disorders of calcium metabolism certainly occur more frequently than it was supposed during the last 20 years. In this condition absorption of calcium entirely depends on phosphate metabolism, but, fortunately dietary phosphate deficiency is extremely rare.

General Symptoms of Calcium Deficiency

Deffective absorption of calcium causes great changes in the cellular tissues of bones and muscles. Therefore, persons become fat without fitness. They look pale and listless, get tired and become lazy. They are sensitive to cold weather and desire to keep themselves warm even during hot months. They become nervous and suffer from mental derangements having fanciful haullicinations that some body is always chasing them. They are afraid of death if they sleep and most of the patients keep awake in mental derangements due to this typical fear. Cold sweating around the head even during cold weather is the key note of calcium deficiency in all ages. It is really strange that all persons who are deficient in calcium develop a great liking for eggs. This is usually seen in non-vegetarians only.

Symptoms of Calcium Deficiency in children

Children who are born to calcium deficient mothers have great chances to suffer from calcium deficiency. In such children when there is no adequate supply of calcium, proteins, minerals and vitamins in the form of whole milk, fresh fruits and vegetables; calcium deficiency becomes more prominent. These children fail to grow, develop healthy and strong, bones etc., they develop all the signs and symptoms of Vitamin D deficiency which causes *Rickets*. Mentally these calcium deficient children become peevish and they keep on crying for no reason. They lack appetite and if they are fed forcibly they bring out all the food and milk having a typical sour smell. They pass urine which becomes chalky white on muddy floor, suffer from indigestion and diarrhoea. Teething will be late and deffective, neck will be emaciated with enlarged head having open fontenels and the children do not walk or sit erect etc. Deficiency of calcium lowers the body resistance and these children become an easy prey to respiratory and intestinal infections and the mortality rate in all such children is very high.

Symptoms of Calcium Deficiency in Women

The proper concentration and adequate supply of calcium is greatly required in women and children than men for the normal development of bones, uterus, ovaries and ovarian hormones. If sufficient supply of calcium is not there or there is any underlying defect which checks the absorption of food calcium, the body tries to compensate by drawing the required calcium from the bones. If this defect is not rectified, the bones become soft and weak due to loss of their reserve calcium and a gross deficiency of calcium occurs. Deficiency of calcium in young girls causes late puberty, irregular menstruation, excessive bleeding with crampy pain during this period, anaemias and lowered state of body resistance against infections.

During early pregnancy the requirement of calcium is mostly diverted towards the development of foetus and in the last three months as much as 1,000 to 1,200 mg. calcium is daily required. If there is an inadequate supply of calcium during the entire period of pregnancy the development of the foetus continues by drawing

the reserve calcium from the bones, but, the mother will suffer from uterine inertia which is one of the common causes of difficult labour. Dr J. K. FEENEY my professor of obstetric and gynaecology in Dublin, used to say that majority of the patients who require Caesarean operation due to uterine inertia or due to rachetic pelvis are among those unfortunate ones who do not get adequate supply of calcium during pregnancy. Only during this period of life they develop *Osteomalacia.*

Bleeding, lack of breast milk, poor concentration of mind, prolonged lying in-period etc., is also common due to calcium deficiency after child birth. It is therefore, very important that every pregnant woman must get regular supply of 1,000-1,200 mg. calcium every day to prevent all these complications.

More Calcium and Cancer

ELKELES idea that tissues with an increased affinity for calcium enjoy relative immunity from malignant change sprang from his observation that calcified atherosclerosis of the abdominal arota was much less common in patients with malignant disease than in others of the same age with purely benign conditions. After such a beginning, the latest instalment of the story[15] is some-what unexpected, because it concerns a group of patients with extensive aortic calcification who nevertheless had cancer. ELKELES emphasizes, however, that, in each, the growth was of an unusually low malignancy, and this he attributes to the general predilection of the patients' tissues for calcium.

In each of his 25 patients the diagnosis of cancer was confirmed by examination of specimens removed at operation. In each, aortic calcification was assessed radiographically at follow-up examinations, and in each it was found to be extensive. There, however, the homogenity of the group ends. The patients' ages ranged from 39 to 79; 2 had cancer of the kidney, 1 of the prostate, 12 of the breast, 3 of the stomach, 3 of the colon, 1 of the bladder, 2 of the body of the uterus, and 1 of the cervix (2 patients had two primary growths). More systemic details are not given. After surgical treatment of some sort, survival ranged from five-and-a-half to fifteen years; and, at the time of inquiry, some of the patients were alive—and well and some were dead.

Undeniably, the assorted members of the group responded well to the surgical treatment. But the data indicate little else:

According to ELKELES 'Evidence is accumulating that calcium may indeed be revelant to the growth of malignant tissue. Calcium has been shown to be absent from cancer tissues or present only in small amounts fulminating growths are characteristically unable to take up calcium in the blood and lack of calcium at the cell surface is responsible for reduced adhesiveness and, perhaps, for some of the disorganised behaviour of malignant cell. Thus there are indications that, one way another, calcium and cancer do not agree'. (The Lancet, No. 7344, Vol. I, p. 1204).

Treatment of Calcium Deficiency

Preventive: Adequate supply of food-calcium, maintenance of good health, regular medical checkups and occasional dose of Biochemic Calcium-phosphate 6 x, 5 grs. once a month and taking one-two tablets of *Calcium-D-Redoxon-Roche*, daily is the surest way of preventing calcium deficiency.

Curative: ZINN suggests that it is the duty of every physician who intends to treat the patients suffering from calcium deficiency to give more attention to the eating habits since infancy, about the occurrence of renal calculi etc. Examination of urine by a simple Sulkowitch Test, microscopic examination of stools for the presence of increased fat (which should not exceed more than 10 per cent), and X-ray of pelvis, spine, thorax, cranium etc., and blood serum calcium estimation should be routinely done in all calcium deficiency cases.

Except in children, treatment of calcium deficiency is a long process. ZINN says, 'If it usually takes years or decades for calcium deficiency to lead clinically detectable symptoms it also of course takes years for a highly decalcified skeleton to present normal calcium content. However, in osteomalacia the skeletal pain usually disappears with correct treatment within two weeks'.

In the light of the above expert statement, it becomes necessary to treat a calcium deficient patient with oral as well as injectable calcium preparations along with iron, vitamin C, D, B_{12} and folic acid in the form of Calcium-D-Redoxon, Calcium-Sandoz etc., with Skelimin or Calci-Ostelin with B_{12}, (Glaxo) 1-2 ml. by I.M. injections and a weekly dose of Sterogel 1 ml.

I.M. by a physician. Supplementing Calc-phos 30x. 5 grs. once a week with a daily cup of crab-soup along with the above treatment has given me very gratifying results in the treatment of rickets and osteomalacia (Dr. M. PRIESTMAN).

General Symptoms of Hypercalcemia

According to J. H. Foertch (J. Oklahama, M.A. 56: 322, 1963), hypercalcemia is a polymorphic phase and is often hard to diagnose because the patient may not be aware of the diverse and vague symptoms until damage, which sometimes proves to be fatal, has been done. However, *Hyperthyroidism* is accepted to be the most common cause of hypercalcemia, but other diseases that can be accompanied by hypercalcemia are *Sarcoidosis, Hyperthyroidism, Neoplasms with or without skeletal lessions,* immobilisation in such conditions as *Paget's disease* and *Paralytic Poliomylitis, Vitamin D* intoxication, *The milk alkali syndrome,* and *Hypercalcemia of infancy.*

General symptoms of hypercalcemia, which may last for several years, include; weight loss, weakness, and vague aches or stiffness in muscles and joints. These symptoms, often diagnosed as neurotic, should be considered significant in a person formerly considered to be emotionally stable.

Hypercalcemia crisis, though rare, can occur in any disease with a marked increase (up to 19 or 20 mg. per 100 ml.) in serum calcium and is characterised by abdominal pain, vomiting, severe dehydration, muscular weakness, and psychic disturbances. Polyurea early in the crisis is followed by oliguria and azotemia. Rehydration is essential, and surgical removal of parathyroid adenoma, if present, should be performed at once.

Because the consequences of hypercalcemia and the symptoms are so serious and non-specific, patients with the following signs and symptoms should be investigated for hypercalcemia: radiologic evidence of non-specific demineralisation of bone, spontaneous fractures, bone swelling, or neoplasm with bone metastases; renal stones, (particularly stones composed of calcium and phosphorus); polyuria; calcium casts in the urine; gastro-intestinal symptoms such as: dryness of mouth and throat, anorexia, nausea, vomiting, flatulence and disseminated or localised abdominal pain without disease of the liver of gastro-intestinal tract; duodenal ulcer that worsens on ulcer therapy,

central nervous symptoms of drowsiness, lethergy, confusion, personality changes, overt psychosis, memory loss or impaired hearing, symptoms that in geriatic patients usually are attributed to cerebral arteriosclerosis.

Although no physical signs are pathognomonic of hypercalcemia, the most valuable signs may be in the eyes, where calcium deposits in the cornea may appear as slender, elongated, hazy grey opacities on the nasal or temporal edge. Small glass-like, clear particles may appear in the occular conjunctiva at the edges of the eyelids, which cause irritation, a burning sensation, and increased lachrymation accompanied by inflammation of the conjunctiva. A palpable mass in the neck suggests parathyroid adenoma. Also, muscles may be hypertonic or atonic and tendon reflexes may be depressed or absent (Therapeutic Notes 69, No. 3, December 1964, Parke-Davis, India).

Indications of Calcium Theraphy

Rickets, Tetany, Osteomalacia, Osteoporosis, Pot's Disease, Bone-tuberculosis, Slow-healing of the bone fractures, Caries of the teeth, Stoney harness of lymphatic glands, Haemoptysis Haematemesis, severe bleeding during pregnancy, labour and after childbirth, bleeding jaundice, Itching and urticaria due to allergy from drugs, or mycosis, Angio-neurotic edema, Eczema, Contact dermatitis, Asthma, Tuberculosis, Bronchitis Chronic and acute tonsillitis, Rhinitis, Palpitation and irregularity of the heart, Plurisy with effusion, Migraine, Rheumatism, General weakness during pregnancy, lactation, and menopause, Pre-mature oldage, Dryness and wrinkling of the skin, Twitching of the eye-lids, Complications of Vitamin K deficiency, Mental tension due to nervousness and menopause, etc. (*In all these indications, treatment by an experienced physician is advised*).

Calcium patent preparations: Osteo-Calcium-*Glaxo*, Minogen *M.P.I.*, Dicalciplex-*Khandelwal*, Dacecal-Tablets *Vifor.*, Calcium-Sandoz, etc. Calcium-D-Redoxon-*Roche*-Calscorbat-*Neo-Pharma*.

REFERENCES

1. Antia, F. P., *Clinical Dietetics and Nutrition* Calcium, By R. H. Dastur, pp. 160-171, (1966).
2. Hodgkinson, A. and Pyrah, L. N., *Brit. Journal of Surg.*, 46, 10, (1958).
3. Zinn, W. M., *The Roche-Courier* 4 and 5, Vol. XVII, (1964).

4. Courvoiser, B., *Helv. med. Acta* (Switz), 26, Suppl. 38, 1:94, (1959).
5. Nordin, B. C. E., *Lancet* (Eng.), 1, 1011-14, (1961).
6. Albright, F., Reifenstein, E. C., *The Parathyroid Glands and Metabolic Bone Disease*, Baltimore, (1948).
7. Wright, S., *Applied Physiology*, 10th Edn., London, New York, Toranto, pp. 503-11.
8. Dent, C. E., *Brit. Med. Jour.*, (Engl.), 1962/II, 1419-25; 1495-1500.
9. Wernly, M., Konig, M. P., *Schweiz., med. Wschr*, 91, 769-74, 795-98, (1961).
10. Dallas, I., Nordin, B. E. C., *Amer. J. Clin. Nutr.*, 11, 163-69, (1962).
11. Boericke, W., Dewey, W. A., *The Twelve Tissue Remedies*, pp. 37-61, 6th, Edn., Boericke and Tafel, Philadelphia, (1953).
12. Kent, J. T., *Homeopathic Materia Medica*, 4th Ed., Boericke and Tafel, (1932).
13. Priestman, M., M.R.C.S., L.R.C.P., D.C.H., F.F. Hom. *Clinical Lectures at R.L.H. Hospital*, London, 1954-1957.
14. *Lancet*, 1962, ii, 1097.
15. Elkeles, A. *Brit. J. Cancer*, 572, 1963, 17.
16. deLong, R. P., Coman, D. R., Zeidman, I., *Cancer*, 718, 1950, 3.
17. Lansing, A. J., Rozenthal, T. B., Kamen, M. D., *Arch. Biochem.*, 177, 1948, 19.
18. Coman, D. R., *Science*, 347, 1947, 105.
19. Coman, D. R., *Cancer Res.*, 519, 1945, 14.

8. PHOSPHORUS

Like Calcium, Phosphorus is another mineral which is very essential for the proper utilisation of other minerals like, Calcium, Iron, Magnesium, Potassium and Sodium. It combines with them and forms their respective phosphates and only in this alkaline form all these minerals are able to help the tissue regeneration in the human body. It is already said that by chemical combination with calcium, it forms Calcium-Phosphate and its relationship with the formation of bones. Likewise, by combining with Iron it forms Iron-Phosphate which is so much essential for the synthesis of blood haemoglobin, capillary elasticity and it prevents the internal hyperaemia. Forming its phosphate with Magnesium, it controls the spasticity of the nerve and muscular fibres and hence, prevents the spasmodic contractions of nerves and muscles. Proper development of the brain and its grey matter, the transmission of the motor and

sensory impulses through the entire network of sensory and motor nerves and the automatic function of sympathetic and parasympathetic nervous system is controlled by its combination with Potassium forming Potassium-Phosphate. Sodium combining with Phosphorus regulates the decomposition of lactic acid and converts it into carbonic acid and water. Thus, it maintains the pH value of the entire organism.

Luckily, phosphorus deficiency does not occur so frequently as other minerals and particularly, when there is enough calcium in one's food, its adequate reserve will be there. However, according to SHERMAN and SAMSON an adult requires 680 mg. of phosphorus. Pregnant woman and growing children need it between 785 to 1,937 mg. per day. There is a constant concentration of phosphorus ranging between 28 to 48 mg. in every 100 ml. of whole blood. In blood serum, Phosphorus is 3.5—5 mg./100 ml., in adults, and 5-6 mg./100 ml. in children. It falls below normal in *Rickets*, *Osteomalacia*, *Hyperparathyroidism* and increases in *Hypoparathyroidism*, *Renal failures* etc. (F. P. ANTIA).

In foods rich in phosphorus, it is found combined with protein molecule like: Adenyl-pyrophosphate which, hydrolyses during the process of digestion and releases phosphoric acid and enters the blood combining with other minerals as stated above. This hydrolyses is only possible if there is no presence of organic compound phytate phosphorus as it is found in some cereals, pulses, vegetables and nuts. Man is deprived of a special digestive enzyme which is commonly found in rats and other herbiverous animals, therefore, he cannot digest them. However, cooking of these grains may change their digestive aspect, but still, these will not supply enough phosphorus as other foods like chicken, eggs, fish, meat, apple, banana, figs, tomatoes, sultanas etc. Eating plenty of phosphorus rich foods prevent the deficiency of calcium and naturally, the deficiency of phosphorus will never occur.

Diseases Caused by Phosphorus Deficiency

Active rickets, osteomalacia, osteitis fibrosa, mental derangements, nervous weakness, and other indications of calcium deficiency.

Phosphorus Patents

Phosphomin—*Squibbs*, Phospholers *Cipla.*, Metatone-*Parke-Davis* etc.

REFERENCES

1. McCance and Widdowson, *Bioch. J.*, 29, 2694, (1035).
2. Lehmann, *Triangle*, 5, 335, (1935).
3. Lehmann, *B. Med. Bull.*, 15, 40, (1959).
4. Josephson, *Med. Clin. N. Amer.*, 46, 151, (1962).
5. Ingram, *Brit. Med. Bull.*, 15, 27, (1959).

9. IRON

Blood the most wonderful life giving fluid that flows in our body is composed of a red colour matter called *Haemoglobin* which is made up of certain proteins and Iron. In a normal healthy adult there is about 14.5 g. of haemoglobin per 100 ml. of blood. Each g. of haemoglobin contains about 3.5 mg. of iron. It is estimated that about 25 mg. of iron is required to increase one per cent of haemoglobin.

The normal body of an adult contains about 4 to 5 g. of iron. 73 per cent of this iron is circulating in the haemoglobin which transports oxygen to every cell of the body. 3.3 per cent of iron is in the muscles as Myoglobin, 0.2 per cent in a number of iron containing enzymes and less than 0.1 per cent of iron is bound to a B-Plasma globulin. Most of the reminder, sufficient to replace about 25 per cent of the blood haemoglobin in the event of haemorrhage, is contained in body stores, notably the reticulo-endothelial cells of the liver and spleen (B.M.J., Aug., 10, 1963, p. 367).

'According to the statement of MOORE, the body has a remarkable power for conserving iron, only about 1 mg. being lost per day in cells that are shed normally from the gastro-intestinal tract, urinary tract and skin in sweat, and hair. An increased physiological loss occurs in women in the child bearing period through menstruation, an amount averaging about 1 mg. a day; in addition, despite the amenorrhoea of pregnancy there is net loss of iron from the mother to meet the requirement of each

foetus (about 400 mg. of iron). There is further loss due to haemorrhage at childbirth and subsequent lactation.' To compensate this daily loss of iron frcm the body one must have sufficient intake of iron in the form of foods rich in it.

Foods Rich in Iron: (in mg. per 100 g.)

Cauliflower green leaves	40	Liver	10.3
Amaranth leaves	25.5	Egg yolk	5.8
Coriander leaves	18.5	Mutton	3.5
Fenugreek leaves	17.2	Milk	0.2

Daily Requirement

10 to 15 mg. of iron must be supplied in the form of food. Out of this only 1 mg. of iron is absorbed.

Absorption and Excretion

HARVY pointed out that all healthy subjects absorb about 2 to 10 per cent of iron from the food depending on its nature. But in persons who are deficient in iron the amount absorbed increases up to 50 per cent from the injested food.

The factors which control iron absorption are still not clear, however, the main sites of absorption are the stomach and the upper part of the small intestine. Ferric iron is converted into Ferrus-iron and by a process of active transport mechanism it is absorbed through the gastro-intestinal wall. 'Absorption of iron is enhanced by a deficiency of body stores of iron and increased erythropoietic activity in the bone marrow and by reducing substances in the intestinal lumen, particularly ascorbic acid; it seems to be inhibited by a decreased rate of erythropoiesis by phytic acid and other phosphates in food'. (T.C.F., Abstracts, No. 2).

According to WHEBY, *et al.*, the regulating mechanism of iron absorption has been referred to as a 'mucosal block'. With small physiological amounts of iron, the absorptive mechanism shows kinetic compatible with an enzyme medicated process and the amount absorbed increases directly with the dose. The mechanism operating with small dose consists of two steps, (1) Mucosal uptake, (2) Mucosal transfer of iron to plasma. Both the steps are involved in the regulating mechanism, but step 2 is

more rate limiting and more affected by the state of body iron stores and prefeeding iron.

Iron after absorption is stored as Ferrentin and Haemosiderin in liver, spleen bone marrow etc.

The excretion of iron usually takes place along with bile, stools, scaling of the skin and sweating. It is therefore advisable to take extra quantity of iron rich foods during summer to compensate the iron loss.

General Deficiency of Iron

Iron deficiency is generally caused by severe blood loss, malnutrition, infections and by excessive use of drugs and chemicals.

1. *Severe blood loss:* Severe blood drainage due to badly cut major blood vessels, rupture of aneurysms, perforation of internal organs, incomplete abortion, severe menstrual bleeding due to various causes, and all other factors which deplete the life giving fluid from the body cause acute iron deficiency in the human body. These factors not only reduce the iron content but also reduce the fluid volume of the body. In this condition, when there is no sufficient volume of blood, the heart begins to fail and one soon dies due to haemorrhagic shock.

All severe bleeding tendencies should be considered as a surgical emergency and should be handled by a team of surgeons and physicians in a well equipped hospital having a blood bank. Treatment by oral medications in such emergencies should never be attempted.

2. *Malnutrition:* The common cause of iron deficiency in poor countries is malnutrition. When there is no adequate supply of food rich in iron, protein, minerals and vitamins and the daily intake of iron in the form of food falls below 12 mg. gradual deficiency of iron takes place. Defective absorption of food-iron due to lack of hydrochloric acid, digestive enzymes, diseased intestines also causes iron deficiency by hampering the absorption of food-iron even if there is sufficient iron in the food.

3. *Infections:* It is proved beyond any doubt that malnutrition is the basis of all infections caused by various pathogenic organisms, viruses and intestinal parasites. The already existing iron deficiency in the blood becomes more severe due to the

toxaemic action of the various toxins liberated by germs during infections. Malaria, kala-azar, typhoid, tuberculosis, hepatitis, roundworm infestation etc., are some of the most common infections that play a major role in lowering blood-iron.

4. *Chemicals and Drugs:* Certain chemicals like: arsenic, lead and drugs like: sulphanilamides, chloromphenical etc., exert a deleterious effect on the blood forming mechanisms. The careless use of such chemicals and drugs usually cause iron deficiency in the blood.

5. *Miscellaneous causes:* Repeated pregnancies, prolonged breast feeding, excessive sweating during summer etc., also reduce blood iron to a greater extent.

Signs and Symptoms of Iron Deficiency

(*a*) *In severe blood loss:* The body becomes pale and cold with profuse sweating. The patient becomes severely exhausted, feels creepy sensation all over the body as if iced water is running in the blood vessels, finds great difficulty in breathing, hears buzzing sounds in the ears, the mind becomes dull, fears that he is going to die and becomes unconscious. If something immediately is not done to stop the blood loss and shock by blood transfusion etc., the patient dies soon.

(*b*) In other conditions when the iron deficiency is gradual and the blood haemoglobin falls below 60 per cent one usually looks pale and emaciated. Particularly the nails, the lips, the tongue and the eye-lids look more paler than the skin in coloured persons.

The patient feels tired on doing some physical work, gets breathless, experiences a kind of tingling sensation of pins and needles in the limbs associated with cramps in the calf muscles. The desire to eat food becomes less, and the patient feels nausea and vomiting. The chewing of food becomes difficult due to soreness of the mouth associated with difficulty in swallowing. There may be burning in the rectum as if some chilly paste is applied there, which becomes worst after passing the stools.

The nervous system of the patient usually gets affected causing insomnia, constant pain in the forehead and in the nape of the

neck associated with heavy feelings all over the head as if the whole head is filled with molten lead. The intensity of the headache increases as the sun goes on rising, and strangely it begins to decline as the sun goes down and one usually does not feel any pain after the sunset. The patient becomes sensitive to cold water, winds, and sudden change of the weather. The mental depression becomes more, irritability increases, and one often looses interest in the life. The feeling of dizziness while rising from sitting position prevents one from walking frequently.

Due to low blood haemoglobin, the saturation of blood oxygen falls resulting in breathlessness, palpitation on manual exertion. There may be angina like catching pain in the heart which comes on while doing some physical work and goes off on resting. This spasmodic pain is due to lack of oxygen supply to the heart. The blood pressure falls low with less tension in the pulse.

The condition of the patient becomes bad if the blood haemoglobin falls below 40 per cent. In addition to the above mentioned signs and symptoms one becomes an easy prey to infection and dies due to toxaemia. For all these signs and symptoms put together, doctors call it '*Hypochromic Microcytic anaemia*'. For details, refer to any text-book on medicine.

Iron Deficiency during Pregnancy and Childhood

During pregnancy as much as 900 mg., of blood-iron is used by the foetus. It is established that out of this quota more than 450 mg., of iron goes to placenta alone.

To compensate this extra need of iron, nature puts off the blood that is wasted during menstruation. Even with this saving of iron the body finds difficult to supply the required quantity of iron for the normal growth and termination of the foetus. Therefore, liberal supply of iron in the form of iron-rich foods are regularly advised. Ones digestive system should be thoroughly examined and if there is any cause which disturbs the free absorption of food-iron; it should be set right immediately. Clinical experience teaches, that supplementing elemental iron combined with other minerals and vitamins in the form of *GEVROL-Lederle, VITAMINETS-FORTE,-Roche.*, one capsule or a tablet daily during the entire period of pregnancy not only helps the normal growth of the foetus but also prevents all the other

complications feared due to iron-deficiency-Anaemia. Particularly, the birth of the baby becomes easier and the lying-in period shortens by constant supply of iron with other minerals and vitamins.

Effects of Iron Deficiency during Childhood

During infancy and childhood iron deficiency is very common in spite the child is born with sufficient iron in its liver to supply the daily requirement of body needs. It is estimated that about 266-937 mg., of iron is found in the liver of a new-born baby, and this concentration depends on the sufficient intake of iron by mother during pregnancy.

As the child grows, the liver-iron is constantly supplied to the body needs and the reserve gradually declines, because, the baby cannot supply extra iron in the form of food; even the breast milk contains very little iron and the cow's milk is a very poor source. It is therefore, supplementing iron in the form of *Sodium-Ironedate, a non-ionised iron.* (*SYBRON-Parke-Davis.*); half to one teaspoonful mixed with a table spoonful of tomato or orange juice twice daily should be regularly given after the baby is two months old.

'The incidence of iron-deficiency anaemia in the first and second half years of life in infants of low socio-economic populations remains upwards of 30 per cent, and is associated with illness, especially upper respiratory tract infection. Seemingly, all the factors making for poor iron nutritional status come together in the environment of economically deprived infants. The mother usually lacks adequate antenatal care; her diet is generally deficient; and at delivery she is often iron-deficient with or without anaemia. Pregnancies are more frequent, and delivery is often premature. The infant's diet is woefully inadequate, the morbidity rate for all members of the family is high.

A recent issue of American Journal of Diseases of Children recommends a daily supplement of at least 12 mg., of iron for all the children above two months to promote good health and prevent infections' (Editorial J.A.M.A., Vol. 195, No. 10, March 7, 1966, p. 863).

Clinical Manifestations of Iron Deficiency

1. BREATH HOLDING SPELLS AND OBESITY

According to SHARPAY-SCHAFER *et al.*, cerebral hypoxia is the cause of breath holding syndrome in infants and children who have low blood haemoglobin level. When they cry, pressure on the carotid blood vessels checks the free flow of the blood and possibly the reduced oxygen carrying capacity of the blood due to anaemia might aggravate the situation. Breath holding episodes in children can also occur due to calcium and vitamin D deficiency. In some children there is familial tendency. However, of all the cases who come under my treatment for this syndrome get very good response by combined treatment of rickets and iron deficiency anaemia. I usually treat these children with Sybron-P.D., one teaspoon with *Calcium-D-Redoxon-Roche*, one tablet three times a day, and continue the treatment for more than three to four months even after the blood picture is normal. Severe cases should be treated with parenteral administration of calcium and iron, and the period is left to the discretion of the physician.

In adults, deficiency of iron can cause obesity. CHANDRA observes that iron defieicncy could possibly impair the functions of many respiratory enzymes which contain Iron as essential constituent. Due to this impairment, tissue metabolism is reduced, leading to storage of food calories as body fat (R. K. CHANDRA, The Lancet, Vol. 1, No. 7342, May 16, 1964, p. 1106).

2. THE GASTRO-INTESTINAL EFFECTS OF IRON DEFICIENCY ANAEMIA

NAIMAN *et al.*, state that iron deficiency anaemia causes achlorhydria, impaired absorption of Xylose and vitamin A and stetorrhoea. In children bowel disturbances due to infections may also play a major role in causing the above symptoms associated with iron deficiency. Correction of the bowel disturbances and administration of iron combined with vitamin A preparations like *Ferradol-P.D.* or *Sharkoferrol-Alembic.* etc., is advised in such cases.

3. IRON DEFICIENCY WITHOUT ANAEMIA

BEUTLER *et al.*, state that the possibility of lack of iron contributes to the production of clinical symptoms other than

iron-deficiency anaemia has been reviewed. In series of cases that were treated with iron showed marked improvement in their condition such as lassitude, dysphagia, stomatitis, anorexia etc. In all these cases, though the blood haemoglobin was in normal range, but there was no haemosiderin demonstrable by sternal marrow-puncture. The authors confirm that iron deficiency without anaemia belongs to a class of disease which we cannot yet diagnose with certainty because of the limitations of diagnostic methods. The significance of iron depletion without anaemia will remain unknown until its presence can be recognised without a therapeutic trial of iron.

FIELDING described the differential ferrioxamine test for measuring the amount of body iron chelated by desferrioxamine. The two main sources of iron chelated in this way are iron stores as ferritin-haemosiderin and iron newly released from haem in some haemolytic states. When the rate of destruction of red cells is normal, ferritin-haemosiderin stores can be measured by the amount of iron chelated in vivo by desferrioxamine. This method is tested and found correct in number of people with normal haemoglobin but with marked iron deficiency (FIELDING, J., *et al.*, The Lancet, Vol. 11, No. 7401, 3rd July, 1965, p. 9).

4. OZAENA—A MANIFESTATION OF IRON DEFICIENCY

BERNAT proved that had smelling in the nose can be successfully cured by treating for *Iron-deficiency-anaemias*. He says 'That ozaena is a preventable disease, particularly prevalent in impoverished populations and can be eradicated by raising the dietary standards and breaking the bonds of ignorance and tradition' (BERNAT, Text-Book 1st Eng. Edn., 166, 1965).

5. IRON DEFICIENCY AND MENORRHAGIA

It is demonstrated that iron-deficiency anaemia can be a cause as well as a result of excessive menstrual flow. Apart from the iron deficiency in such cases, MOORE and JACOBS demonstrated that there are certain other factors that alter the enzymes of buccal epitheliam of humans. These enzymes play an important role in the function of muscle, and this fact lends considerable weight to the theory menorrhagia may be caused by the weakness of muscular elements in the uterus due to tissue iron

deficiency. This weakness particularly affects the spiral arterioles and often occurs without significant anaemia. Thus iron deficiency from whatever cause may lead to menorrhagia in turn produces a more severe iron deficiency. In such conditions, judicious use of oral or parenteral use of iron not only cures anaemia but also breaks this vivacious cycle. It is noted that such cases who fail to respond to other hormonal treatment got cured by simple iron therapy (J.A.M.A., Vol. 187, No. 5, Feb., 1, 1965).

6. Iron deficiency and its relation to dirt eating habit

Pica or dirt eating habit is commonly found in children and some women during pregnancy. 'This bad habit is often associated with an iron deficiency anaemia and this is proved by LANSKOWSKY, and correcting the anaemia cures the habit'. My own experience has confirmed that these findings are correct and it is interesting that CATZEL has found that the habit disappears a few days after one or two IMFERON 1-2 cc., by intramuscular injections. Oral iron therapy takes longer time to break this habit, because giving iron by intramuscular injection elevates the serum iron even though the stores of iron still be deficient.

'Any child with the abnormal eating habits must be regarded as a potential candidate for poisoning, especially chronic lead poisoning. The lead may reach the stomach in various ways especially from chewing lead-containing paints. Chronic lead poisoning leads to mental deterioration and mentally retarded children are liable to possess abnormal eating habits. This emphasises the continuing need for all practitioners to be aware of the possibility of chronic lead poisoning in mentally retarded children and those with behaviour problems, as well as in any child with abnormal eating habits' (The Practitioner, Oct. 1963, p. 422).

7. Defective reutilization of iron in the anaemia of inflammation

'In ten patients with anaemia of inflammation, measurements were made of iron utilization and iron reutilization by the red blood cell. Iron utilization was measured by intravenous injection of ferrous citrate labelled with radio-active iron 59 (59 Fe),

whereas iron reutilization was measured by the intravenous slow injection of radio-active iron-tagged haemoglobin solution. This solution was prepared from either reticulocyte-rich blood incubated with 59Fe (in vitro tagging) or from the blood of a patient who received a large amount of 55Fe (in vivo tagging). Reutilization of iron compared to its utilization was significantly lower in eight patients than in the controls. This could play an important role in the pathogenesis of anaemia, especially when it is not considered that more than 90 per cent of the bone marrow daily iron need is derived from reutilization of iron from senscent red blood cells. The retention of the metal by the reticuloendothelial system may be the result of oxidative metabolism incurred by the inflammation. The prompt reutilization of iron during the recovery phase in the two remaining patients is evidence against the hypothesis that the radio active iron in the inflammation is diluted because of increased iron stores (HAURANI, F. I., *et al.*, J.A.M.A., Vol. 192, No. 7, p. 194, May 7, 1965).

How to Cure Iron Deficiency?

1. *By Dietetic Methods:* Eating foods rich in iron regularly and keeping the gastro-intestinal tract healthy is one of the safest and more potent methods to prevent iron deficiency. It is discovered that vitamin C in the form of citrus fruits enhances the absorption of food-iron, therefore, supplementing fresh citrus fruits in one's daily menu is advised.

2. *By Medical Methods:* When there is marked iron-deficiency, it is important to realize that the body stores of iron are seriously exhausted. In such conditions simply eating iron-rich foods will not help to rebuild the depleted iron reserve.

'All patients with iron-deficiency anaemia require supplements of medicinal iron. The first objective is to raise the haemoglobin to a normal level and thereafter to continue with iron therapy until the body stores are refilled. This means continuing for further two to three months with orally administered preparations or giving an addition 1-1.5 g. when parenteral preparations are being used. In patients suffering from conditions in which the cause of the iron deficiency cannot be permanently removed e.g., epistaxis from hereditary telangectasis, chronic

bleeding from hiatus hernia, post-gasterectomy malabsorption, or menorrhagia not severe enough to warrent hyaterectomy-iron supplements should continue indefinitely, either regularly or intermittently at the discretion of a physician.

According to O'SULLIVAN and KERR, it has been established that no one preparation of iron when given in equivalent doses as regards contents of elemental ferrous iron is more efficient in raising the haemoglobin level or less likely to cause side-effects than another.

With oral iron preparations though there are mild gastro-intestinal disturbances, which can however be minimized or abolished by reassurance and by insisting that iron is taken only after a meal (RALLIS Abstracts).

The selection of a particular brand of iron is left to the discretion and the experience of the attending physician.

The indications for parenteral iron therapy are few, but it becomes a necessary measure of treatment when the patient is not able to take any oral preparation of iron due to vomiting, nausea, anorexia though there is marked sensitiveness to such preparations. Experience teaches that patients who get some disturbance after taking oral iron preparations will never take it again however they are persued. In all such conditions parenteral iron therapy becomes unavoidable.

The time honoured dextran-iron preparation *Imferon-Tata-Fissions* that is available in 2, 5 and 10 ml. vials containing 50 mg. of elemental iron per ml. It can be safely given after checking the sensitiveness which rarely occurs in some patients. The frequency and the dosage depends on the severity of the patient; the attending physician is the best judge to treat. Recently Total Dose Infusion method of giving *Imferon* by I.V. Drip with glucose on Normal Saline has become very popular. For technical details write to Tata Fission, Bombay with Ref. P.H.M.S./1. T.D.I. In still severe conditions when there is very low haemoglobin, blood transfusion is the choice treatment to increase the blood haemoglobin quickly.

When once the deficiency of iron is cured and the patient is able to eat the normal diet and attend his daily work, oral iron preparations should be continued for a couple of months more.

Effects of Excessive use of Iron

Indiscriminate use of elemental iron causes toxic symptoms. It retains elemental iron in the tissues causing *Siderosis*.

Siderosis can occur due to excessive intake of alcohol (Pitcher). DAVIS and BADENOCH found that the excessive use of iron in alcoholics is due to pancreatic involvement associated with cirrhosis of the liver. The authors believe that the effect of the pancreatic extract in reducing absorption of iron in alcoholic cirrhotic patients and the high incidence of chronic pancreatitis in cirrhosis is associated with excessive absorption of iron (B.M.J., Dec. 14, 1963, p. 1516).

Excessive blood transfusions in the treatment of aplastic and haemolytic anaemias may also cause iron deposits after breakdown of haemoglobin. This is called *Haemosiderosis*. Defective absorption of iron with deposition of iron pigments like, haemosiderin and haemofusin in various body tissues may also occur as seen in *Haemochromatosis* (ANTIA, F. P.).

According to the provings of Biochemic Society of Austrians, administering Calc-phos 12x 5 gr., twice daily for a week and alternating with Nat-mur 30x 5 grs. once a day for two days along with Fer-phos 12x 5gr. t.d.s. during the treatment of iron deficiency not only helps the quick absorption of iron but also resets the deranged molecular movements of tissue elements in the body (RAWLY, W.).

Iron Intoxication

Iron intoxication causes gastro-intestinal irritation with nausea and vomiting, haematemesis and melaena, and circulatory collapse. Treatment of iron intoxication should be immediatly given to prevent pyloric stenosis which may persist even after recovery. This is usually caused from corrosive injury in the stomach. Gastric lavage with sodium-bicarbonate followed by administration of aluminium hydroxide and bismuth sulphate as demulcents (Somers). Recently, Desferal (desferrioxamine-B.) and (diethylevetriamine-Pentacetic acid-D.T.P.A.) are tried as iron chelating agents after gastric lavage. They convert the remaining iron in alimentary tract non-toxic and help its excretion (B.M.J., Aug., 10, 1963, p. 367).

Iron-Patents

Tablets: Iron-Tables-T.C.F., Fersolate and Caldeferrum-Glaxo., Roncovite-H'st, Ferrets-T.C.F., Ranical-Johnsons etc.

Elixirs: Tonoferron-E.I.P., Ferilex-T.C.F., Ferro-B-Liver-Uni-chem., etc.

Injections: Imferon-Tata-Fissions., Jectofer-B.D.H. Uniferron and Uniferron-F-Unichem etc.

REFERENCES

1. Antia, F. P., *Clinical Dietetics and Nutrition*, pp. 152-159.
2. Compston and Pitcher, *Recent Advances in Medicine*, p. 205, 14th Edn., (1964).
3. Mackay, Goodfellow, *et al.*, *Med. Res. Council Report*, No. 157, (1931).
4. Hussain, R. and Patwardhan, N. V., *Lancet*, i, 1073, (1959).
5. Shermann, I., *J.A.M.A.*, 175, 188, (1961).
6. Moore, C. V., Dubach, R., *J.A.M.A.*, 162, 179, (1956).
7. Finch, C. A., *J. Clin. Invest.*, 28, 780, (1949).
8. Hagedorn, A. B., *Pro. Myo. Blic.*, 32, 705.
9. Brown, *J.A.M.A.*, 144, 1084, (1950).
10. Das Gupta, *et al.*, *Med. Gaz.*, 81, 122, (1946).
11. Das Gupta, *et al.*, *ibid.*, 81, 402, (1946).
12. Das Gupta, *et al.*, *B.M.J.*, 11, 645, (1953).
13. Ralis, *Abstracts from Current Medical Literature* Nos. 2, 3 (1964), 1, 2 and 4 (65), 1, (1966).
14. Camacho, J., *et al.*, *Clinical Pediatrics*, Vol. 4, No. 9, pp. 550-552, Sep. (1964).
15. Fielding, J., *et al.*, *The Lancet*, Vol. 2nd, No. 7401, 3rd July, (1965), p. 9.
16. Hauran, W., *et al.*, *J. Lab. Clin. Med.* 65; 560-570, April, (1965).
17. *J.A.M.A.*, Vol. 187, No. 5, Feb. (1965).
18. *J.A.M.A.*, *Question and Answers Column*, Vol. 189, No. 12, November (1954), 21, p. 973.
19. Gilliman, *et al.*, (1967).
20. Naiman, *et al.*, *Tropical Diseases Bulletin*, p. 517, May (1964).
21. Drabkin, D. L., *Physiol. Rev.* 1951, 31, 345.
22. Harvey Lect., 1959-60, Series 55, p. 67.
23. Dowdle, E. B., *et al.*, *Amer. J. Physiol.*, 1960, 198, 609.
24. Baird, I. M., *et al.*, *Quart. J.M.*
25. Kerr, D. N. S., *et al.*, *S. ibid.*, 1958, 2, 483.
26. Girdwood, R. H., *Brit. Med. J.*, 1952, 1, 599.
27. Israels, M. C. G., *Blood Diseases*, in Progress in Clinical Medicine, 4th ed., 1961, ed., R. Daley and H. Miller, Churchill, London.
28. Anderson, N. S. E., *Brit. Med. J.*, 1961, 2, 275.
29. Lundin, P. M., *Brit. J. Cancer*, 1961, 15, 828.
30. Somers, G. F., *Brit. Med. J.* 1950, 1, 845.
31. Tata-Fission's T.D.I.: Ref.: P.H.M.S./1.

10. POTASSIUM

Dr D. C. Jarvis, in his folk medicine says, 'Potassium is the most important mineral, in fact the key mineral in the constellation of minerals. It is so essential to the life of every cell of a living thing that without it there would be no life. Nature has flung it about with such prodigality that one may say it is among the most generously and widely distributed of all the tissue minerals. Yet, notwithstanding its diffusion all over the earth, the mineral potassium never occurs in a free state nor it is found pure, but always in combination with an acid'.

Potassium is widely distributed in almost all the animal and vegetable cells and acts as the base of the cellular compartment as like sodium is the compartment of the extracellular tissues (Forbes, G. B. and Lewis, A. M.). Our body contains 120 g. as potassium and 245 g. as Kcl (Potassium chloride). Out of this body potassium 117 g. is found in the cells and 3 g. in the extracellular compartment. Normal serum concentration of potassium is 20 mg. About 5.5 g. of Kcl, or 3 g. of K, is daily required for the normal balance of fluids. Formation of sulphate and phosphate of potassium also takes place from the food potassium in the body.

The chloride of potassium as Drs W. Boericke and W. A. Dewey, say, 'This salt, according to Schuessler, stands in a chemical relation to fibrin; disturbances in its molecular action cause fibrinous exudation. Without the presence of this salt no new brain-cell formation would take place. This salt is found in blood corpuscles, nerve and brain cells as well as in the intercellular fluids. It is essential for the proper distribution of fibrin in the animal organism'.

The sulphate of potassium acts as a catalyst in the absorption and distribution of Oxygen and Iron in the body.

'Phosphate of potassium, is the chief constituent of all animal tissues and fluids, notably of the brain, nerves, muscles and blood-cells. All tissue forming substances retain it with the greatest obstinacy, all nutritious fluids contain it, hence we may well conclude that it is indispensable to the formation of tissues. We

also know that the oxidation processes, the change of gasses in the respiration and other chemical transformations in the blood, as well as the saponifying of the fat and its further oxidation, are brought about by the presence of the alkalies and chiefly by the presence of potassium phosphate. This alkaline reaction is essential to a large number of vital processes taking place in the interior and is present, without exception, in all the animal fluids which are actually contained in the circulating system, or in the closed cavities of the body (Dolton). It helps the nerve impulses to reach their destination and prevents the cell decay'. 'Potassium is concerned with cellular excitability. The irritability of the nerves, skeletal and cardiac muscles is determined by the relative amounts of K., Ca., Mag. It is necessary for the proper functioning of the involuntary muscle and for the maintenance of acid-base balance' (F. P. Antia).

Foods Rich in Potassium (In mg. per 100 G.)

Figs	1,015	Peas	293
Prunes	864	Tomatoes	288
Almonds	856	Mutton	266
Brazils	760	Grapes	250
Currants	707	Grapefruit	234
Walnuts	687	Plums	188
Liver	407	Orange Juice	179
Chicken	381	Strawberry	161
Beef	368	Cabbage	144
Fish	360	Eggs	134
Bananas	348	Pears	129
Potatoes	325	Apple	123
Duck	319	Carrots	87

(Hutchison's, *Food and Principles of Dietetics*, 124, 10th Ed.)

Deficiency Signs and Symptoms of Potassium

Deficiency of potassium rarely occurs during health because we take sufficient potassium in the form of food. However, its deficiency does occur during starvation after major surgery, gastro-intestinal disturbances with severe vomiting and diarrhoea, diabetic acidosis, mercurial and chlorothiazide diuretics, before

and during major operations and surgical drainage, Conn's syndrome, potassium-secreting tumours of large intestine, potassium-losing nephritis, Familial periodic paralysis and potassium loss during steroid theraphy and similar drugs (F. P. Antia.)

It is estimated that the excretion of potassium is 8 mEq. per day through stools. It is retained in the body during renal failure and in Addison's Disease. About 90 per cent of potassium is excreted by kidneys during normal health.

Potassium deficiency causes undue nervous and body tiredness, palpitation of the heart, cloudiness of the mind, nervous shaking of the hands and feet, great sensitivity of the nerves to cold, excessive perspiration of the feet and hands, slow healing of the ulcers and fractures, sterility, weeping tendency, hatred towards dear ones, suicidal tendency, hysteria, twitching of the muscles and itching of the body, psychoneuroses, insomnia, sick headache, obesity, low resistance to infections, diarrhoea, bed-wetting in children, giddiness, hypertension, mental irritability, sore throat and chronic cold with loss of smell.

For the proper treatment of gross potassium deficiency an experienced physician or a surgeon is required, however, in simple cases, drinking plenty of tender coconut water or taking Pot-citras, 20-30 grs., t.d.s., (three times daily), cures it. It is advised to take plenty of figs, apricots, prunes, almonds, tomatoes etc., during the use of oral diuretics. Potassium-rich foods should be restricted during acute renal failure, Addison's disease etc.

Regular administration of potentised Biochemic potassium-chloride; Potassium sulphate and Potassium phosphate along with the standard official treatment helps the quick re-establishment of the deranged molecules and hastens recovery.

REFERENCES

1. Jarvis, D. C., Folk Medicine, pp. 58-60, Panbooks Ltd., (1961), London.
2. Forbes, C. B., and Lewis, *J. Clin. Invest*, 35, 596, (1956).
3. Anita, F. P., *Clinical Dietetics and Nutrition*, pp. 143-152, (1966).

11. SODIUM

Our body's extra-cellular fluid is the chief seat of sodium concentration. The total quantity of sodium in our body is 235 gms. In blood it ranges from 450-530 mg. per 100 ml. It is estimated that about 10 gms. of sodium in the form of NaCl, (Sodium chloride) is daily required for the proper maintenance of *Osmotic pressure, Fluid balance, Muscle irritability and Acid-base-balance.* During summer-months, when there is excessive sweating; excessive depelation of sodium chloride takes place. It is estimated that about 3,000-4,000 mg. NaCl, is lost from the body if one works continuously for three hours during summer. Additional 10 gms. of common salt is therefore essential to balance the deficiency. Recent researches show that after the body is accustomed to the hot environment, much less sodium chloride is lost in the sweat because of its low concentration in it.

Deficiency of sodium chloride during health is rare, because we use it regularly along with our food. It is absorbed from small intestine and much less from large intestine. It is excreted from kidneys where it is reabsorbed by the tubules. Therefore, its acute deficiency during health does not take place unless there is severe starvation, restriction of salt intake due to high blood pressure, congestive heart failure, nephritis, cirrhosis of the liver or severe depelation of sodium chloride due to excessive vomiting and diarrhoea during gastro-intestinal diseases like cholera, etc., excessive sweating, excessive urination due to mercurial diuretics or chlorothiazide drugs, during surgery, fistulae, intubation and suction, Addison's disease etc., may also cause NaCl deficiency (F. P. Antia).

Acute deficiency of common salt causes severe thirst, muscular weakness and cramps, breathlessness, mental confusion, drowsiness and if there is severe dehydration one dies soon. In mild condition taking a teaspoon of common salt in a pint of water or any fruit juice quickly restores the health, but in severe conditions administration of sodium chloride in the form of *Normal Saline* by intravenous drip is worth life saving. It can also be administered by rectal route as 0.45 per cent NaCl.

Sodium chloride has the water retaining property in the tissues, it is therefore restricted in the above said diseases. Even certain foods, rich in salt such as: salted nuts, biscuits, meat, fish, dried fruits, spinach, carrot, radish, milk, cheese, chicken, egg, etc., are restricted. However, Low-sodium foods like: cereals, sugar, honey, fresh fruits, unsalted butter, brinjals, cabbage, cauliflower, tomatoes, lettuce, beans, peas, onions, potatoes, pumpkin, vinegar, sour lime, cucumber etc., can be used (F. P. Antia). Prolonged deprivation of sodium or enthusiastic administration of sodium chloride is dangerous, particularly the hypernatremia during the treatment of dehydration causes convulsions, coma and death. The bad effects of excessive use of salt can be rectified by taking Biochemic Nat-Mur. 30x. 5 grs. once a month. Great desire for salt and excessive saltish taste with much salivation is the key-note of Nat-Mur.

Sodium Phosphate

The combination of Sodium with Phosphorus in the human body is a very complicated biochemical process. Suffice to say that sodium phosphate is found in blood, inter-cellular fluids, brain-cells, muscles and nerves. Its chief function in the body is to exchange Carbon-dioxide into Oxygen and help it to distribute to all the cells of the body along with arterial blood. It acts as a catalyst and converts the lactic acid into CO_2 and water. In Liver, it prevents the improper metabolism of carbohydrates, crystallization of bile salts in the form of cholesterin and controls the super acidity of the human system.

According to Biochemic theory, its molecular dysfunction in the blood and other tissues of the body produce ACID DIATHESIS which causes, rheumatism, urinary calculi, diabetes, tuberculosis, jaundice, gastric ulcer, biliousness etc. This molecular dysfunction can be rectified by judicious administration of Biochemic Nat-Phos. 6x, 5-10 grs. three to four times a day for four days alternating with Nat-Sulph. 12x 5 grs. once a day only (Dr W. L. Templeton, M.D., London).

Sodium Sulphate

Sulphur combines with Sodium and forms Sodium Sulphate. Its chief function in the body is to eliminate the extra water

which is formed during various metobolic processes. It looks after the physiological functions of liver, kidneys, bladder, skin and lungs.

Its molecular imbalance causes a state of HYDRAEMIA, which acts as a predisposing factor in malaria, cholera and other liver derangements. Its administration in the form of Nat Sulph. 12x 5 grs. t.d.s., for a day or two resets the cellular function and restores a feeling of health and well being (Dr M. Blakie, M.D., London). The common indication of the administration of this remedy is particularly during *Dampness* and the diseases aggravated by such kind of atmosphere. Aggravation of the symptoms of any disease during MISTY weather is the key note for the systematic action of this wonderful Tissue remedy (Dr D. M. Foubister, B.Sc., M.B., D.C.H., F.F. Hom., London).

12. IODINE

In our body, the chief store-house of iodine is Thyroid gland. The essential hormone THYROXINE, which is secreted by this gland is made by the circulating iodide. In the body iodide is converted from the foods rich in iodine such as sea-weeds, fishes, kelp, lobster or other fish liver oils etc. After trapping the iodide, the thyroid gland converts it first into *Tryosine* to form *monoiodotyrosine*. Two molecules of this substance combine to form di-iodotyrosine and again two molecules of it combine to form *Thyroxine* (Tetra-iodothyronine.)

Thyroxine is a wonder chemical which controls the basic metabolism and oxygen consumption of tissues. It governs the combustion of sugars and converts them into glucose from glycogen when liver is damaged. It increases the heart rate as well as urinary calcium excretion.

It is estimated that the entire body contains about 10 mg. of iodide and a very minute quantity of iodine is required for the proper health of thyroid gland. Sir Hutchison claims that an normally a man requires about 150 mcg. per day; a drop of Lugol's iodine contains sufficient iodine to supply the body needs for 2 months. Dr F. P. Antia says, that a teaspoon of potassium

iodide is enough to supply the body requirements of iodine for the entire life up to seventy years.

Like other organs of the body, thyroid gland also goes out of gear causing excessive secretion or low secretion of the hormone Thyroxine.

The excessive secretion of thyroid stimulting hormone of the pituitary gland acts on the thyroid gland and subsequently enlarges it. For this derangement we call Goitre.

The present causative factors of goitre are based on the following factors which cause the deficiency of iodine in the body:

(1) Failure of the conversion of thyroxin from iodide due to certain drugs which were formerly used in the treatment of hypertension; like: Thiocynates.

(2) Insufficient formation of thyroid hormone due to excessive use of beans, cabbage, carrot, lettuce, peach, strawberry, spinach etc., or the use of Thiouracil compounds. These foods contain a substance known as Thio-oxazolidone when they are raw and however, cooking destroys it. This substance is found to cause insufficient secretion of thyroxine.

(3) Hereditary specific enzymes which interfere the formation of hormone also play a major part in causing goitre (Geer, M. A. and Astwood, E. B.).

(4) Puberty, infection, mountainous regions, pregnancy may also interfere with the proper formation of thyroxine. (Dr N. J. Sha, M.D., M.R.C.P., Bombay).

There are three major diseases which are associated with the deficiency of *Iodine*. They are Goitre, Thyrotoxicosis (Graves' Disease) and Myxoedema.

Goitre: This is a common disease caused by the enlargement of the thyroid gland due to lack of iodine in the body. The enlargement of the gland increases the secretion of thyroid hormone and thereby the body metabolism increases causing loss of weight, tremor, palpitation of the heart while resting, sweating etc. In a well marked case, bulging of the eye balls with the above signs and symptoms are some of the clinical manifestations of this disease. For details refer any standard Text Book on Medicine.

Myxoedema: Deficiency of thyroid hormone due to radio active Iodine I^{181} or anti-thyroid drugs, atrophy of the thyroid

gland etc., are found to be some of the common causes. Diminished circulation of thyroid hormone results in bloating up the body with dry skin, puffiness of the face, coarse and brittle hair, swelling that does not pit on pressure, thick and coarse voice, dullness of the mind, slowness of the heart, intolerance to cold etc., which are the guiding symptoms of this disease. Some children who are born without thyroid gland are said to be suffering from *Certinism*. In these unfortunate children, the normal growth does not take place and they suffer from poor mental, physical and sexual development. For all such deficiency diseases of thyroid the regular attention of a physician is very essential. Regular administration of Thyroid extract or a synthetic substance Eltroxin (Glaxo) along with iodine and vitamin C rich foods are very useful in the treatment of these diseases. German Biochemic scientists have proved that an occasional dose of Nat-Mur. 30x 5 gr. two times a day repeated once a month along with the above standard treatment helps to reduce the regular administration of thyroid extract.

REFERENCES

1. Antia, F. P., *Clinical Dietetics and Nutrition*, Oxford Publications, India, 179.
2. Shah, N. J. *Hand Book of Endocrine Disorders*, Unichem Lab. Bombay, pp. 16-28.

13. SULPHUR

Sulphur is very much essential for the synthesis of vitamin B_1. It is present in all the amino-acids of eggs, meat, milk and cereals and the irregular consumption supplies the required amount of sulphur. The presence of sulphur in the body tissues helps their proper wear and tear, helps the proper digestion of fats and it controls the metabolism of carbohydrates. It prevents the infection of scabies and other itchy conditions of the skin.

Food-sulphur is absorbed as an organic compound and after metabolism it is converted into sulphate and excreted in the urine as such (V. H. Mottram and G. Graham). The same authors say that some of it is detached as cystine, or converted into glutathione, thiocynates etc., which perform essential functions in the body (Food and Principles of Dietetics, p. 125). The formation of respective Sulphates of the various essential minerals take place from this food-sulphur.

14. MAGNESIUM

Though magnesium is largely consumed in the form of whole grain cereals and green vegetables like cabbage and cauliflower, the deficiency does occur in certain cases during some diseases like: vomiting, iliostomy dysfunction, prolonged use of oral diuretics of both chlorothiazide and mercurial group, mal absorption of magnesium due to massive small bowel resection. HANNA, S., NORTH, K. A. K., MACINTYRE, I. are of opinion that magnesium deficiency may occur during recovery from Diabetic coma. ACHARI, G., *et al.*, confirm that low serum magnesium is associated during toxaemia of pregnancy.

The human body contains about 2,000 mEq., and about 25 mEq., (0.3 g.) of magnesium is daily required for the proper metabolism of carbohydrates, protection of the nerve sheaths and the proper electrolyte balance of sodium, potassium and chloride (Dr F. P. Antia). McCOLLUM *et al.*, found that marked deficiency of magnesium may cause marked vasodilation, neuro-muscular irritability, convulsions and death in experimenting animals (Newer Knowledge of Nutrition, 161, 1939). SMITH, W. O. and associates, confirmed that the neuro-muscular irritability caused by magnesium deficiency produces an aimless plucking at the bed clothes, constant tremors in the hands which appear on stretching them and on griping something. They may disappear for some time and reappear again. The patient may suffer from mental haulicinations and disorientation. VALLEE *et al.*, proved that the cramps and convulsions are some of the early manifestations of magnesium deficiency. The convulsions with exaggerated planter reflexes with Chvostek's sign etc., are in fact due to low calcium in the blood serum. According to Dr SCHUSSLER of Germany, Magnesium in the form of magnesium phosphate is fairly well distributed in the muscles, nerves and brain's grey matter, bones and sperm. It acts as an insulating covering over the nerve fibres just in the same way as the electric wires are insulated to prevent the leakage of the electric current. The deficiency of magnesium occurs due to molecular dysfunction of the cellular

tissues and starts its manifestions in the form of above said symptoms. The crampy pain is the guiding symptom of the deficiency of this mineral which is attributed due to the weakening and rupture of the insulation over the nerves. The bathing of the bare uninsulated nerve in an acid environment is the cause of intense pain which is relieved by hot application. Giving Biochemic Mag-phos, 12x 5 gr. every ten minutes during the acute crampy pain and the spontaneous remission is the proof of the above theory (Dr Khelner, M.D., F.M.S.S.A., F.F. Hom., R.L.H. Hospital, London). Oral administration of Magnesium Hydroxide, B.P. 5ml. and intramuscular injections of Magnesium Sulphate 50 per cent 2 ml. b.d. with potassium and calcium administration is the usual therapy in clinical deficiency of magnesium (Dr F. P. Antia). Saturated solution of Mag-sulf, administered intravenously kills spontaneously and it is the common procedure to destroy the unwanted animals in veternary hospitals.

The site of the absorption of magnesium is not fully known, however, some workers like SMITH and HAMMARSTEN believe that it is absorbed from the small intestine. It is found that it is excreted through the kidneys, at the rate of 5-17 mEq., a day and some of it is passed out through stools. If, due to any defect in the kidneys and the secretion of urine becomes scanty, signs of magnesium intoxication like stupor, drowsiness and coma become prominent. In such cases of intoxication the concentration of magnesium varies between 18 mEq. and 15 mEq. per litre (Dr F. P. Antia). Therefore, in such conditions of low urinary output, purgation with magnesium sulphate is contraindicated.

REFERENCES

1. Hanna, S., *J. Clinic. Path*, 14, 410, (1961).
2. North, *et al.*, *B.M.J.*, ii, 1253.
3. Smith, W. O., *et al.*, *J.A.M.A.* 174, 77.
4. Vallee, *et al.*, *New J. Med.*, 262, 155.
5. Antia, F. P., *Clinical Dietetics and Nutrition*, pp. 173-176.

15. CHLORINE

In human body chlorine is liberated by the inter action of common salt that we take along with food and Hydrochloric acid which is liberated in the stomach during the process of digestion. It is essential for the proper distribution of carbon-dioxide and the maintenance of osmotic pressure in the tissues.

Deficiency of chlorine however occurs rarely during restriction of the use of common salt during the active phase of general edema or hypertension etc., and develops the same symptoms of sodium chloride deficiency.

16. MANGANESE

Manganese is also found in the body as a trace element and its total amount in it ranges between 30 to 35 mg., of which 20 mg. is found in bones which acts like a reserve. It is also found in the liver, pancreas, kidney, pituitary gland and most of the cellular manganese is in the mitochondria (Borg and Cotzias.).

Daily requirement of this element is about 5 mg. When manganese rich foods like, nuts, coffee, tea, cereal, bran etc., are consumed it is absorbed from the intestinal gut. After its function of carbohydrate metabolism is over, it is excreted in the urine and in the bile which pass on through the stool.

Manganese deficiency is not common in man, except in birds which is known as Perosis. However, its intoxication does occur in miners who work in the mines and chemists who are exposed to its compounds. It is absorbed via lungs and produces marked nervous and respiratory symptoms like: insomnia, depression, mental irritability, impotence, temporary episodes of insanity, body ache, weeping tendency for no cause, sham mirth (pathological laughter) etc. CHARLES, J. R. describes, that manganese intoxication produces the similar symptoms of Parkinsonism.

Respiratory manifestations of manganese EXCESS, are: pulmonary tuberculosis, common cold, bronchial asthma, dry

isy, pneumonia, bronchitis, emphysema etc. There may creased haemoglobin and blood cell count. These symptoms anganese intoxication can be prevented by protecting the ons from dust extraction and isolation from manganese borne-dust environment. There is no specific curative treatment for this malady (F. P. Antia).

REFERENCES

1. Borg, *et al.*, *J. Clinic. Invest.*, 37, 1269.
2. Charles, J. R., *Brain.* 50, 30.
3. Antia, F. P., *Clinical Dietetic and Nutrition*, pp. 176-179.

17. COPPER

Our body contains about 100-150 mg. of copper and the total serum concentration is 122, micrograms per 100 ml. We need 2 mg. of copper per day (Chou, T. P. and Adolph).

GUBLER, C. J. *et al.*, confirm that copper is essential for the synthesis of haemoglobin from iron. It forms an intimate part of oxygen-carrier haemocyanin found in lobsters, crayfish, and of sundry oxidizing ferments. Its gross deficiency in the soil interferes with the flowering and setting seeds in plants. In animals it causes Schleswig-Holstin disease and piglet anaemia (Liverton and Binkley). In man, though its deficiency is not common, but still, its abnormal deposition either due to defective copper metabolism or deficiency of copper-binding protein ceruloplasmin in the body causes WILSON'S DISEASE (F. P. Antia).

Copper intoxication can be cured by the administration of B.A.L. (British-Anti-Lewside), 200 mg.-300 mg. by intramuscular injections for some months. Penicillamine, 2 G, daily orally is also used in the treatment. It increases the urinary copper-output (Walshe, J. M.)

Eating of copper-rich foods like: almonds, pistachonuts, lobsters etc., prevents copper-deficiency and iron deficiency anaemias. Taking copper in excess is poisonous and food cooked in copper vessels having poor tin plating causes severe vomiting

and diarrhoea with abdominal pain. Drinking acid-drink copper vessels also produces the same symptoms. In pso blood copper is found elevated.

REFERENCES

1. Chou, T. P., *et al.*, *Boi. J.*, 29, 476.
2. Gubler, C. J., *et al.*, *Blood*, 7, 1075.
3. Liverton, *et al.*, *J. Nut.*, 27, 43.
4. Walshe, J. M., *A. Med. J.*, 21, 487.
5. Antia, F. P., *Clinical Dietetics and Nutrition*, pp. 183-188.

18. FLUORINE

Fluorine enters in the body as Calcium-fluoride. It is mostly found in the enamel of the teeth, in bones, thyroid gland, skin, blood and blood vessels. Its deficiency in the body causes dental caries, relaxation of blood vessels, stoney harness of the glands which can however be prevented by sufficient intake of fresh vegetables, bone-meal, fish, fruits, tea, dried meat etc. Taking a dose or two of Calcium-fluoride, 6x, 5 grs. once or twice a week not only prevents fluorine deficiency but also cures the deficiency symptoms (Sir John Weir, London).

Excessive intake of fluorine causes, gross nervous and bone deformities and optic-neuritis.

19. MOLYBDENUM

Like copper molybdenum is also a trace element essential for the synthesis of haemoglobin and absorption of iron. Its proper concentration in foods is not fully known, however, foods rich in A-class proteins and iron are said to have it in sufficient concentration.

20. COBALT

Though cobalt is essential for the good health of man, but its exact daily requirement is not known. It is estimated that a cow requires about a milligrame and from this it is assumed that it may be about 0.25 mg. per day is needed for human

gs. Recent research in Vitamin B_{12}, and its pink colour is buted for its presence in B_{12}. Foods rich in vitamin B_{12}, are rich source of this trace element. The presence of cobalt foods helps the synthesis of haemoglobin and the absorption of food-iron. Its deficiency in soil and plants causes coast disease and enzootic marasmus in sheep. Its excessive use causes toxic symptoms in rats.

21. SILICON

Among all the trace elements, silicon is very essential for the proper functions of nerve-cells, tissues and synthesis of vitamin B_1, in the human body. It controls the transmission of nerve impulses through the motor and sensory nerves. Its proper concentration and the bio-chemical molecular balance of silicon helps the correct absorption of the exhudated serous fluids during inflammations, and congestions, hence, it prevents the formation of pus in the inter-cellular tissues. Its presence is essential for the proper control of reflex arc in the lumber region.

Pure silicon is found in the form of white crystals in matured bamboo stem. This substance is called 'Tabashir' in Urdu. Biochemic *Silicea,* in higher potencies in a single dose rectifies the mal-absorption factor in the body. The chief symptom of silicon's deficiency is *Sensitiveness to cold and one feels always chilly even in hot months and suffers from pus forming diseases.* Its reckless use causes irrepairable damage therefore, its administration is left to the choice of a physician.

22. ZINC

W. B. KOUNTZ says in; Indust. med. 27, 537, 1958; that zinc, is important in the formation of Carboxylase, a respiratory enzyme. It also acts on the prestalisis and controls the movements of the waste matter in the form of faeces. Its deficiency causes, diarrhoea, weakness of the lower limbs, indigestion, eye disorders etc. However, acid-foods cooked in zinc vessels are not good for health and cause constipation and a peculiar type of pain in the nape of neck. Cooking in aluminium vessels causes the same symptoms of zinc. Zinc deficiency causes dwarfism (Dr Harold, H. Standstead, Cairo, Med. News, 16-6-1967).

23. VITAMINS

Oh! Destiny where you end.
The more I wait, the far you go.
(Dr Aman)

Until 1912, we believed that the science of nutrition is perfect and the *Organic* and *Inorganic food-components* were the only nutritive elements for the maintenance of good health and longevity. But the destiny of food science took a marvellous change after the food research of Hopkins, who, after six years of extensive research, surprized the nutrition scientists and physicians, that apart from the organic and inorganic food-components there are certain other chemical substances in *organic* form which are present in natural food-stuffs and are essential to normal metabolic functioning of human beings and other animals. They are indispensable for health and growth of the body cells, for the protection against infective and degenerative diseases, for the mobility of the other organic and inorganic food-components and their utilisation for good health and longevity.

In 1911 these wonder-organic chemicals were named as *vitamines* by a Polish chemist, Casimir Funk. Later they named as *Vitamins*.

The present century is the '*Vitamin Century*'; for, everywhere you hear the word *Vitamin*. In the beginning, there were about six vitamins, but, today their number is increased up to twenty two, and God better knows how many more will be added to increase their number in years to come.

The use of Vitamins took a crazy shape after the second world war. Every one came to know their wonderful life-giving effect on the human body during health and disease and for every thing they began to enter the anxious stomachs. This excessive consumption of vitamins stirred the minds of chemists and they began to find the structure of these natural chemicals. After years of research they finally succeeded in their mission. Today, all the vitamins that you find, are synthetic and they can be

manufactured by tons in various forms like: tablets, injections, syrups etc., having their own mysterious names.

Are these *synthetic vitamins* necessary? Generally, NO, but, by their attractive colourful labels, packings and fabulous indications, the ignorant young and old, buy them and start gulping in the great hope of curing their ailments, to attain good health, vigour and longevity. This is really a sad aspect, because, all of these man-made vitamins in their higher concentrations are only useful in the hands of physicians, who should use them with care in the treatment of acute and chronic diseases caused by *vitamin deficiencies*. But, their indiscriminate use causes serious degenerations in the body-cells and robs the good years of one's life. In health, these concentrated vitamins are never required, because, for the maintenance of our daily wear and tear of the cells and for the metabolism of the food, only very small amounts of natural vitamins are needed, which we get by eating *fresh vegetables*, *fruits* and *nuts*. In the healthy condition of the body, even if you add these concentrated synthetic vitamins, they will not increase the value of the well mixed diet or impart any vigour or increase any resistance to disease. Fortunately, moderate use of synthetic vitamins does no harm unless over dosed.

In this connection of the uselessness of the *synthetic vitamins*, it will be worthwhile to study what *Dr Cumming*, Surgeon-General of U.S.A. says, 'Let me emphasize this fact: we should obtain our vitamins from our food supplies and not from drug stores or from nostrum vendors; we need select only the proper foods to eat and we will get an abundant supply of these precious substances'. (Drugless Road to Perfect Health. By Dr Joseph H. Greer, M.D.).

The author of the Medical Management (1954) writes, 'The best and the only certain source of all the vitamins is a well balanced diet; therefore, a person in health with proper nutrition does not require vitamin supplements. Yet many persons, even in good economic circumstances eat less vitamin-containing foods than are necessary for optimal health. No controlled evidence exists to show that vitamins exert a "tonic" effect. There is probably much indiscriminate use of the vitamin supplements. In illness there may be considerable variation in the body requirements depending upon age, activity, metabolic rate and

other factors affecting the utilization and excretion of the vitamins. Vitamin deficiencies are usually multiple, particularly of fat-soluble or B-Complex vitamins as a group. Early signs of vitamin deficiency are usually non-specific, vague, mild, easily misinterpreted or missed entirely. The crude sources of the vitamins are more efficacious in therapy than the pure or synthetic vitamins. Only during the more severe phase of the deficiencies it is usually necessary to resort to the use of pure vitamins. Treatment of vitamin deficiencies requires an adequate, balanced, high protein, high vitamin diet in addition to vitamin supplements. In general it is wise to use vitamins therapeutically in 5 to 10 times the amount required for daily maintenance'.

Dr Hector Munro of London says, 'Vitamins are nothing more or less than stored sun-light. The rays of the light most valu ble to health are those to the right of the spectrum, and when these rays are excluded from an area in which a plant has been placed, the plant dies. These rays are caught and held by the fruits of the earth and are the vitamins of which so much has been heard. Lately, oranges and lemons contain a higher percentage of stored sun-light than any other fruit in the world.

'The body needs a wide variety of substances for repair; some of these it can manufacture but others it has to obtain ready made. The later fall into two groups, viz., those which are stable and those which are easily destroyed. Metallic salts like those of iron are stable ones. The unstable group of substances are present in fresh fruits, vegetable or fruits, but are easily destroyed by processes and in food preservation, and these are vitamins. Both of these groups enter into the composition of blood through the food stuffs that animals eat. But as vitamins are produced only by plants, they pass directly with vegetable-food. But indirectly with animal foods, into the human system. It has been observed that the total deprivation of these vitamins in case of rapidly growing animals, (human beings also) lead to diseases, now known as 'deficiency diseases'—the most common being, Scurvy, Beri-Beri, Rickets and Pellagra. Recent investigations have led to the discovery of the minimum human needs of various vitamins. It is important to remember that the minimum requirement is not the same as the optimum supply. The aim of nutrition is not to discover the deficient diets on which human

beings can manage to survive, but the diets optimum for the maintenance of full health and activity. The effects provided by complete-vitamin-lack are much easier recognised than are the effects of partial deficiency; and these latter are more important in the investigation of disease'.

Col. MacCarrison says,

1. 'Vitamins are constant constituent of living tissues. Although in very small amounts, maintenance of health is dependent on their action'.
2. 'Vitamins themselves do not contribute to the energy supplied to the body, but facilitate utilization of proteins, fats, carbohydrates and salts of food'.
3. 'Proteins, fats, and carbohydrates and salts do not support life without vitamins, nor vitamins without these proximate principles; they are complementary to each other; without the vitamins the body starves'.
4. 'A distinct relationship exists between the amounts of vitamins required, balance of food in protein, fats, carbohydrates, salts, the efficiency of vitamin depending on the composition of the food mixture'.
5. 'A distinct relation exists between the amount of vitamin required and the rate of metabolic processes'.
6. 'Each vitamin plays a specific part in nutrition'.
7. 'It appears that vitamin A is associated with metabolic lipoids and calcium, as well as the chemical reactions for the growth and maintenance'.
8. 'Vitamin B appears to be associated with the metabolism of carbohydrates and with the chemical reactions and functional perfection of all cells particularly nerve-cells'.
9. 'Vitamin C appears to be associated with the metabolism of calcium and iron'.
10. 'All vitamins are concerned in the maintenance of orderly balance between destructive and constructive cellular processes'.
11. 'One vitamin cannot replace another, although its function may be interfered with by the absence of another'.

12. 'The final result of their deficiency is the same whatever be the degree of deprivation, the greater the deprivation the more rapid is the onset of symptoms due to it; the lesser the deprivation, the slower is the onset of symptoms due to it'.
13. 'Each vitamin exercises a specific influence on the adrenal glands; the effect of their deprivation on these organs is one of the most outstanding features of deficiency diseases'.
14. 'Vitamins influence markedly the production of hormones and external secretions'.
15. 'There is a reason to believe that the capacity of any given cell for work is impaired in proportion to the degree of vitamin starvation'.
16. 'Vitamins aid the tissues in resisting infection'.
17. 'Vitamins, especially vitamin B_1 induces in the human and animal body a desire for food'.
18. 'Vitamins are one link in the chain of essential substances requisite for the harmonious regulation of chemical processes of healthy cellular action. If the link be broken, harmony ceases or becomes discord, as it may cease or become discord, if any other link be broken'.
19. 'The place of vitamins in human economy must be considered in connection with the metabolism of a whole, in connection with their relation to other essential food requisites, with their relation to organs of digestion and assimilation and with relation to endocrine regulators of metabolic processes'.

24. FAT-SOLUBLE-VITAMINS

Certain *vitamins* like: *Vitamin A, D, and E* are not soluble in water, but, they are soluble in fats. Therefore, they are known as *Fat-Soluble-Vitamins.*

25. VITAMIN A

Vitamin A is a *growth promoting, anti-infection* vitamin found in the form of *Carotene, Cryptoxanthin, Lutin* etc., in vegetables and fruits having *deep-yellow colour*, fungi, bacteria and in all animal life. Animals cannot synthesize vitamin A, but they convert carotene into vitamin A and store it as oily droplets in living tissues.[4] GOLDBLATT *et al.*, found that vitamin A is found along with vitamin D in cod liver oil. The authors confirmed that both of these vitamins are heat-resisting when cooked ordinarily. But, McCollum found that over cooking and oxidation of fat destroys them. However, addition of vitamin E, an anti-oxidant prevents the loss of vitamin A.

Chemistry of Vitamin A

Naturally vitamin A is abundantly found as pure vitamin A in animal-livers, eggs etc. It is synthetically made from *beta-carotene* which is *water-soluble.* The hydrolysed formula of *carotene* is: $C_{40}H_{56} + 2H_2O = C_{20}H_{29}OH$. Carotene was crystallized in 1828, but the Scientific approach by WILLSTATER and MEIG began in 1907. In 1919, STEENBOCH established the possible relationship between vitamin A and Carotene. In 1950, KARRER and his co-workers synthesized several carotenoids.[4]

Foods rich in vitamin A

Food	Vitamin A I.U./100 g.	Food	Carotene I.U Per 100 g.
Halibut liver oil	4,000,000 I.U.	Carrots, mature	20,000 I.U.
Cod liver oil	200,000 ,,	Spinach	13,000 ,,
Liver, sheep	45,000 ,,	Spinach beet leaves	11,000 ,,
Liver, ox	15,000 ,,	Carrots, young	10,000 ,,
Liver, pig	5,000 ,,	Cress	8,000 ,,
Liver, calf	4,000 ,,	Kale	8,000 ,,
Butter	3,500 ,,	Sweet potato	6,000 ,,
Cheese (whole fat)	1,500 ,,	Watercress	5,000 ,,
Eggs, hen	1,100 ,,	Apricot	2,000 ,,
Kidney, ox	1,000 ,,	Lettuce	2,000 ,,

Food	Vitamin A I.U./100 g.	Food	Carotene I.U. Per 100 g.
Salmon canned	250 I.U.	Tomato	1,200 I.U.
Milk (summer)	150 ,,	Peach	800 ,,
Herrings, fresh	100 ,,	Brussel sprouts	700 ,,
Milk (winter)	75 ,,	Cabbage	500 ,,
Beef or mutton	20 ,,	Maize, yellow	350 ,,

(Moore, T. Clinical Dietetics & Nutrition, F. P. Antia, p. 110).

Mango, papaya, jack-fruit, curry-leaves, drum-stick leaves coriander leaves, amaranthus, fenugreek leaves and seeds, cabbage leaves, mint etc., are some of the cheapest sources rich in carotene as a source of Vitamin A.

Some Indian Food preparations rich in vitamin A

Amaranth curry 1 cup	8,000 I.U.	Agathi curry 1 cup	5,000 I.U.
Drumstick curry 1 cup	3,260 ,,	Carrot curry 1 cup	2,000 ,,
Biryani 1 plate	1,000 ,,	Omlette One	940 ,,

('Balanced Diets & Nutritive Value of Common Recipes', C.F.T.R.I., Mysore City, South India).

Daily requirement of vitamin A

The daily requirement of vitamin A is expressed in terms of *International Units* (I.U.) One I.U. of vitamin A is equal to 0.344 mcg. of pure vitamin A acetate which is obtained in a pure crystalline form. According to National Research Council of U.S.A. and BROADLY, 5,000 I.U. of pure vitamin A is required daily. Since the vegetable carotenes are not fully digested the requirement of vitamin A in the form of carotene is three times higher, therefore, 15,000 I.U. of vegetable vitamin A is daily needed. British Medical Association (1950) recommends the following daily requirement of vitamin A:

Children 15 and under	...	1,500 I.U. to 4,500 I.U.
Adolescents and adults	...	2,500 I.U. to 7,500 I.U.
During pregnancy	...	3,000 I.U. to 9,000 I.U.
During lactation	...	4,000 I.U. to 12,000 I.U.

(Clinical Dietetics & Nutrition, F. P. Antia, p. 111).

Pharmacodynamic action of vitamin A

In our body vitamin A plays a major role in the development of healthy layers of skin and mucous membrane. It controls the physiological formation of visual purple and looks after the sensory and motor functions of nervous system.

Absorption and excretion of vitamin A

Vitamin A is absorbed from the proximal part of the small intestine. The absorption of vitamin increases, if it is taken with fats and it is more rapid in men than in the women (Moor, T). Vitamin A is poorly absorbed if there is diarrhoea, jaundice, coeliac disease and excessive intake of liquid paraffin.

It is not clearly known about the conversion of carotene into vitamin A in our body. However, MATTSON *et al.*, believe that this process takes place in the intestinal wall and not in the liver as it was originally believed by MOORE. The conversion of carotene into vitamin A is also influenced by thyroid gland[7].

Vitamin A is stored in the liver in the form of ester and a healthy person stores about 324 I.U. of vitamin A per g. of liver. HUME *et al.*, believe that an average liver weighing 1,500 g. can store 500,000 I.U. of vitamin A which is sufficient for 200 days if the daily requirement is 2,500 I.U.[7]

Vitamin A is distributed in blood-plasma and normally it contains about 120 I.U. per 100 ml. It becomes less during early pregnancy, cancer, old age, and at child birth.

The mode of the destruction of vitamin A is not known. However, its excretion in milk and urine is detected[7].

Signs and symptoms of vitamin A deficiency

In India deficiency of vitamin A is very common due to poor intake. RAMLINGASWAMI *et al.*, found that the daily intake of vitamin A is as low as 460 I.U. in south Indian labourers.

Deficiency of vitamin A can also occur not only from malnutrition but also as a result of poor absorption of vitamin A and carotenes of food from the intestines. This faulty absorption is commonly present in diseases of liver, poor formation or obstruction of free passage of bile etc. (Harper). This factor also plays on the absorption of other *Fat-Soluble-Vitamins* like D and E.

Deficiency of vitamin A affects the skin before other organs are influenced. The skin becomes *dry*, *rough*, *thick* and *scaly* (xeroderma). One can feel the roughness by passing the hand over the elbows and buttocks as if passing over the toad's skin. ANTIA advises, while treating any other manifestation of vitamin A deficiency, this skin manifestation should not be forgotten. It is

noted that vitamin A deficiency indications are associated with *night-blindness*. FRANDSON says, that the basic pathological deficiency-change in vitamin A deficiency is in the epithelium. Due to which the superficial layers of the skin are destroyed. The underlying cells of mucous membrane proliferate but do not differentiate well, and due to this, horny cells are produced. 'In the absence of cilia stagnation of the secretion occurs on the mucous membranes. Bacteria proliferate and infection occurs as the circulatory antibodies cannot reach the invading bacteria'[10]. It is also confirmed that deficiency of vitamin A thickens and dries the mucous membrane. This condition helps the lodging of various pathogenic organisms; particularly the mucous membrane of the respiratory tract and alimentary canal greatly manifest the deficiency of vitamin A and develop pathogenesis of *acute* and *chronic* bronchitis, asthma, tuberculosis, laryngitis, tonsillitis etc. Dryness of the alimentary canal counteracts the secretion of the digestive enzymes which distrub the process of digestion and absorption of food. Here, also, the disease causing organisms find a favourable ground for their growth and cause enteritis, diarrhoea, dysentery etc. Vaginitis, urinary infections and tendency to stone-formation are also found to be caused by vitamin A deficiency[11, 7].

Deficiency of vitamin A greatly affects the *eyes*. The night-blindness caused by vitamin A deficiency is due to poor formation of a chemical which is known as *Rhodopsin*. This substance is present in the rods of the retina and changes into chemical energy to form good sight in dim light with the help of vitamin A. Conjunctiva also gets affected by marked deficiency of vitamin A. It becomes *dry* (xeropthalmia), *lustreless and looses its transparent appearance*. It appears in folds when the eye is turned to one side due to loss of elasticity. *Bitot's spots* and *keratomalacia* (softening of the cornea) are also caused by vitamin A deficiency. In under developed countries the common cause of the blindness particularly in children is due to keratomalacia leading to various infections. The degeneration of the epithelium and the absence of Lysozyme, an enzyme found in tears also helps the microbes to lodge in the eyes[12].

MELLANBY proved that the vitamin A deficiency can affect the growth of bones of the skull and spinal column. This incoordination of the bones encroach on the nervous system and

damage the sensory paths of the nerves. The author claims that this degeneration of epithelial structures and in the nerve-cells of afferent nerves which have a tropic effect on the epithelia leads to nervous derangement ending in neuritis and other infections. Therefore, persons engaged in active occupations like: *automobile driving, handling of textile-machines, generating stations etc.*, should have a regular supply of vitamin A between 5,000 to 8,000 I.U. per day.

GOODWIN disclosed that vitamin A has its effect on the activities of procreation in animals. He is optimistic about this effect which may help as a family planning measure in future.

Clinical manifestations of vitamin A

1. Pimples (Acne)

Ugly looking pimples which spoil the beauty of the girls can be prevented and cured by regular use of food-vitamin A or careful use of synthetic vitamin A combined with vitamin E. KOSTER recommends to give more attention to skin hygiene, vegetables and fruits rather than synthetic vitamins. Application of *Eskemel-Smith-Kline* once or twice over the face and taking *Rovigon-Roche* one tablet after every meal for two to three months helps a lot to clear the face from pimples. Constipation should always be avoided during the treatment of pimples.

2. Atherosclerosis and Aging

SHERMAN AND RAFSKY believe that the deficiency of vitamin A acts on the blood vessels and causes atherosclerosis, increases the chances of aging process resulting in early appearance of wrinkles on the skin, premature loss of teeth, sight, impaired hearing and premature greyness of hair. POLLOTA and KRAUSE found low level of vitamin A in old persons. Sterility due to weak and non motile sperms, weakness of the sex organ, loss of smell etc., are also attributed to vitamin A deficiency.

3. Hypervitaminosis A

SULZBERGER, REINBERG and BAIR confirmed that excessive use of vitamin A exceeding more than 1,000,00 I.U. per day for a long time causes toxic symptoms due to Hypervitaminosis A.

'Vitamin A resembles vitamin D is being toxic when given in great excess. Moreover, as with the antirachetic vitamin, the lesions produced are clearly related to those observed in deficiency. Thus the state of hypervitaminosis appears to be caused by the vitamin acting in the normal manner, but without being subject to the influences which must normally control its action. Skeletal features in rats given excessive doses of vitamin A have been known for over thirty years. The clinical effects of hypervitaminosis A, however, have been known even longer, since Arctic explorers, even in Elezebethian times, were aware of the dire effects of eating the liver of polar bears. Rodhal and Moore (1943) found that the liver of this animal was so rich in vitamin A as to make hypervitaminosis seem an inevitable consequence of its consumption'.

'Reports of hypervitaminosis A under ordinary domestic conditions have been received mainly from America and from France. All the incidents have been due to greatly excessive intake of the therapeutic preparations of the vitamin. In some cases infants and children have been overdosed for no purpose at all except for the fallacy that 'one can never have too much of a good thing'. Two types of lesions have been observed. Marie and Ses (1951) noticed that when young infants were given single dose of about 300,000 I.U. of vitamin A, twelve hours later they developed a mushroom-like protuberance of the fontenal, accompanied by vomiting. The disturbance was only temporary, and was presumably due to an increased secretion of cerebrospinal fluid. We have already seen that the same increase in pressure can result from avitaminosis A, which suggests that either the absence or excess of vitamin can disturb the delicate balance of the chorionic cells in excreting the correct amount of fluid. The second type of injury results from aimless dosing and is caused by chronic excess. An early case was described by Josephs (1944). A three-year-old boy who had received halibut-liver oil equivalent to 240,000 I.U., of vitamin A daily from the age of three months, became seriously ill. The syndrome included precoskeletal development, enlargement of the liver and spleen, hypoplastic anaemia, clubbing of the fingers and coarse sparse hair. The blood level of vitamin A was many times higher than the normal average. Discontinuation of dosing soon corrected most of the abnormalities, and allowed the blood vitamin A to return within the normal range.

Cases in which administration has not been aimless have all arisen from the treatment of skin diseases. GERBER, RAAB and SOBEL (1945), for example, eventually arrived at a diagnosis of hypervitaminosis A, in a 28-year-old woman, who had a history of eight years of persistent illness, for which she had been treated on ten occasions in different hospitals. She suffered from headaches, a coarse and itching skin, blurring of vision and diplopia, and stiffness and pain in the spine and limbs. The liver was somewhat enlarged. The skull was bulged in the right temporal area, and a tantalum plate had been fitted after an operation for sub-temporal decompression. The patient was well nourished, but walked with a stoop and had pain and difficulyt in moving. X-ray studies indicated extensive skeletal abnormalities, including calcification of the ligaments flava and of the infrapatellar ligaments. Previous diagnosis had included brain tumour, viral radiculo-encephalitis, psychoneurosis and infective arthritis, whilst investigations had been made to exclude Addison's disease, dermatomyositis and hepatitis. Sobel and his colleagues, however, elicited the vital information that the patient, for the whole duration of her illness, had been taking no less than 500,000 I.U., of vitamin A daily for the control of ichthiosis. On discontinuing the excessive dosage the condition of the patient rapidly improved. Pruritus ceased after one month, and after two months, there was no more spontaneous pain in the bone and spine. It took several months, however, for the level of vitamin A in the blood to fall within the normal range.

Fortunately, cases of hypervitaminosis A have been comparatively rare. It is perhaps a reflection on the lavish nutritional standards in America, however, that in recent reports of cases of hypervitaminosis A have outnumbered those of frank avitaminosis A, as characterised by the classical xeropthalmia.

Hypercarotenosis: Disconcerning symptoms, but with less effect on the general health, have also been reported in subjects who have ingested excess of carotene, particularly in the form of carrots. The skin becomes decidedly yellow, but jaundice is ruled out by the absence of colour in the sclerotics. It seems probable that abnormal yellowness will appear in any subject if a sufficient excess of carotene is taken, but Cohen (1952) and others have found that hypothyroidism increases the liability to pigmentation. Almond and Logan (1942) gave an interesting

account of cases of hypercarotenosis caused during the war (1939-45) by the intensive propaganda for an increased consumption of carrots. Some women developed a liking for the vegetable which amounted to a craving, and consumed 2 to 3 kg. weekly. Unsuspecting practitioners diagnosed jaundice, pernicious anaemia or cholithiasis before the true cause of their yellowness was recognized. The yellowness generally disappeared rapidly after the excessive consumption of carrots had been stopped. McGonaghey (1952), however, reported the case of a woman who preferred, after her assurance that her condition was not serious, to remain permanently yellow rather than to deny her craving for carrots'. (J.H.M. Vol. 1, July-Sept. 1959, Bombay, pages 118-19).

Hypervitaminosis A, also causes: loss of hair, vomiting, excessive itching of the skin, formation of the kidney-stones, mental irritability, loss of weight, loss of appetite, wet eruption of the skin, cracking and bleeding of the lips and fissuring of the corners of mouth. These symptoms are frequently common in children who are unnecessarily fed with vitamin A preparations by their anxious mothers. Doses of vitamin A above 25,000 I.U., per day and its use regularly for a month or more paves a way for hypervitaminosis A. (Amer. Med. Ass. Council on Food and Nutrition. J.A.M.A. 169: 41, 1959).

Indications of Vitamin A Therapy (Preventive and Curative)

Eyes: Night blindness, photophobia, xeropthalmia, keratomalacia, keratitis, dimness of the sight, burning and itching in eyes, excessive lachrymation on exposing the eyes to light and cold air.

Nose: Loss of smell (Anoxia), rhinitis, ozaena, common cold, nasal polypy etc.

Ears: Deafness of inner ear, itching and burning in ears.

Skin: Dryness of the skin, eczema icthyosis, Darier's disease, acne, toad's skin, cracks and fissures of the skin.

Lungs: Bronchitis, tuberculosis, asthma, smoker's-cough, influenzal cough, cough due to enlarged uvula, unproductive cough due to laryngitis, weakness of the lungs, etc.

Mouth: Pyorrhoea, loss of the enamel of the teeth, dryness of the mouth with acute soreness all over it which does not respond to B-complex vitamins, burning of the tongue after food and poor appetite.

General: Nephritis, cystitis, formation of urinary calculi, low resistance to all the general infections, colitis, coeliac disease, neuritis general weakness during pregnacy, lactation and menopause, premature old age and greyness of the hair, cancer, impotency, sterility in both male and female and gastro-intestinal disorders.

Note: It must be noted that all these diseases can be prevented by eating foods rich in vitamin A, but, during the treatment of any of the above said diseases, correct diagnosis, good nursing and approved treatment is very much essential along with the therapeutic doses of vitamin A, to get gratifying results.

Some combined preparation of vitamin A

Rovigon-Roche Vitamin A + E. 30,000 I.U. + 70 mg. per tablet. Dose: 1-3 tablets to be chewed daily.

Adexolin *Glaxo* capsule Vitamin A + D. 6,000 I.U. + 1,000 I.U. per capsule. Dose: 2 to 3 capsules daily.

Sharkoferrol (*Alembic*), Ferradol (*Parke-Davis*), Kepler's Malt with Shark liver oil (*B-Welcome & Co*), etc., are also some of the best malt preparations combined with vitamin A and other minerals and vitamins.

Vitamin A Patents

Tablets:	Arovit *Roche.* 50,000 I.U./Tablet. *Dose:* 1-3 Tablets daily.
Capsules:	Aquasol—*U.S.V.* 50,000 I.U./capsule. *Dose:* 1-3 capsules daily. Prepalin—*Glaxo.* 24,000 I.U./capsules. *Dose:* 2-6 capsules daily.
Liquid drops:	Arovit—*Roche.* 150,000 I.U. per 30 drops. *Dose:* 8 to 15 drops daily.
Injection:	Arovit—*Roche.* 300,000 I.U./ml. *Dose:* As desired by a Physician.

REFERENCES

1. Goldblatt, H. and Zilvia, S. S., *Lancet*, ii, 647.
2. Antia, F. P., *Clinical Dietetics and Nutrition*, pp. 106-115.
3. McCollum, E. V., *et al.*, *J. biol. Chem.*, 53, 293.
4. Broadley, *The People's Food* 157.
5. Moore T., *Practitioner*, 185, 5, (1959).
6. Mattson, *et al.*, *Arch. Bio Chem.*, 15, 65.
7. Moore, *Biochem. J.*, 24, 692 (1930).
8. Varma, T. N. R. and Chichester, C. O., '*Bio-Synthesis of carotenoids*' Reviews in Food Technology, pp. 109-10, Vol. 3, C.F.T.R.I.
9. Hume, *et al.*, *Spec. Rep. Ser. med. Res. Coun.* (Lond.), No. 264, H.M. S.O., London.
10. Ramlingaswamy, *et al.*, *Indian J. med. Res.*, 37, 51, (1949).
11. Frandson, A., *Acta odont. Scand.*, *Supplement* 37, (1964).
12. Ramlingaswami, V. I., *J. Med. Sce.*, 2, 665. (1948).
13. Mottram, V. H. and Graham, G., *Food and the principles of Dietetics* pp. 138 to 148. 10th Edn., (1948).
14. Mellanby, E., *Proc. Roy. Soc.*, *B.*, 132, 8, (1944).
15. Goodwin, *International Convention on Biochemistry* held in Bangalore that concluded on 8.9.1967.
16. Koster, R., Consultant in Dermatology, Waldshut, (Germany), 'Die Behanlung der Acne Vulgaris Iuvanilis in der Praxis'. *Ther. d. Gegenw.* (Germ.), 102, 749-60, (1963).
17. Harper, H. A., '*Review of Physiological Chemistry*', p. 62, 8th Edn., Lange Publications, Los Altos, California, (1961).
18. Sulzberger, M. B., and Lazer, M. P., *J.A.M.A.*, 146, 788, (1951).
19. Reinberg, I. E., and Gross, R. J., *J.A.M.A.*, 146, 1222, (1951).
20. Bair, G. *J.A.M.A.*, 146, 1573, (1951).

26. VITAMIN D

The secret of early morning *Surya Namaskar*, practiced by our ancient rishis and wise forefathers was discovered by PALM, who wrote an article '*The Geographical distribution and aetiology of Rickets*' in *Practitioner, 45,270 and 328, 1890*, that morning sun-rays are rich in Ultra-Violet-Rays, which, on falling on the skin activate a wonderful chemical substance named 7-dehydrocholesterol. After exposure to morning sun-rays, this substance in the skin forms the natural source of vitamin D in all the animals and man. McCollum, in 1922, isolated vitamin A and D from cod liver oil and described vitamin D as an antirachitic vitamin which resists oxidation.[3]

Pharmacodynamics of Vitamin D

Edward Mallanby and his wife, May Mallanby proved by their experiments that, vitamin D, is very much essential for the proper absorption of *Calcium and Phosphorus*. It is proved that poor absorption and metabolism of both of these minerals, checks the formation of strong and healthy bones resulting in *Rickets*. Therefore, vitamin D is known as *Antirrhachitic Vitamin*. It controls the proper metabolism of *citrates* in blood, bones, kidneys, heart, small intestine[4] ZETTERSTROM *et al.*, proved that Vitamin D also influences the proper handling of phosphates by the kidneys. They confirmed that for this reason *Alkaline phosphates* inevitably increase in *Rickets* which is in fact a genuine diagnostic feature of this disease.[6]

Chemistry of Vitamin D

Vitamin D is synthetically made by the exposure of *Ergosterol* to *U.V.R.* by which *Calciferol* is formed. (1 mg. of Calciferol= 40,000 I.U. of vitamin D.)

Foods rich in Vitamin D

Fishes, eggs, animal-livers, butter, milk etc., are rich in vitamin D. Provitamin D_2 (*Ergosterol*) occurs in plants (*Ergot*) and yeast. It is absorbed from the intestines along with fatty emulsion formed by the action of bile. After absorption, it is stored in liver, bones, skin and brain.[8]

Daily Requirement of Vitamin D

According to recommendation made by British Medical Association (1950); vitamin D in I.U. is daily required as follows:

Children:	0—12 months	400 I.U.
	1—9 years	400 I.U.
Adolescents:		400—600 I.U.
Pregnancy and lactation:		600—800 I.U.

(Goodman and Gilman, 'The pharmacological Basis of Therapeutics', pp. 1650; 3rd Edn. The Macmillan Co., New York 1965.)

Signs and Symptoms of Vitamin D deficiency

In our country, though we are blessed with plenty of sunshine, our children usually suffer from rickets due to ignorance

and malnutrition. If any kind soul peeps in the tiny eyes of the poor children who rarely drink a cup of milk or eat an egg in a week, he will understand how unfortunate they are!

Deficiency of vitamin D causes *Rickets* in which the child looks old with enlarged head. The face looks drawn, dry and wrinkled. The fontenals of the head remain unclosed and the head does not stand firm on the neck. One easily sees the beads of tiny perspiration all around the head even in cold weather. The ends of the arm and leg bones become deformed and they swell due to poor formation of the bones. The bones of the chest become soft and get depressed forming the classical '*Funnel shape of rickets*'. The bones of the legs become bow shaped due to pressure of the body and the child fails to walk properly. This condition reduces the body resistance and the child becomes an easy prey to infection and dies due to toxaemia unless treated properly in time.

Vitamin D deficiency also develops during pregnancy and lactation, if there is an inadequate supply of vitamin D. The extra need of calcium during this period is compensated by drawing the required calcium for the growth of the foetus from the long and pelvic bones of the mother. If there is no regular supply of vitamin D and calcium, these bones remain soft and weak and the mother develops *Osteomalacia*. This is also common among the ladies who stay indoors due to social or religious customs.

After some days of delivery, the mother feels a kind of dragging pain in the hips and usually this is ignored as a common complaint after childbirth. After some months, she feels that the pain becomes intense and she begins to limp while walking. In this state, if it is not properly treated, she becomes bed-ridden and remains crippled.

How to prevent and cure Vitamin D deficiency

Vitamin D deficiency can certainly be prevented by feeding the children with fresh milk into which 1-3 drops of *Ostelin-(Glaxo)* are daily added. Exposing the children to morning sun-shine without clothes, giving them a teaspoon of cod-liver or shark liver oil daily with milk also prevents the deficiency of vitamin D and helps them to grow quickly, stonger and healthy.

In olden days, the wise mothers used to massage their children with pure cow's melted butter (Ghee), and used to expose them to morning sun. Even today, this folk medicine works wonderfully if used regularly.

Indications of Vitamin D Therapy

In diseased conditions like: *rickets, delayed teething, delayed consolidation, fractures, decalcification in pregnancy and lactation, osteoporosis, asthenia, tuberculous adenitis, pulmonary tuberculosis, sero-fibrinous pleurisy, asthma, allergic-rhinitis, eczemas, chilblains, tuberculous-sinuses, Pot's disease, lupus vulgaris, arthritis, psoriasis* and *osteomalacia*, Vitamin D, in the form of *Ostelin-forte 50,000. I.U. per tablet. (Glaxo) or Sterogyl. 15, A.—Roussel Oral ampule —6,00,000. I.U. per ampule*, should be given once a week for two to three months. In my opinion, oral administration of vitamin D in the form of *Ostelin-forte, 100,000* to *200,000. I.U. per day* according to the severity of the disease and continued for two to three months with frequent intervals is quite satisfactory. (It is cautioned that all these diseases require a physician or a surgeon to treat them properly to effect a permanent cure. Simply, treating with oral Vitamin D, may not be useful.)

Absorption of vitamin D, from food and sun-rays can be increased by occasional administration of Biochemic *Calc-Phos. 6x. 5 gr.* t.d.s., once a week, alternating with *Silicea. 12x 5 gr.* t.d.s. The same can be safely repeated during the treatment of all the above said diseases, with very good result. (Dr. D. M. Foubister).

Hypervitaminosis D

Indiscriminate daily use of vitamin D, in large doses, exceeding 1800 I.U. for three to four months causes hypervitaminosis D, resulting in vomiting, diarrhoea, loss of appetite, loss of weight, headache, general weakness, excessive urination, constipation etc. Therefore, anxious mothers are particularly warned of excessive use of vitamin D, in hope to bring rapid growth to their children. I have seen few cases of children who were given more vitamin D in the form of *Ostelin liquid* for two to three months, developed convulsions without fever, which however subsided on stopping the medicine. Remember, convulsions in children can be serious, ending in death.

REFERENCES

1. Palm, T. A., *Practitioner*, 45, 270 and 321.
2. U.S. Dept. of Agri., *Agriculutre Hand-Book* No. 8, June 1950.
3. Antia, F. P., *Clinical Dietetics and Nutrition*, pp. 115-123 (1966).
4. Steenbock, H. and Bellin, S. A., *J. Biol. Chem.*, 205, 985 (1951).
5. Zetterstrom, R. and Ljungren, M., *Acta Chir. Scandinav.*, 5, 252, (1951).
6. Harper, H. A., *Review of Physiological Chemistry*, pp. 63-64 (1961).

27. VITAMIN E

I have got an old Persian manuscript on Unani medicine, written by an unknown author who seems to have lived during the time of Emperor Jahangir. The author has formulated various herbal and metalic medicines for different kinds of diseases. He has written only those medicines which he tested and found specific for the respective diseases.

In this manuscript, there is a simple food-medicine for Sterility having the following ingredients:

Cotton-seed oil	2 parts
Palm Jaggery	1 part
Pure black goat's milk	10 parts

The author instructs as follows:

'Take this medicine every morning before sun-rise after praying to God mixing all the ingredients well. Commence this medicine after the fifth day of menstruation and continue to use every morning for 7 days regularly. On the last day of taking the medicine sleep with your husband after praying to God and continue to sleep for another four nights regularly to enjoy the bliss of the union of the two bodies. By the Grace of God you will have a moon-like child. Please bless my soul after your lap becomes green'.

I tried this simple medicine in number of sterile patients who had undergone various treatments including D and C without any benefit. After treating these patients with this food-medicine majority of them became pregnant and gave birth to healthy babies. (Treatment of sterility is a very complicated process and—

one is advised to undergo a complete male and female investigation to have good results. This medicine is only useful in simple cases having progesterone and vitamin E deficiency).

How this simple food-medicine cures is no wonder. If you analyse the each ingredient of this old recipes the treasure-house of vitamin E, which is one of the major tools in the hands of gynaecologists and obstetricians to cure sterility and prevent abortions. You will wonder how perfect were our ancient masters in the science of therapeutics.

Chemistry of Vitamin E

Vitamin E is synthesized as *Tocopherol.* This word is derived from Tocos: *childbirth*; Pheros: *to bear. Alfa, beta, gama* and *delta Tocopherol* are some of the synthetic vitamin E.[1]

Foods rich in Vitamin E

Tocopherol Contents of Foods* (in Mg./100 G.)

Fruits					
Apples	0.74	Bananas	0.40	Grape-fruit	0.26
Oranges	0.24				
Vegetables					
Beans dried navy	3.60	Cabbage	0.11	Carrots	0.45
Celery	0.48	Lettuce, head	0.43	Onion	0.26
Potatoes (Peeled)	0.06	Potato sweet	4.0	Tomatoes	2.30
Turnips green	2.30				
Cereals					
Cornmeal yellow	1.70	Farina	1.60	Oatmeal	2.10
Rice brown	2.40	Rice polished	0.57	Wheat-flour	2.20
Wheat spagati	1.20				
Bakery Products					
Bread white	0.23	Bread wheat	1.30	Cake (unfrosted)	9.65
Doughnuts	2.52				
Meats					
Bacon	0.53	Beef-steak	0.63	Beef-liver	1.40
Lamb chaps	0.77	Porkchops	0.71		
Fish					
Haddock	0.39				

* Harris, P. L., Quaife, M. L. and Swanson, W. J. (1959). 'Vitamin E, content of Foods', *Journal of Nutrition,* 40, 367 ('Clinical Dietetics and Nutrition' F. P. Antia, 1966, pp. 124-125.)

Chicken

Chicken, whole	0.25	Egg, whole	2.00

Dairy products

Butter	2.40	Cheese	1.00	Ice cream-vanilla	0.30
Milk Whole	0.12	Milk evaporated			0.30

Vegetable Oils and Fats

Coconut	8.3	Corn refined	87	**Cotton seed refined**	**90**
Margarine	54	Olive	56	**Palm**	**56**
Peanut, refined	22	Soyabean	140	Lard	2.7
Wheatgerm	268	Shark liver	4-10		

Miscellaneous Foods

Chocolate, unsweetened	11.10	Cocoa	3.1
Peanuts	9.30	Potato chips	3.22
Pudding, chocolate	0.69	Yeast	0.00

Daily requirement of Vitamin E

Vitamin E 15 mg. is daily required.

Pharmacodynamic action of Vitamin E

Vitamin E plays a major role in the transportation of *oxygen* in the body. It functions as a co-factor in the electron transfer system operating between *cytochromes b* and *c* (Nason).[3] The turn over rate of nucleic acids is accelerated by vitamin E (Harper).[4] Vitamin E also controls the secretion of Fertility-hormones, prevents the congenital anomalies and muscular dystrophy. Recently it is discovered that Vitamin E acts on the motility of sperms and keeps them virile and strong. It prevents the necrosis of liver due to malnutrition (Schwartz)[5].

Absorption and Excretion of Vitamin E

Vitamin E is absorbed from small intestine. The vitamin E content of blood is between 361-412 mcg. per 100 ml. (Nair).[6] or 1 mg. per 100 ml. of blood serum. It is found that vitamin E, can be destroyed while cooking particularly when the foods are fried. Therefore, overcooking and frying should be avoided. However, eating fresh uncooked vegetables is the best source of vitamin E. There is no evidence of any toxity after prolonged use of vitamin E.[1, 10]

Signs and Symptoms of Vitamin E deficiency

The signs and symptoms of vitamin E are vague except during pregnancy in which it is empiricaly given when there is a history of abortion or there is any bleeding etc. Vitamin E is one of the 'hope' Vitamins which doctors administer and patients take to satisfy a need to do some thing. There is no toxic effect from the larger doses of Vitamin E (Antia).

Clinical manifestations of Vitamin E

1. Gynaecology and obstetrics

(a) Sterility

MARRARO,[7] says that vitamin E, has been used without any effect in the treatment of sterility and habitual abortions. But, in my series of experiments and clinical trail conducted on 300 cases of sterility and habitual abortions, about 55 per cent of them responded well to vitamin E alone which was given in the form of *Ephynal-Roche 100 mg. daily.* My professor *Dr. Gross,* method of checking infertility was observed in all the cases.

Supplementing vitamin A and C in the form of *Arovit-Roche 50,000 I.U. and Redoxon-Roche 500 mg. per tablet given one of each two times a day with* usual vitamin E, 100 mg. along with food rich in proteins, calcium, iron etc., added another 30 per cent of success totalling 85 per cent all together. Prior to this treatment all the patients had regular abortions in their previous pregnancies.

Note: Treatment of sterility and habitual abortions can rularly never be dependent on *vitamin E.* Hence, in all such treating on *Dr. Gross,* method leads towards a very successful road.

Dr. Gross, Method to Control Infertility

'The Infertility Department of the Rotunda Hospital has involved routine approaches to different types of infertility. Marriage guidance is an essential portion of the problem of Infertility and a Marriage Guidance Clinic has functioned for a number

of years. The routine investigation of an infertile marriage demands the consideration of four factors:

1. Ovulation.
2. The tubal factor.
3. The fertility of the husband.
4. The marriage, including technique, frequency and timing of intercourse.

Considerable research work has been done on ovulation and the tubal factor, but very little consideration has been given in the literature to male fertility and maritial technique.

Male Fertility

Male Fertility is affected by the following factors.

1. The temperature of the scrotum.
2. The diet, especially high intake of protein and phosphorus.
3. The general health.
4. The vitamin intake, particularly vitamin C, vitamin E and Vitamin A
5. The frequency of intercourse.

There would appear to be no doubt that male fertility fluctuates according to these factors. Each male has a frequency of intercourse that is compatible with full fertility. This is not the same for all males. To fully investigate a marriage, it is essential to determine the frequency factor for intercourse in which the husband can maintain full fertility. This is important in both primary and secondary sterility.

In primary sterility many marriages can be made fertile by mere regulating the timing, frequency and technique of intercourse.

In secondary sterility, multiple miscarriage, habitual abortion, and repeated foetal abnormalities such as anencephaly can in the absence of other causes be attributed to semen of poor quality caused by excessively frequent intercourse. Here the soma type, stature, education, social habits, testicular development, diet and vitamin intake will of course always affect the issue.

The most important question to answer is: how long must elapse from the last to the present act of intercourse if the present act of intercourse is to be 100 per cent fertile; the answer is

at least ten days. It must not be forgotten that animals have intercourse only when the female is ovulating or about to ovulate. Animals also do not have intercourse during pregnancy.

Routine Approach to all Cases

Both husband and wife are interviewed separately. A careful history is taken and each is questioned on the technique, frequency and timing of intercourse. On the wife a pelvic examination is carried out. She is then given a lecture on the physiology of menstruation, ovulation, coital technique and the ways of producing maximum fertility in herself and in her husband. A general examination of the husband is aimed in particular at excluding diabetes and syphilis. His genitalia are examined, abnormalities such as phimosis, atrophied and undescended testes, varicocele and hypospadias are looked for. His adolescence and early sexual experience are analysed and he too receives a lecture on coital technique, male and female orgasm and how to create the optimum conditions for fertility. He is then put on the following preconceptional profertility regimen.

The Preconceptional Profertility Regimen

1. Rest from intercourse for as long as possible, at least ten days, or better still for a month or six weeks, the rest to end on the day the wife starts to ovulate.
2. To abstain from hot baths.
3. No tight fitting underwear that raise the scrotal temperature too much.
4. A high protein, high phosphorus diet.
5. Supplemental vitamins C, E and A are prescribed in high doses. In addition iodized table salt should be taken.
6. From the date the wife starts to ovulate, intercourse should take place as often as desired for 4-7 days. Rest again from intercourse for 24 or more days if possible until the phase of ovulation in the next cycle.

Antenatal Routine in Secondary Sterility

When the case history includes former abortion, miscarriages, dead babies, or anencephalics, during pregnancy there must

be no cycling, dancing, swimming, lifting of heavy weights, hair washing or hot bath and no intercourse. Vitamin C is taken in the form of '*Redoxon-Roche*', 200 mg. 3 times daily and vitamin A, E, in the form of 1 tablet '*Rovigon-Roche*' (30,000 I.U. Vitamin A and 70 mg. Vitamin E) twice daily. Until the 37th week, one injection weekly of each following is given: *bismuth oxychloride* (1 ml. injection bismuth oxychloride, B.P.) I.M. into the upper and outer quadrant of the buttock; and 1000 mcg. vitamin B_{12} I.M. If cervical deficiency is present a small backlite ring is placed around the cervix at the level of the internal os and left in position until the 38th week.

Results

Typical results from the methods used are as follows:

Previous anencephalics and foetal abnormality

In 16 cases of clinical trail, when the preconceptional profertility regimen was allied to the antenatal routine, all patients gave birth to a normal healthy child, that is, a success rate of 100 per cent.

Habitual death of the foetus in conditions other than deficient cervix treated when first pregnant with antenatal routine including vitamins A, C, E, B_{12} and bismuth.

Cases treated	99
Live babies	81
Abortion and miscarriage	10
Dead born	6
Neonatal deaths	2

Excessively frequent intercourse. In 225 cases of secondary sterility 53 cases were found in which no factor was present except excessively frequent intercourse. On application of the preconceptional profertility regimen to these cases, 21 pregnancies resulted of which two aborted.

In conclusion it may be stated that male fertility fluctuates. Each male has a frequency of intercourse that is compatible with full fertility. This frequency is not the same for all males. By means of the preconceptional profertility regimen, adequate rest from intercourse and the timing of intercourse in relationship to ovulation dates, it is possible to produce maximum male fertility'.[3]

(b) Abortion and Congenital Anomalies

Vitamin E is successfully used in the prevention of *habitual abortions, tendency to premature delivery* and *congenital anomalies.* EVEN SHUTE, in his researches confirms that, congenital anomalies result from placental inadequacy. As vitamin E has shown to be effective in overcoming this inadequacy, it is logical to administer alpha tocopherol on conception, to mothers who had anomalous infants previously. Fatal anomalies which can result from anoxia in early pregnancy can be avoided if alpha tocopherol, which increases the oxygen utilisation in tissues more than any known nutrient or physiologic substance, is administered early in pregnancy before the twelfth week of gestation. He confirms that vitamin E, is equally effective in males too. Its administration in males increases the number of spermatozoa which become scare in them due to sedentary life, malnutrition, stress and excessive use of tobacco etc. In all such cases giving vitamin E, 100 mg. daily for at least 3 weeks before they intercoursed, has resulted in prevention of congenital anomalies. Administration of vitamin E, from the beginning of the conception along with high protein, calcium, iron-diet up to the entire period of pregnancy with regular medical check ups is the surest protection against child mortality.[9]

(c) Dysmenorrhoea

In young girls who often complaint of severe crampy pain during menstruation, giving vitamin E, 10 mg. 3 to 4 times a day commenced from 4 days earlier the expected time of menstruation and continued for another five days during the flow is found to be very effective in my practice. In all such cases, I usually, use vitamin E plus A, in the form of *Rovigon-Roche* 1 tablet a day which is sufficient to bring rapid relief. Cases who do not respond to this treatment, should be fully investigated and treated for the underlying cause.

(d) Menopause

Change of life is a very critical period in woman. She is laden with tension and other psychological problems. In such cases frequent use of vitamin E, 100 mg. daily with *Serpénia-*

Dr. Langhof, I administered Vitamin A and E in the form of *Rovigon-Roche* 2 tablets 4 times a day along with a tablet of Calci-luin 2 times a day for a month. The curative effect was dramatic and even after stopping the treatment, there was no light sensitivity. *Dr. Langhof*,[7] is of opinion that such hypersensitivity to light may be due to reduced ability of the patient's skin to bind toxic photo-oxidation products.

3. *Deafness.* Old persons suffering from deafness and deafness due to injury to the organ of Corti responds very well to vitamin A and E therapy. In such cases, Rovigon 2 tablets 3 times a day for a month brings rapid relief and imparts a feeling of well being and protects the eyes.

4. *Peripheral circulatory disorders:* ASSMANN[8], considers that administration of vitamin A and E along with usual vasodilators is remarkably effective. Still better results are to be expected where treatment is started at a less advanced stage of the disease with high concentrations of vitamin A and E. In my opinion *Rovigon* and *Ronicol-Roche* seems to be an ideal combination in all such cases.

5. *Effect of vitamin E and A on milk secretion:* SHAFEI[9] Studied the lactogenic effect of vitamin E and A and confirms that giving them 200 mg. and 1000,000, I.U. daily increases breast milk. He says, vitamin A almost certainly has a specific lactogenic effect, acting either directly on the mammary gland or indirectly by stimulation of the pituitary and ovaries. This effect is potentiated by vitamin A.

Biochemic remedies and Vitamin E absorption

In all vascular disorders like, hypertension, cardiac ischaemia, varicose veins, etc., regular treatment supplementing vitamin E 100 mg. daily and *Calc-Fluor. 6x 5 grs. t.d.s.* seems to enhance the therapeutic effect and brings rapid improvement.

Supplementing *Kali-sulph. 12x t.d.s.* along with Vitamin E 200 mg. daily commencing after 6 days of menstruation and intercoursed during ovulation is found to be very effective in simple types of functional sterility due to lack of hormones. Continuing Kali-sulph. 200x 5 grs. a week alternating with *Kali-phos. 6x 5 grs. weekly once* prevents the foetal anomalies and eases

the child birth. During this entire period, vitamin A, E, C and B-complex and nutritious diet must be regularly given.

During the treatment of *threatend* and *habitual abortions, toxaemias of pregnancy, lack of breast milk* etc., vitamin E 150 mg. daily; supplementing with *Silicea. 12x 5 grs. t.d.s. for a week* and Silicea. 200x 5 grs. once a week along with Calc-phos, 6x 5 grs. bi-weekly during the entire pregnancy is very effective measure. (Dr M. Blakie, M.D., F.F. Hom., M.R.C.O.G. Gynaecologist, R.L.H. Hospital, Bloomsbury, London).

Recently, The Biochemic Society of Germany has proved, that, the various *Tissue Remedies* explained above have a definite relationship in absorption of vitamin E from the food.

I found remarkable symptomatic relief in *bulbar paralysis, amiotrophic-lateral sclerosis, tabes dorsalis*, on administering vitamin E, 100 mg. t.d.s. with vitamin B_1 in the form of *Benerva-100 mg. Roche* t.d.s. supplementing with *Kali-sulph. 12x t.d.s. and Kali-phos. 30x t.d.s.* The treatment was continued for 3-4 months with a weekly dose of *Mag-Phos. 12x 5 mgs.*

REFERENCES

1. Antia, F. P., *Clinical Dietetics and Nutrition*, pp. 115-123, 15, (1966).
2. Harris, P. L., Quaife, M. L. and Swanson, W. J. (1950), Vitamin E content of Foods. *Journal of Nutrition*, 40, 367 ('Clinical Dietetics and Nutrition', F. P. Antia, (1966), pp. 124-125).
3. Nason, A. and Lehman, *J. Biol. Chem.*, 222, 511, (1956).
4. Harper, H. A., *Review of Physiological Chemistry*, pp. 64-68, (1961).
5. Schwartz, K., *Nutrition Reviews*, 18, 193 (1960).
6. Nair, P. and Margar, H. *J. Biol. Chem.*, p. 220, 157, (1956).
7. Langhof, 'Dermatitis Solaris subita recidivans', *Arch. Klin. exp. Derm.* (Germ.), 214, 549-58 (1962).
8. Assmann, F., *et al.*, *Chirug* (Germ.), 30, 63-65 (1959).
9. Shafei, A. Z., 'Clinical Observation on the lactogenic effect of vitamin A and E. *Alexandria Med. J.* (U.A.R.), 5, 194-5 (1959).
10. Gross, R. G., *The Roche Courier*, Vol. XVI, 6, (1965).
11. Evan Shute, *Fertility and Sterility*, Dumex Digest (India), Vol. 11, No. 4, April (1959).
12. Boyed and Shute, *Surg. Gynec. Obst.*, (U.S.A.), 86, 1-8, (1948).
13. Tolges, *Canad. Med. Ass. J.*, 76, 730-38, (1957).
14. Livingstone, P. D., and Jones, *Treatment of intermittent claudication with vitamin E, Lancet, Engl.*, 11, 602-04 (1958).

28. WATER-SOLUBLE VITAMINS

Vitamins like: *B-Complex*, *C* and *K* are soluble in water and all water-soluble vitamins are affected by heat. Therefore, these vitamins should be handled with care while washing and cooking. Adding baking soda to retain the natural colour of the fresh vegetables, cutting them finely and rigorous washing destroys these vitamins and makes the food useless.

29. VITAMIN B-COMPLEX GROUP

Vitamin B_1, B_2, B_6, B_{12}, *Nicotinic acid*, *Pantothenic acid*, *Folic acid*, *Choline*, *Inositol* and *Biotin* are grouped together although some of them are not B vitamins.

30. VITAMIN B_1 (Thiamine or Aneurine Hydrochloride)

Thanks to EIJKMAN, a Dutch physician in Java for his wonderful discovery of vitamin B_1. He wondered, why certain persons who ate highly polished rice and over-boiled vegetables developed extreme tiredness, heavyness of the legs, lack of appetite difficulty in walking, giddiness, lassitude, weakness of the heart, palpitation of the heart, insomnia, indigestion and numbness in the limbs. He was astonished to note that these symptoms disappeared after feeding these sick persons with *hand pounded unpolished rice*, *fresh green uncooked vegetables* and *fruits*. He noted that there is a factor in the outer covering of the rice and fresh green vegetables and fruits, absence of this factor causes all the above said diseased symptoms. Later CASIMIR FUNK, a Polish chemist isolated a crystalline substance from *rice-polishings* and named it as *Vitamin* B_1 in 1911. In 1936 vitamin B_1 was synthesized having its chemical structure as; C_{12} H_{17} CIN_4 *OS. HCl.*

Chemistry of Vitamin B_1

Vitamin B in the form of Thiamine hydrochloride is a white crystalline substance soluble in water. It is stable in acid solution

and at 100 C. It is not stable in alkaline medium, therefore, adding soda-bicarb while cooking is not advisable. It has a thiazole and pyrimidine nucleus and *one milligram of thiamine hydrochloride* internationally represents *333 I.U. and 3 mcg. uals to 1 I.U.*

Foods rich in vitamin B_1 (in mcg. per 100 g.)

Cereals:

Bajra	140	Jawar	300
Ragi	215	Rice bran	2700
Wheat	330		

Flesh foods:

Beef	100	Chicken	80
Egg	30	Ham	325
Mutton	166	Veal	122
Crab	100	Oyster	120
Milk (cow's)	½ cup 50	Milk (buffalo's)	40

Vegetables:

Bengalgram	43	Greengram	65
Cabbage	60	Peas	340
Turnip	60	Carrot	60
			etc. etc.

(Clinical Dietetics and Nutrition—Antia, F. P. pp. 526-29, 1st Edn. 1966)

Daily requirement of Vitamin B_1

0.5 to 1.5 mg. of vitamin B_1 is daily required.

Pharmacodynamic action of Vitamin B_1

In our body, vitamin B_1 is required to help proper metabolism of carbohydrates and the distribution of energy to all the nerve and muscle-cells. Vitamin B_1 is indispensable for the oxidisation of pyruvic acid with the help of insulin, for the optimal growth of infants and children, etc.

Absorption and Excretion of Vitamin B_1

Vitamin B_1 is usually affected by rigorous washing and cooking. It is absorbed from large and small intestine. It is excreted in the urine, breast milk and much less in stool.

Signs and Symptoms of Vitamin B_1 Deficiency

After the absorption very little of vitamin B_1 is stored in liver, muscles, kidney, heart, brain etc. Even this little storage can b reduced if there is an inadequate supply of vitamin B_1 in the for of food rich in it. *Faulty food absorption* due to intestinal disease*excessive demand of vitamin* B_1 during *acute illness, during surgery, growth, pregnancy* and *lactation* also plays a major role in reducing the body storage of vitamin B_1.

When vitamin B_1 is depleted from the body, deficiency of vitamin B_1 occurs in which one starts feeling a sort of tiredness associated with lack of appetite. The patient feels that his legs are becoming heavy and finds difficulty in walking for a little distance. He must take rest as he feels a kind of uneasy crampy pain in them as if there are pins and needles. The wife notices that her husband who once was so cheerful has become irritable, depressed, does not like to eat however deliciously she cooks. He has lost his usual cheerful attitude towards his family and friends. He is always seen with a crown of frown and remains moody. He complains of throbbing headache with dizziness on walking and while rising from sitting position and feels ringing sounds in ears on turning the head quickly. A devoted wife often worries on finding her dear husband who has lost interest in her, in children, in home and in her daily affairs. When she tries to woo, he flarese on her and unnecessarily scolds and makes mountains out of moles. He sits brooding for hours with the silly feelings either to commit suicide or to run away from the hom He looks his face in a mirror and hates it. Some times he sp on his own image. There will be no sleep because of over crowdin of the thoughts and one gets completely exhausted in the morning. Due to poor carbohydrate absorption, one feels burning in the chest and passes excessive flatus of bad smell and *frequently* con plains of constipation, attributable to vitamin B_1 deficiency.

In children and adolescents, vitamin B_1, deficiency cause lack of concentration, stubbornness, and laziness. They develo great fear of their teachers, parents, and strangers. They hat to go to school and play with their friends. In class, they slee while the lecture is going on. They come home tired and sta indoors quarrelling with other members of the family. Suc

students usually fail to progress in their studies and become a burden on their parents.

If these symptoms are not treated by vitamin B_1, they become more serious and one sees his feet are becoming swollen. He becomes breathless on walking or climbing the stairs. His mind becomes cloudy and fails to think easily. His heart begins to thump violently and he feels his limbs are becoming numb and heavy as if filled with lead. He becomes more sensitive to noises, suffers from diarrhoea and likes to remain at home with fear of death. In such advanced conditions of vitamin B_1 deficiency, the body resistance becomes weak giving an open way to all sorts of infection and one dies due to toxaemia and exhaustion. In all such patients immediate treatment with antibiotics and heavy doses of vitamin B_1 in the form of *Benerva-Roche 100 mg. t.d.s. or Benuron Forte 100 mg. t.d.s.* should be commenced as early as possible. *It must be remembered that* 'THERE IS NO SUBSTITUTE FOR VITAMIN B_1'.

Clinical Manifestations of Vitamin B_1

1. *Neurology:* It is already known that vitamin B_1 is indispensable for the metabolism of carbohydrates and for the destruction of pyruvic acid. Moreover, cells of the nervous system are entirely dependent on carbohydrate for their energy requirement. In adequate supply of vitamin B_1 in the body, impairs the carbohydrate metabolism and fails to remove the pyruvic acid from the nerve-tissues and interferes with the wonderful mechanism of motor and sensory transmission. This functional failure of the nervous system, leading rapidly to organic changes which are reversible only during the initial stages.

Functional or organic impairment of the nervous system gives a rise, directly or indirectly, to various symptomatic complexes. Primarily, it appears in peripheral sensory and motor disorders—*polyneuritis and mental disturbances.* But secondary symptoms may occur in any organic system the innervation of which is affected by the pathological process. Hence, the main functions of vitamin B_1 are to ensure energy for nerve-cells and to protect them from intoxications. 'This is attributed by BONNET DE LA TOUR, that vitamin B_1, has a tonic action on the nerves'.[2]

In our daily practice we use vitamin B_1 for a number of neurological disorders having the clinical manifestations of muscular weakness and cramps, paresthesia, anesthesia, loss or decrease of ankle and knee jerks and of vibration sense, at a later stage for paralysis and muscular atrophy etc. Particularly for all painful conditions like: *Neuritis and Polyneuritis, Scapulohumeral periarthritis, Artheroses, Rheumatic neuralgias, Sciatica, Rheumatic pain, Lumbago, Mylagias, Trigminal neuralgia, Intercostal Neuralgia etc.*, regular administration of thiamine in the form of *Benerva-Roche 200-300 mg. daily* exerts a sure analgesic action due to vitamin B_1. Supplementing vitamin B_{12}, enhances the analgesic action of vitamin B_1. (Robert. R. Sem. Therap. France. 34, 508-09, 1958). Robert states that in all painful conditions, heavy doses of vitamin B_1 supplemented with vitamin B_{12}, 1000-2000 mcg. orally per day, not only exert a very selective action on the sensory disorders but also provides a tonic effect on the nerves. This analgesic action of thiamine is attributed to the hypernutrition of nervous tissues, the detoxification of pyruvic and lactic acids and the motion of cholinergic nervous transmission, VILLEQUEZ, says, 'Intensive thiamine therapy is recommended in polyneuritis of varied etiology, trigminal neuralgia, facial neuralgia, sciatica and nerve-root pains'.[3]

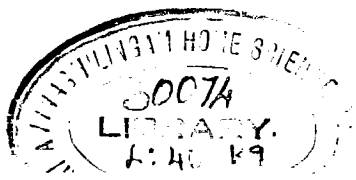
Remarkable results are seen in all mental disorders by using thiamine mononitrate in the form of Benerva-*Roche* 100 mg. 4-6 tablets a day with Redoxon-*Roche* 500 mg. daily. Supplementing *Eskazine* (*Smith Kline*) *1 mg. one tablet t.d.s.* with vitamin B_1 and C, in cases of neurasthenia, poor concentration and memory, lassitude, insomnia, irritability, depression, anxiety etc., often brings a rapid recovery and keeps the patient cheerful. (*Librium-Roche 10-20 mg. daily can also be used with vitamin* B_1 *and C*).

2. *Cardiology:* JONES, says, 'Intensive studies during the past several decades have revealed specific causes of certain cardiac disorders formerly labelled "idopathic", "coronary" or "arteriosclerotic"; one of these is beriberi heart disease. Recent reports suggest that this condition is more prevalent than generally believed and that it occurs particularly in chronic alcoholics; it may also contribute to the cardiovascular picture of thyrotoxicosis and pregnancy, and is sometimes found in acute form in infectious diseases, in gastro-intestinal malabsorption or following

operation. Vitamin B_1 deficiency may also complicate the existing heart diseases, as shown by an undernourished patient with chronic rheumatic endocarditis, mitral insufficiency and congestive failure who did not respond to digitalis and diuretics. Vitamin B_1, 100 mg. four times daily by s.c. injection added to the regime, produced prompt diuresis and weight reduction. A second case illustrates the simple occurrence of beriberi heart disease in a chronic alcoholic suffering from gross malnutrition. Bed rest, a high-carbohydrate, high-protein diet and vitamin B_1 200 mg. thrice daily by s.c. injection led to slow but definite improvement, and the patient was discharged after some $2\frac{1}{2}$ weeks. Progress continued on the same diet and oral thiamine 50 mg. thrice daily at home. In addition to the diagnostic features common to heart disease of other origins, beriberi patients normally present other evidence of thiamine deficiency; the most specific indication, however, is the prompt response to vitamin B_1 in high doses'.[4]

'The necessity for adequate supplies of vitamin B_1 for normal cardiac function is established, GOODMAN and GILMAN state that mild thiamine deficiency may be fairly prevalent yet escape diagnosis. KIRK[5] reports that the recognition of early symptoms-lassitude, loss of energy and appetite, fatigability and prompt B_1 therapy form an effective prophylaxis of cardiac involvement. Cardiovascular diseases due to thiamine deficiency are manifested by extrasystoles, dysponea on slight exertion, disorders of cardiac conduction, tachycardia and hypotension. Chronic thiamine deficiency causes myocardial neurosis and dilation with sudden death from heart failure in the pig. According to SINCLAIR,[5] relative thiamine deficiency in man due to high carbohydrate diet may affect the heart in two ways: defective carbohydrate metabolism disturbs nerve conduction, and accumulation of *pyruvate* and *pyruvic aldehyde*, both toxic substances, disturbs the metabolism of cardiac muscle cells.

In Europe and the Western hemisphere the association of heart disease and thiamine deficiency may not be so infrequent as generally thought . On the basis of 35 cases in one hospital during a period of two years, WEISS[5] finds that B_1 deficiency may complicate cardiac disease of other etiology. BLANKENHORN,[5] emphasizes the need for early recognition, especially in mild cases, including those complicating other forms of heart disease.


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He suggests the following criteria for the diagnosis: inefficient evidence for other etiology; three or more months on a thiamine deficient diet; signs of neuritis or pellagra; enlarged heart with sinus rhythm; dependent edema; elevated venous pressure; minor electrocardiographic changes; and recovery with decrease in heart size or autopsy consistent with beriberi heart disease.

GREELEY[5] states that failure to respond to digitalis is suggestive of vitamin B deficiency and is the rule. Heart disease due to B_1 deficiency should be considered in every patient with intractable heart disease, especially in older age group; patients having cardiac failure without rheumatic heart disease; in patients with cirrhosis or alcoholism; in shut-ins living alone in those on salt-free diets; and in those poor economic status the condition should be suspected in any case of heart failure which does not respond to the standard treatment of rest, low, salt diet, digitalis and diuretics.

DRUMMOND[5] has administered thiamine as a routine adjuvent to all his cardiac cases over a period of years and considers it to exert a good cardiotonic action. In high dosage it has proved effective in fast fibrillation resistant to digitalis, and when given as a prolonged course in bundle-branch block and complete heart-block. HALDEN[5] also recommends thiamine therapy in digitalis resistance cardiopathies.

In continental countries, cardiac failure, especially left sided with all degrees of pulmonary congestion up to edema, is a complication of chronic alcoholism which responds to high dosage B_1 therapy. BONNET DE LA TOUR[2], also reports that 'high dosage thiamine therapy is specific in functional myocardial insufficiency in chronic alcoholics'.[5]

In all cardiac disorders. I found gratifying results by administering *Benerva-Roche*, 200 mg. t.d.s. along with *Herzolon-Cipla. Bombay 3 Teaspoon t.d.s.* Particularly, a very remarkable effect inducing a feeling of well being is noticed in patients suffering from congestive cardiac failure and patients recovering from acute myocardial ischaemia.

Vitamin B_1 has a great influence on coronary circulation and can be successfully used in improving it. OVCINNKOV believes that disorders of carbohydrate metabolism produced by a variety of exogenous and endogenous factors similar to those influencing regulatory mechanism of the blood pressure and coronary

circulation, play a part in the pathogenesis of the cardiovascular diseases, like: *angina pectoris, myocardial infraction, hypertensive disease, heart failure due to valvular disease* and *arteriosclerosis. Vitamin B_1 corrects the reflex regulation of carbohydrate metabolism and increases coronary flow, improving nutrition of myocardium.*[6] Hence, Vitamin B_1, is indicated in palpitation due to indigestion and constipation, functional deficiency of the heart particularly due to obstruction in the *pulmonary circulation* and *right sided failure.* In cardiac asthma, vitamin B_1, 100 mg. t.d.s. with *Nutraphyline-Hude one tablet t.d.s.* gives a lasting relief.

3. *Gastro-entrology:* In various gastro-intestinal disorders vitamin B_1, 50 mg. given 3 times a day with a suitable digestive enzyme preparation like; *Combizyme* or *Unienzyme* one tablet t.d.s. immediately after meals is found to be very effective. Particularly this recipe is remarkably useful in *carbohydrate* and *protein indigestion, loss of appetite, flatulance, atonic constipation, abdominal distension, metorism* etc. In all these symptoms of digestive hypotonia which may result from functional failure or degenerative changes in the nervous system, sometimes it is necessary to administer vitamin B_1 in higher doses for a period of two to three months. For this purpose, I usually recommend *Benerva-Roche 100 mg.* and *Taka-Combex-Parke-Davis,* one capsule, three times a day after every meal.

4. *Surgery:* Vitamin B_1 deficiency is fairly widespread in post-operative patients convalescing from abdominal operations. COON *et al.*,[7] after extensive study confirms, 'The present study was carried out in an attempt to obtain further support for the premise that an isolated enzyme defect might result from thiamine restriction during the post-operative period. Determinations of the activity of *transketolase*, a thiamine containing enzyme, were performed on the blood of surgical patients. No operative surgical patient was found to have levels of enzyme activity outside the broad range determined for normal persons. In four of 31 post-operative patients, an abnormally low *transketolase* activity developed, a decrease in the rate of *sedoheptulose* production, which, by statistical criteria based on tolerance limits, might be characterized representative of another biochemical lesion of thiamine deficiency. In six other patients, profound decreases in *sedoheptulose* production developed which did not reach the

lower limits of normal but exceeded the very broad tolerance limits for day-to-day variation. A decrease in the activity of two separate thiamine containing enzymes in a significant proportion of diet-restricted surgical patients in support of the potential value of the administration of supplemental thiamine to post-operative patients having operations within the abdomen'.

Therefore, to all patients who are expecting to undergo any operation; it is advisable to give a regular course of vitamin B_1, and vitamin C, in the form of *Benerva* and *Redoxon each* 100 mg. t.d.s. for a fortnight before the operation. The same may also be continued to hasten the healing and tone up the nerves of the patients, convalescing from the operation.

During the treatment of various kinds of chronic cough, administration of thiamine mononitrate (*Benerva or Benuron Forte*) 100 mg. t.d.s. reduces the frequency of spasms of cough and hastens the recovery.

Supplementing vitamin B_1, 50 mg. t.d.s. with the indicated dose of thyroid-extract increases the absorption of iodine and tones up the nerves and digestive organs in patients suffering from *Myxoedema.*

Regular administration of vitamin B_1 50 mg. t.d.s. during the last trimester of pregnancy, helps in easy child birth.)

Indications of vitamin B_1 Therapy

Beriberi, toxic neuritis due to alcohol, arsenic, lead etc., optic-neuritis, herpes zoster, facial nuralgia, pregnancy neuritis, Bell's palsy, hemiperesis, hemiplegia, infantile paralysis, neurasthenia, insomnia, Korsakoff's psycosis, Wernick's encephalopathy, loss of memory, hysteria, mental tension and irritability, chronic fatigue, multiple scelorosis, insanity, dyspepsia, atonic constipation, gastric ulcer, lack of hydrochloric acid, vomiting due to lack of acidity, morning sickness, micro and macrocytic anaemia, diabetic neuritis, toxaemias of pregnancy, myxoedema, goitre, neuro-cardiac disorders etc. (*All these diseases are serious and a physician should only treat them.*)

Dosage

Prophylaxis during restricted diets: 5-10-20 mg. daily by mouth.
Therapeutic doses: 500-1200 mg. daily or as directed by a physician.

Parenteral Administration: Parenteral administration of vitamin B_1 should be reserved for severe cases. It must be noted that giving vitamin B_1 by injection sometimes causes anaphylatic severe reactions ending in death. Cases are reported that even 50 mg. of vitamin B_1 can cause such reaction resulting in death. However, there is no harm in giving vitamin B_1 30 mg. IM with all the caution of reaction. Even in sensitive patients as well as other non-sensitive patients oral administration of vitamin B_1 up to 1200 mg. daily is quite safe and effective.

Administration of Biochemic *Kali-phos. 6x 5 grs. t.d.s.* alternating with *Magnesium-phos. 12x 5 grs. t.d.s. with warm water* is reported to be effective during the treatment of vitamin B_1 deficiency diseases with thiamine. (Dr W. L. Templeton, M.D., F.F.Hom. Dean, R.L.H. Hospital, London).

Vitamin B_1 Patents

Benerva—*Roche*, 10-50-100 mg. per tablet
Benuron—Forte, *Franco-India*, 100 mg. per tablet.
Berin—*Glaxo*, 5-10-50-100 mg. per tablet.
Betamid—*Cipla*, 5-10-50 mg. per tablet.

Injections are also available in the same strength.

REFERENCES

1. Antia, F. P., *Clinical Dietetics and Nutrition*, pp. 56-66, (1966).
2. Bonnet de la Tour, *J. Med. Chir. Prat.* (France), 129, 305-12, (1958).
3. Villequez, E. J., *Association acidenicotiniueae—thiamine en pathologic generale. Gax. Med.* (France), 62, 567-70, (1955).
4. Jones, R. H., Roche, *Courier*, Vol. XIII, 6 P. 23, (1960).
5. Goodman and Gilman, Roche, *Review of Thiamine Therapy in Cardiology*, No. S. 0286662. Benerva, (1967).
6. Ovcinnkov., *Klin. med. Mosk.*, 37: 123, (1959).
7. Coon, *et al.*, *J.A.M.A.*, 245, (1965).

31. VITAMIN B_2 (RIBOFLAVINE)

One who usually notices a kind of yellowish-orange coloured urine after taking some B-complex preparation is due to *Riboflavine.*

Riboflavine is derived from two words; RIBOS and FLAVUS *ribos* means ribos sugar and *flavus* means yellow. Since, the heat stable portion of B-complex vitamins contains a molecule similar to that of sugar ribos and it is also yellow in colour, which is known as *Riboflavine.*

Chemistry of Vitamin B_2

Riboflavine is dimethyl iso-alloxazine attached to d-ribitol, which is sugar pentose. The empirical formula is $C_{17}H_{20}N_4O_6$. In nature it may occur as the free *pigment*, as riboflavine phosphate or as a flavoproteins. The latter are a combination of riboflavine with phosphoric acid and adeninie to form riboflavine-adeninedi-nucleotide, and the whole joined with a protein.[1]

Riboflavine was isolated in 1933 and synthesized in 1935 in the form of a crystalline compound having beautiful yellow-orange colour. Vitamin B_2 is soluble in water, but can be affected by direct exposure to sun-light, therefore, it is advised not to expose milk to direct sun-light (Antia). However, ordinary cooking does not affect it but, cooking in large quantity of water drains some of vitamin B_2 from the food.

Foods rich in Vitamin B_2 (in mg. per 100 gr.)

Soyabean	760	Bengalgram	510
Ricebran	480	Blackgram	370
Jawar	280	Barley	200
Tender Maize	170	Rice	160
Ragi	100	Wheat	70
			etc. etc.

(Aykroyd, W. R. 'The Nutritive value of Indian Foods and the planning of Satisfactory.' Diets, 6 Edn. rev. Gopalan, C. and Balsubramaniam, S. C., I.C.M.R., Delhi, 1963).

Daily requirement of Vitamin B_2

Infants and Children	0.6 mg. to 1 mg.
Adults (males)	1.4 mg. to 2.6 mg.
„ (females)	0.9 mg. to 3.0 mg.
Pregnancy and lactation	2.0 mg. to 3.0 mg.

(Committee of the British Medical Association 1950).

Pharmacodynamic action of Vitamin B_2

In human body the function of vitamin B_2 is to carry oxygen to all the tissues, particularly to the tissues of cornea of the eye, where there is no oxygen supply due to absence of blood supply. It acts as a co-enzyme for the transportation of hydrogen. Vitamin B_2 is also useful for the oxidisation of carbohydrates, amino-acids and aids the absorption of vitamin A from the food. According to DUNCAN Vitamin B_2 combines with phosphoric acid and proteins forming a *yellow oxidation enzyme*. This substance is involved in the reaction of cellular oxidation. In the body, vitamin B_2 is found in the form of dinucletide with adenine in combination with specific protein. It is also detected either free or as a compound with phosphoric acid in the human body. According to SUVARFAKICH and others vitamin B_2 is found 3.16 mcg. per 100 ml. serum. Most of it is present as *Flavin-adenine dinucleotide* (F.A.D.). It is 2.33 mcg. per 100 ml. The reminder exists as free B_2 0.84 mcg. per 100 ml. (Harper)[2]. In vegetables the same combination with protein also exists, therefore, unless the protein is separated and vitamin B_2 is set free by cooking the vegetables, the absorption of vitamin does not take place. However, the other combination with phosphoric acid is easily absorbed in the body, regulating carbohydrate, fat and amino acid metabolism.[3]

Absorption and Excretion of Vitamin B_2

In our body, vitamin B_2 is absorbed from the food in the small intestine and excreted via kidneys along with urine, therefore, one who is taking vitamin B_2 notices the orange coloured urine. It is estimated that about 500-800 mcg. of vitamin B_2 is excreted both via urine and stool and the body storage capacity is poor.

Signs and Symptoms of Vitamin B_2 Deficiency

Apart from food supply, Vitamin B_2 is also synthesized from the bowel flora. If there is *inadequate supply of Vitamin B_2*, due to over cooking, exposure of foods and milk to sun etc., *poor absorption* as a result of acute and chronic diarrhoea dysentery, colitis, *inhibition of intestinal non-pathogenic organisms* due to excessive use of broad spectrum anti-biotics and sulpha drugs, *infection, thyrotoxicosis, pregnancy and lactation*, the body reserves of vitamin B_2 are exhausted and the body begins to flash deficiency signals in the form of acute rundown feelings associated with lack of appetite. One feels a sort of tingling and burning sensation in the mouth and feels as if pepper is pasted all over the tongue. It is impossible to eat hot and curried food due to this burning sensation.

Corners of the mouth become sore and ulcerated due to which one finds difficult to open the mouth while eating or talking. The lips become pale and cracked. One notices that his tongue has become cherry-bluish red and the verticle margins are blue in colour (*magneta tongue*).

The marked deficiency indications are noted in the eyes with corneal ulceration, smart burning lachrymation, extreme sensitiveness to light, the eyes become red and one feels as if some sand is fallen in them. Opacities, keratitis and other serious eye complications also take place due to vitamin B_2 deficiency.

Vitamin B_2 deficiency causes watery diarrhoea with passing of flatus after taking high-carbohydrate and high-protein diet. One often finds severe rancid belching indigestion, heart-burn, lack of appetite, etc., attributable to vitamin B_2 deficiency. Skin becomes scaly which is markedly noted on ears, nose vulva and scrotum.

Vitamin B_2 deficiency lowers body resistance and causes mental stress, particularly automobile drivers find it difficult to drive during night. Vitamin C also causes the same feeling in the drivers. Vitamin B_2 deficiency may also associate with B_1 and Niacin deficiencies.

Taking a regular course of vitamin B_2 orally or by injection 5-15 mg. daily with vitamin B_2 rich food, usually clears all the deficiency signs and symptoms in a very short time. Supplementing a few doses of Biochemic *Nat-Mur. 30x 5 grs. daily* once a week is found to have gratifying effect on the absorption of

vitamin B_2 from the food. *Calc-phos, Kali-sulph, and Silicea 12x 10 grs.* once a week also found to be helpful in the absorption of vitamin B_2 (Dr. Priestman, M.R.C.S., L.R.C.P., London).

Indications of Vitamin B_2 Therapy

Stomatitis, cheliosis, glossitis, angular stomatitis, amblyopia, photophobia, corneal ulcer, corneal anoxia, sprue, colds, anaemia of pregnancy and lactation, coeliac disease, polyneuritis, tuberculosis, sebbhorrhic dermatitis, eczema, bedsores, psoriasis, senile itching of the skin, periodical headaches, laziness etc. (Duncan). Recently, vitamin B_2 is also indicated in phyrnoderma, pellagra etc.

Vitamin B_2 Patents

Riboflavin—*T.C.F.* 5-10-50 mg. per tablet
Beflavin—*Roche*, 10 mg./2 ml.
Vitamindon-B_2—*Indon-Bombay*. 3-5-10 mg. per tablet.

Dose: Normally 10 mg. three times a day after meals with a glass of buttermilk is found to be very effective in all the indications of vitamin B_2 deficiencies. One can take even higher doses, since there is no toxicity is noticed, however, it is always safer to follow the advice of the attending physician.

REFERENCES

1. Antia, F. P., 'Clinical Dietetics and Nutrition', pp. 63-66, (6), (1966.)
2. Harper, H. A. 'Review of Physiological Chemistry, pp. 71-72, (1961.)
3. Hutchison's 'Food and Principles of Dietetics', pp. 154-55, (1948.)

32. VITAMIN B_6 (Pyridoxine hydrochloride, Adermin)

Chemistry of Vitamin B_6

Vitamin B_6 is another water-soluble vitamin which was isolated in 1938 and in the same year it was synthesized in the form of a white crystalline substance soluble in water and alcohol. Its chemical formula is $C_8H_{12}O_3N$.

Foods rich in Vitamin B_6

Vitamin B_6 is abundantly available in both vegetable and non-vegetable foods. The following articles of food contain vitamin B_6 milligramme per 100 gramme. (Swaminathan, M. 'Clinical Dietetics and Nutrition, by F. P. Antia (1966), 68.)

Cereals					
Cambu	10.7	Cholem	8.8	Maize whole yellow	7.9
Rice raw husked	6.9	Rice raw milled	3.3	Wheat whole	8.1
Wheat flour	33.3				
Pulses					
Bengalgram	10.9	Blackgram	9.9	Greengram	10.1
Redgram	10.0	Soyabean	8.6		
Vegetables					
Beet	1.1	Cabbage	2.9	Carrots	1.0
Potato	1.6				
Flesh Foods					
Liver (sheep's)	13.6	Muscle (sheep's)	4.6		
Miscellaneous					
Milk (cow's)	1.8	Rice polishings	19.0	Yeast brewer's	51.8

Daily requirement of vitamin B_6

2 to 4 mg. of vitamin B_6 is daily required. This quantity can be easily procured by eating foods rich in *vitamin A and D*, *calcium* and *iron*.

Pharmacodynamic action of Vitamin B_6

In our body, Vitamin B_6 is connected with protein metabolism. After phosphorylation it combines with various specific proteins to form a series of metabolic enzymes. One group of these

participates in the decarboxylation of aminoacids. Such carboxylases have been discovered for the levorotatory forms of lysine, tyrsine, arginine and ornithinine.

Another group of enzymes regulates transmination, the biological reaction in which an amino group is transferred from an amino to a keto acid, producing a new aminoacid (glutamic acid $\rightleftarrows$ Glutamic acid, glutamic acid $\rightleftarrows$ alanine, L-aspartic acid $\rightleftarrows$ L-alanine).

Vitamin B_6 also forms the prosthetic group of enzymes which catalyze the synthesis and metabolic breakdown of tryptophan. Tryptophan is later converted into Nicotinic acid and in phosphorylated form and serves as a co-enzyme systems which are concerned with decarboxylation of amino acids and transmission reaction. (Lichestin). Vitamin B_6 increases the absorption of food-iron and elevates the haemoglobin in the blood.[2]

Absorption and excretion of Vitamin B_6

Pyridoxine is absorbed from jejunam and intestines. VILTER, and his associates demonstrated that vitamin B_6 can also be absorbed by external application on the skin. In our body certain intestinal micro-organisms synthesize vitamin B_6 for its use. Vitamin B_6 is excreted from kidneys and during its deficiency its quantity increases in the urine[1].

Signs and Symptoms of Vitamin B_6 Deficiency

On living a diet deficient in *pyridoxine*, and continue to eat the same for a couple of months or giving 4-*desoxypyridoxine* an antagonist to vitamin B_6 or excessive secretion of vitamin B_6 due to excessive and prolonged use of INH in tuberculosis, one gradually begins to develop the following *signs* and *symptoms:*

In the beginning of the deficiency one feels tired, depressed, nervous, irritable and exhausted. He lacks appetite and feels sick on seeing the food. There may be a slimy rancid feeling on the tongue. He cannot eat the usual hot and spicy food. Most of the digestive symptoms resemble to vitamin B_2 and Nicotinic acid deficiency. Clinically, there may be changes in the peripheral nerves imparing the sense and motor activities. The discolouration of the skin in vitamin B_6 deficiency is also similar to Nicotinic acid deficiency.[3]

Clinical manifestations of Vitamin B_6

(*a*) *Convulsions in infants and women*

BESSEY, *et al.*, report that deficiency of vitamin B_6 is commonly found in infants that are fed on powdered milk. He confirmed that such marked deficiency increases the excretion of *Xanthurenic acid* in urine. This increased excretion is attributed to cause convulsions without fever and other exciting causes of convulsions in such artificially fed children. The researchers proved that administration of vitamin B_6 0.5 to 10 mg. three times daily checks the excretion of *Xanthurenic acid* and the convulsions are cured.[1, 8]

HARPER has reported that deficiency of vitamin B_6 in under nourished women during pregnancy usually occurs due to excessive demand by the foetus. He believes that such notable deficiency of vitamin B_6 acts on the central nervous system causing *demyelination of the peripheral nerves* and *degeneration of the axon* resulting in epileptic like seizures. In all such conditions without any other cause of convulsions administering vitamin B_6 50 mg. three times daily is found to the very effective treatment. Vitamin B_6 is found to be essential for the metabolism of the brain.

(*b*) *Cystic Glandular Hyperplasia*

Long standing irregular vaginal bleeding in young girls are successfully treated with vitamin B_6 (*Benedon-Roche* 80 mg. three times daily. In such conditions supplementing *male* and *female* hormones are usually not required. However bleeding caused by carcinoma is not affected FOUKAS believes that vitamin B_6 controls the bleeding by inhibiting the activity of *Estrogen* and the ripening of the follicles to impair ovarian function.[6]

(*c*) *Hypochromic anaemia with normal serum iron*

WEISMAN, HARRIS and others proved that a reversible *hypochromic anaemia* may occur with a high serum iron in vitamin B_6 deficiency. This type of anaemia can be cured with vitamin B_6 40 mg. three times daily within a short time.

(*d*) *Mental stress and hypertension*

Vitamin B_6 is found to have a sedative effect on central nervous system as pointed out by HARPER.[5] Taking this key note

in consideration I tried vitamin B_6 40 mg. t.d.s. in Psychoneurosis, mental irritability, feeling of rundown condition, sleeplessness mental stress and found great relief in clinical systems. After taking vitamin B_6 (Benedon-Roche) 1 tablet three times daily, most of my patients found a remarkable change in their distress.

According to HARPER,[5] vitamin B_6 is essential for the metabolism of *methionine* by transfering its *sulphur* to *serine* to form *cystine* by a process of *Transulfuration* and *Transmination*. This chemical change in the body and these enzymes depend entirely on the co-enzyme factor of vitamin B_6. It is also found that vitamin B_6 is essential for metabolism of fats.

On the weight of these facts I tried vitamin B_6 40 mg. in persons suffering from hypertension due to atherosclerosis along with Niacin 50 mg. three times daily and watched the daily fluctuations of blood-pressure. The clinical improvement in these patients without the use of any anti hypertensive drugs confirm that there is a sure influence of vitamin B_6 on blood cholesterol which becomes more effective by supplementing Nicotinic acid. Hence vitamin B_6 is recommended in all cardiovascular disorders caused by *hypercholesterolaemia*.

(e) Vomiting in pregnancy and travel sickness

The sedative action of vitamin B_6 can be used to relieve morning sickness and travel sickness by using *vitamin B_6 40 mg.* along with *siquil 5 mg.* once immediately before leaving the bed in pregnancy and an hour before travelling with very gratifying results. The dose can be repeated once in four hours if the sick feelings persist. *Pyrovin B.P.W.* 1 teaspoon 3 times daily is also useful.

Vomiting due to certain drug reaction, radiation, post-operative and post-anaesthetic effects toxaemia of pregnancy, bilousness etc., can also be treated with effective results with vitamin B_6 by oral or by intra-muscular injection by the attending physician.

(f) Birth anamolies

Dr. ROGERS of Texas University confirms after his researches that regular supply of vitamin B_6 during pregnancy prevents the toxic effects of tetratogenic drugs like: *Thalidomide*,

Tolbutamide etc. These drugs are reported to cause deformaties of infants (Research News, Albert David Ltd. Calcutta).

(*g*) *Cancer*

Dr. KORYLNYK reports that vitamin B_6 analogue *4-deoxy-pyridoxine* has already been found to be 'highly active against experimental tumours when the dietary content of pyridoxine is restricted.' This compound has the ability to reduce the member of circulating lymphocytes—a finding that the believe might have application in control of lukemia. (Drug Trade News. Sep. 14, p. 50, 1964).

Indications of vitamin B_6 Therapy

Agranulocytosis, Leucopenia, Pseudo-hypertrophic muscular dystrophy, Mysthenia gravis, Sydenham's chorea, Chorea of the pregnancy, Corneal ulcers, Premature presbyopia, Beriberi, Pellagra, Pimples, Dermatitis, Ecxema, Hypochromic anaemia, Excessive sweating in palms and feet, Toxaemia of pregnancy, Insomnia, Spastic hemiplegia etc.

Patent Preparations of Vitamin B_6

Benedon—*Roche*. 40 mg./Tablet 100 mg./2 ml. Ampule.
Gladoxin—*Glaxo*. 50 mg./Tablet 100 mg./2 ml. Ampule.

Dosage: Prophylaxis, 40 mg. t.d.s. *Curative*, 150 to 250 mg. daily orally or by IM or IV injection.

REFERENCES

1. Antia, F. P., 'Clinical Dietetics and Nutrition', pp. 66-70, (1966).
2. Benedon-Roche, p. 076025 TOI, (1967).
3. Vilter, R. W., *et al.*, *J. Lrb.-Clin. Med.*, 42, 335, (1953).
4. Bessey, O. A., *et al.*, 'Paediatric', 20, 33, University of Texas, (1963).
5. Harper, H. A., *Review of Physiological Chemistry*, pp. 74-76, (1961).
6. Foukas, M. 'The Roche-Courier', 2, 1, Vol. XV, (1962).
7. Weisman, R. Jr., Harris, J. W., *et al.*, *Proc. Soc. exp. Biol.* (N.Y.), p. 91, 427, (1956).
8. Coursin, D. B., 'Convulsive Seizures in infants with Pyridoxine deficient diet', *J. Amer. Med. Assn.*, 154-406, (1954.)

33. VITAMIN B_{12} (Cyanocobalmin)

AVICEENA, 'The Persian Gelen' (980-1037 A.D.) wrote in his celebrated medical text book '*The Qanoon*' that eating raw sheep or goat's liver is effective as a food-medicine for sore tongue and bloodlessness. This universal truth remained unscientific until MINOT and MURPHY[1] who took the road of Aviceena and discovered by extensive research that raw liver contains a very active factor which controls the formation of the blood. From 1926 A.D. these blessed Americans turned every stone by clinical trails and declared scientifically giving new hope for all the bloodless persons that treatment can be given by crude liver extract; avoiding unpleasant oral push of raw liver in large quantity. For this discovery they received Nobel Prize in 1936. Later, COHN and his Indian assistant Dr. SUBBA RAO of Lederle Laboratories of America and others were not satisfied with the crude whole liver extract and they were sure that some other undiscovered and unknown factor which is responsible for such therapeutic effect in the treatment of anaemias; that directed their energies for its isolation.

Luck was in favour of Dr. E. LESTER SMITH the British biochemist who noted a strange phenomena in his Greenford Glaxo Laboratories that when the samples of liver extract were poured in a special apparatus, formed myraids of horizontal bands of various colours like; pink, brown and yellow. This led him to give a clinical trail of all the substances of different colours, but, he was amazed to find that the pink coloured substance was the one which remained unknown for all these years. Thanks to Dr. LESTER for his discovery of this substance which he named *Vitamin* B_{12}. After the isolation of vitamin B_{12} (1946) tons of raw animal liver were being processed and the vitamin B_{12} content in the liver is so small that only 1/1500 oz. of vitamin B_{12} per ton of liver could be isolated in the form of pure red crystalline substance. On 28th May 1948 the most hectic chase of vitamin B_{12} came to an end and Dr. LESTER is credited for this discovery. After few weeks Merc Laboratories of U.S.A. also announced the discovery of vitamin B_{12}.

Chemistry of Vitamin B_{12}

Apart from liver, Vitamin B_{12} is also found in all the animal tissues and muscles. Chemically it is known as *Cynanocobalmin*, because it contains a chain of cyanide and cobalt, having the chemical formula as $C_{63}H_{90}O_{14}N_{14}PCO$ and molecular weight is 1355.

Animals synthesize vitamin B_{12} in their rumen and store it in their tissues for their own use and for the use of man. It is unfortunate that man cannot synthesize it in his body, but can have it through these animal foods. Due to absence of binding material, vitamin B_{12} is not found in any vegetable (Prof. Chatterjea). Certain micro-organisms like; *Propionibacteriumshermanii*, antibiotic producing moulds, *Streptomyces griseus* and *Streptomyces auriofaciens* synthesize vitamin B_{12} in sufficient quantity enabling to produce on commercial scales. SMITH and BECK found that other organisms like: *Euglena gracillis*, *Ochromonos-malhemensis*, *Poterichromonos stipitala* also synthesize vitamin B_{12}. But in India Euglena gracillis did not produce vitamin B_{12} in the hands of Banerjea and his collaborators.

Foods Rich in Vitamin B_{12} (Mcg. Per Gramme)

Beef muscle	2-8*	Beef kidney	20-50
Beef Liver	50-130*	Goat Muscle	1-1.26
Goat Liver	40-100	Pork	0-1.5
Veal	2	Leg lamb	8
Milk cow's	4.8/Litre	Milk Goat	0.01
Cheese	1.4-3.6*	Chicken Liver	8
Egg yolk	1.2 (per yolk)	Egg whole	6
Hering whole	11*	Herring fillet	13
Hering liver	34*	Catla-buchani (catla)	0.7-3.08
Labeo rohita	3.6-6.7	Lates-calcalifer (vetki)	3.4
Mystus vitatus (Tangra)	1.18-7.5	Mugil persia (Parsey)	3.6-5.6
Polynemus paradisuns (Tapsey)	8*	Fish meal	10-25
		Meat scrap	3.5
Fish solubles	15-40*	Silage	0.1-2
Pasture soil	1		

* Smith E. L., Vitamin B_{12}, 1960, Methuen, London.
Banerjea, D. K. and Chatterjea, J. B., *Brit. Med. J.*, 11: 992, 1960.

Daily requirement of Vitamin B_{12}

0.6 mcg. to 2.8 mcg. This amount can be easily procured by eating foods rich in Vitamin B_{12}.

Pharmacodynamics of Vitamin B_{12}

In our body vitamin B_{12} helps the synthesis of nucleoproteins by correct metabolism of purines and pyrimidines. It helps the easy transportation of fats and absorption of vitamins from the food. It increases the desire to eat and increases growth and body weight. Vitamin B_{12}, increases the body resistance, controls the maturation of red-blood corpuscles and increases a feeling of well being. It is also connected in the synthesis of *groteins*, *nucleic acid* and methionine. It catalyzes the enzyme *plutamate* to β-methylaspartate. It converts *Methylmalonyl* co-enzyme A into *Succinyl* co-enzyme A.[4, 5, 6, 11]

Absorption and Excretion of Vitamin B_{12}

It is a great wonder that though vitamin B_{12} is needed for good health in very minute quantity like: 1/20,000,000 oz. daily; sufficient quantity of gastric juice must be there in the stomach to ease its absorption in the intestines. It is this reason that vitamin B_{12} is not absorbed in persons suffering from P. A. (pernicious anaemia). In this *condition* the stomach wall is thickened and no gastric juice having digestive enzymes is secreted. However, even in the absence of what we call *Intrinsic Factor* for the gastric juice; administration of vitamin B_{12} in large doses between 500-1000 mcg. by I.M. injection brings rapid relief in the deficiency of vitamin B_{12}. This dose may be continued on alternate days for a week and then oral administration of vitamin B_{12} with Folic acid, iron, calcium protein-rich food greatly helps the absorption of vitamin B_{12} from the intestines (*Pernavit-Neo-Pharma, Bombay*) 1 capsule or 1 teaspoon three times a day after meals for a couple of months is found to be very effective oral administration of vitamin B_{12}. Supplementing a tablet of *Macrabin-Glaxo* daily fortifies the purely vegetarian diet with vitamin B_{12} and eases its absorption from the milk and butter-milk.

Our healthy blood contains about 100-900 mcg. of vitamin B_{12} per ml. of blood-serum. It may go up in certain diseases

of liver like; acute hapatitis, hepatic cirrhosis, hepatic necrosis and neoplastic involvement due to failure of normal binding mechanism.[8]

In pernicious and other nutritional anaemias of pregnancy, vitamin B_{12} falls below 50 mcg. per ml. of serum.

After absorption of vitamin B_{12}, it is greatly stored in liver at the rate of 0.2-2.6 mcg. per gramme of wet healthy liver in the form of *Hydroxycobalamine*.[3]

After absorption and storage of vitamin B_{12} in the liver; about 30 mcg. of vitamin B_{12} is excreted in the normal urine per day. DASTUR says, that a small dose of vitamin B_{12} retains in the body than the larger dose. He says when injected in large doses up to 1000 mcg., vitamin B_{12} is excreted up to 90 per cent. The excretion of vitamin B_{12} in human stools is due to intestinal bacteria. Since the absorption of vitamin B_{12} does not take place in colon much of the un absorbed vitamin B_{12} is excreted. Vitamin B_{12} is also secreted in breast milk for the use of the babies. Mothers who are already having deficiency of vitamin B_{12} secrete no vitamin and as the result, their babies develop vitamin B_{12} deficiency and lack health and growth.[4, 5, 7, 9, 10]

Signs and Symptoms of Vitamins B_{12} deficiency

Usually deficiency of vitamin B_{12} can occur due to following factors:

1. *Malnutrition:* In our country, the most common cause of various deficiencies of food factors including vitamin B_{12} is due to faulty substandard diet. Due to one or more deficiencies of these food factors, it is but natural to develop the deficiency of vitamin B_{12}. We have various religions and sects who are purely vegetarians and even they hesitate to touch an egg or meat. Their chief food consists of purely vegetables and cereals which are deficient in vitamin B_{12} that plays a major role in causing vitamin B_{12} deficiency.[3]

2. *Defective Absorption.* In certain diseases like pernicious anaemia, sprue, ileitis, idiopathic steatorrhoea, etc., the absorption of vitamin B_{12} fails and the deficiency occurs.

3. *Abdominal Surgery.* Surgical operations like gastrectomy and formation of *Blind loop syndrome* after intestinal operation

which forms a breeding place for the bacteria that use the ingested vitamin B_{12} for their use causing vitamin B_{12} deficiency. Due to gastrectomy, the deficiency of Intrinsic factor occurs and due to which vitamin B_{12} fails to get absorbed from food which contains small quantity of vitamin B_{12}. Infestation of *Diphyllobothrium latum* and excessive demands of vitamin B_{12} during pregnancy and lactation may also cause vitamin B_{12} deficiency.[4]

All these factors tend to lower the blood-serum vitamin B_{12} and cause the following symptoms:

(*a*) *Gastro-intestinal manifestations.* One who develops the deficiency of vitamin B_{12} usually feels a great rundown condition associated with lack of appetite, nausea, vomiting and frequent episodes of gastric pain. He feels the tongue is sore and finds difficult to eat even the bland diet. The tongue looks glazed and pale. There may be great desire for acid sour things and excessive accumulation of saliva in the mouth.

(*b*) *Neurological manifestation.* Great mental depression, delusions of chasing devils, desire to commit suicide, the typical sensation of pins and needles in the limbs etc., are some of the neurological manifestations of vitamin B_{12} deficiency. All these deficiency symptoms can be successfully treated by the judicious use of both oral and parenteral administration of vitamin B_{12}.

Indications of Vitamin B_{12} therapy

Pernicious anaemias, Macrocytic nutritional anaemias, anaemias of pregnancy sprue, regional ileitis, idiopathic steatorrhoea, post-gastrectomy anaemias, anorexia, loss of weight, bronchitis in children, asthma, tuberculosis, sub-acute combined degeneration of the spinal cord, cirrhosis of the liver due to excessive alcohol, hepatitis, weakness due to diabetes, weakness of the vision and heart due to excessive use of tobacco, weakness of nerves due to excessive sexual indulgence and malnutrition, ulcerative colitis, migraine, intolerance to D.D.S. during leprosy treatment, lack of breast milk, mental stress during pregnancy, menopause, lactation, psoriasis, herpes zoster, seborrhoic dermatitis, osteoarthritis, chickenpox and other acute fevers. *All these diseases require a physician to treat with larger doses of vitamin B_{12} ranging between 100-1000 mcg. by injection.* Therapeutic oral dosage of vitamin B_{12} is 50-150 mcg. daily.

Absorption of food-vitamin B_{12} can be greatly enhanced by a weekly dose of Biochemic medicine *Calc-phos 30x, 5 grs.* with warm water once at bed time, alternating with—*Nat. Mur* 200x 5 grs. once a month.

Vitamin B_{12} Patents

Macrabin—*Glaxo. Tablets:* 10 and 50 mg. *Liquid:* 25 mcg. per teaspoon. *Injection:* Macrabin and Macrabin-H 100, 500, 1000 mcg/ml.

Redisol-H—*Merc Sharp and Dome. Injection:* 500 and 1000 mcg/ml.

REFERENCES

1. Minot, G. R., and Murphy, W. P., *J.A.M.A.*, 87, 470, (1926).
2. Wintrobe, M. M., *Clinical Haematology, 5th Edn.*, 1961, Lea. Philadelphia (U.S.A.).
3. Chatterjea, J. B., *Some aspects of Vitamin B_{12} and Problems Related to its Deficiency.* Current Topic. *J.I.M.A.*, Vol. 44, March 16, 1965, pp. 315-324.
4. Dastur, R. H., *Vitamin B_{12} Clinical Dietetics*, by F. P. Antia, pp. 83-92 (1966).
5. Hayhoe, F. G. H., *The Leukaemias:* Aetiology Pathophysiology and Treatment, 1957, Academic Press, New York.
6. Smith, E. L., *Vitamin B_{12}* 1960, Methnen, London.
7. Donaldson, R. M., *Gastroentrology* 46, 609, (1964).
8. Garriga, S., and Crosby, N. H., *Blood*, 14, 1008, (1953).
9. Banerjee, D. K., *et al.*, Bull. School of Cal. Trop. Med. 10, 111, (1962).
10. Mollin, D. L. and Ross, G. I. M., *Brit. J. Haemat*, 1, 155, (1955).
11. Mayer, L. M. *et al.*, *J. Lac. clin. Med.* 33, 189, (1948).

34. FOLIC ACID (Pteroylgltuamic Acid PGA)

Chemistry of folic acid

Folic acid is a bright yellow crystalline substance abundantly found in green vegetables. Therefore, the word folic acid is derived from the latin folium (leaf).[11] CHATTERJEA, and BANERJEA, found that folic acid is also found in coconut, spinach, germinating peas and Bengal gram. Bacteria also synthesize folic acid. Just like *Lactobacillus lactis* requires vitamin B_{12} for the luxurient growth, folic acid is essential for the growth of *Lactobacillus casei*.[11]

The chemical contents of folic acid are several, but, the main among them are; *Glutamic acid* combined with *petridine* molecule and *Para-aminobenzoic acid*, which are found on condensation. Folic acid was chemically made in 1945 (Angier, R. B. *et al.*).[11]

Foods rich in folic acid

Folic acid is abundantly available in various vegetarian and non-vegetarian foods.

In *Flesh-Foods*, like fish and mutton; Folic acid is found but, its concentration varies due to different quality and kind of fish and muscle. Raw milk is also rich in folic acid but, cooking all the foods reduces the folic acid contents. This adverse effect of cooking is found to be the destruction of certain inhibitors of the conjugate enzymes which are present in the raw foods. However, cooking causes more folic acid loss than boiling. Various conditions of storage may also alter the folic acid contents of foods (D. K. Banerjea and J. B. Chatterjea, 'Food Technology, 1964, Vol. 18, No. 7, pp. 137-39).

	19-46 S. faecalis Mcg/100 G.	L. casei Mcg./100 G
Wheat	6	
Corn	11	
Rice	5	
Cheese (Cheddar)	13	21 „
Bananas (slightly green)	7	15
„ (ripe)	4	8
„ (very ripe)	1	
Apples		

Vegetables			
Spinach	82 S. faecalis Mcg./100 G.	127	L. casei Mcg./100 G.
Asparagus	48	44	
Brocoli	54	83	
Cauliflower	14	54	
Peas	59	50	
Lettuce	8	16	
Cabbage	12	—	
Tomato	10	11	
Carrot	11	13	
Potato	5	—	
White radish	10	11	

Olson, O. E., Burris, R. H., Elvehjem, C. A. (1947), *J. Amer. diet. Ass.*, 23, 299, 'Clinical Dietetics and Nutrition' by F. P. Antia, p. 80.

Daily requirement of Folic acid

HERBERT suggests that a daily requirement of 50-100 mcg. of Folic acid is very much essential for the maintenance of good health. Since there is great relationship of Folic acid with Vitamin B_{12} supplementing foods rich in vitamin B_{12} along with Folic acid—rich foods which are delicately cooked seems to be an ideal diet to prevent the deficiency. However, for therapeutic purpose, Folic acid 15-20 mg. daily, either by injection or by an oral route is indicated. Since there is no danger of any toxic symptoms by taking excessive doses of Folic acid one can continue it without any fear. But, a physician's advise is always safer in such therapeutic doses. Clinically it is noted that there are some Folic acid antagonists like aminoprotein which depresses the bone marrow by blocking the activity of Folic acid. This advantage is taken in the treatment of leukaemia.[11]

Pharmacodynamic action of Folic acid

In our body, Folic acid plays a very important part in the synthesis of nucleoprotein which aids cellular metabolism. Its major role is to help the maturation of red blood corpuscles and to convert the *Formino glutamic acid* into *Glutamic acid.* Folic acid also helps in absorption and utilization of iron and Vitamin B_{12}. *Tetra hydro folic acids* are the active forms of folic acid enzymes in body metabolism.

Absorption and excretion of Folic acid

Folic acid is absorbed from jejunam and is excreted in the urine. In normal blood serum, Folic acid varies between 6-15 mcg./ml. This serum level of Folic acid falls below 5 mcg./ml. due to poor absorption as one finds in sprue, in-take of food such as; husked rice, mango corn meal, potato and coffee which contain very little Folic acid. Increased demand of Folic acid during growth, pregnancy and lactation also plays a major role in causing *Folic acid deficiency*.

Signs and symptoms of Folic acid

Folic acid deficiency is first manifested by a failure in cell maturation and division and the abnormal maturation of red blood corpuscles leading to leucopenia, macrocytic anaemia with megaloblastic hyperplasia of the bone marrow. The clinical manifestations of Folic acid deficiency are loss of appetite, sore mouth, diarrhoea, retardation of growth in young ones and weakness of mind with a feeling of lack of well being. MARTIN,[9] HARPER,[10] KELSO[7] found that deficiency of Folic acid between 2.6 to 4.1 Mcg./ml. of serum in 150 cases of *Recurrent Abortions* and administration of Folic acid prevented such unfortunate episodes (*Lancet*, Vol. 1, page 672, 27th March 1965). Therefore, from the beginning of the pregnancy it is essential that at least 10 mg. of Folic acid daily with iron and B_{12} should be given till the termination. In such case, a capsule of *Pernavit-Neo-Pharma* or *Folvoron-Lederle 3 times a day*, supplies the required amount of Folic acid in combination with other haemetinic factors. In epileptic children and mentally deranged persons who are undergoing the regular treatment, Folic acid 5 mg. three times daily should be supplemented to get the quick response of the drug therapy. Deficiency of Folic acid associated with Vitamin B_{12} deficiency causes darkish brown spoty pigmentation that usually appears on the face, inner mouth, under arm pit, over thighs and on the palms. One pregnant patient who was undergoing treatment for megaloblastic nutritional anaemia with Folic acid 10 mg. t.d.s. with Vitamin B_{12} 100 mcg. t.d.s. orally showed remarkable changes in the pigmentation. I noticed that her skin cleared after four months of treatment. Three cases of non-pregnant patients who had a similar type of skin pigmentation responded

very well to Folic acid and Vitamin B_{12} oral therapy. With mere three cases I cannot certainly jump to a definite conclusion that Folic acid is a panacea for such skin discolouration.

Taking a weekly dose of Biochemic Kali-phos, 6x, 10 grs. t.d.s. alternating with Silicea, 30x, 5 grs. t.d.s. not only rectifies the mechanism of Folic acid absorption from the intestines, but also cures the deficiency symptoms (Dr Alva, Benjamin, M.D., M.Ch., F.F. Hom., R.L.H. Hospital, London).

Folic acid Patents

Folic acid—*T.C.F. Bombay*, 5 mg./Tablet.
Macrafolin—*Glaxo, Bombay*, 2.5 mg. Folic acid + Vitamin B_{12} 25 mcg./Tablet.
Macrafolin—*Glaxo, Bombay*, Liquid and Injection is also available.

REFERENCES

1. *B.M.J.*, 1, 484, 1965.
2. *B.M.J.* 2, 1030, 1965.
3. F. A. Fe. (IM), in *Gynaec. Obst.* fer Aubt, *J. Cli. Path.*, 19, 1, 1966.
4. *B.M.J.* 2, ii. 1433, (1965).
5. F. acid Pregnancy anaemias. *Lancet*, 2, 214, (1952).
6. Willoughby, M. L. N., *et al.*, *B.M.J.* 11, 1568, (1966).
7. *B.M.J.*, 875, 2, (1966).
8. Martin, J. D., and Davis, R. E., *J. Obst. Gynaec. Brit.* C. with 400, 71, (1964).
9. Hibbard, B. M., *Ibid.*, 529, 71, (1964).
10. Harper, H. A., 'Review of Physiological Chemistry', pp. 83-87, (1961).
11. Antia, F. P., Clinical Dietetics and Nutrition, pp. 93-95, (1966).
12. Herbert, V., Arch. Int. Med., 110-649, (1962).

35. NICOTINIC ACID (Niacin)

Chemistry of Nicotinic acid

FUNK while searching for *Vitamine* in rice bran discovered *Nicotinic acid* in 1912. It is a most significant discovery that changes the gloominess of a patient suffering from a disease known as *Pellagra.*

Nicotinic acid is pyridine beta carboxylic acid having the chemical structure of $C_6H_5O_2N$. It is a white crystalline substance soluble in water. Adding NH_2 radical to it forms another substance called *Nicotinamide.* Nicotinic acid is converted into nicotinamide in the body when taken orally.

Foods rich in Nicotinic acid

Nicotinic acid is widely distributed in various foods like meat, fish and yeast. According to BACHRACH, Nicotinic acid is found in the following foods:

(* In milligrammes per 100 grammes)

Cereal and Cereal Products			
Bread white	0.5	Bread wholemeal	1.2
Maize	0.9-1.6	Oats medium	1.0-1.1
Rice, milled	1.6-2.4	Rice parboiled and milled	3.8
Wheat, whole	4.7-5.3	Wheat germ	2.7-9.1
Wheat bran	5.0	White flour	0.9-1.1
Fish Herring	2.9-4.0	Fish white E.P.	1.7-8.4
Fruits Apples	0.5	Tomatoes	0.5
Meats Offal. Heart	1.2-8	Kidney	3.8-19.4
Liver	9.3-46	Tongue	12.8
Muscle	3.18	Meat extract	37.5-102.5
Milk	0.1-0.5	Milk dried	2.5
Skimmed	4.3-15.0		
Proprietary Articles			
Beer	7.0	Bemax	6.0
Marmite	65.5	Meat juice	34.5-61.5

* Bachrach, (1940-41), Nut. Abst. and Rev., 10, 459, 'Food and the Principles of Dietetics, by V. H. M. and G. Graham, p. 160.

Vegetables and Nuts

Cabbage	0.3	Carrot	0.5
Peanut	13.0	Potato	1.0-2.0
Soya bean	4.85	Spinach	1.7
Yeast Baker's (moist)	7.4-12.0	Yeast brewer's moist	9.1-10.2
Yeast Extract	47.7-49.7		

Daily requirement of Nicotinic acid

Adolescents	17-25 mg.
Pregnancy and lactation	20-28 mg.

Pharmacodynamic action of Nicotinic acid

In our body, Nicotinic acid serves as a co-hydrogenase which is involved in the Hydrogen transport from cell to cell. Thus it plays an important role in the metabolism of all the carbohydrates. (Sebrall and Harris). ANTIA says, 'Like other members of the vitamin B group, nicotinic acid is essential for tissue metobolism. It forms a part of co-enzyme I-diphosphoridine nucleotide (DPN) and co-enzyme-II-triphosphopyridine nucleotide (TPN) and thus aids in tissue respiration.'[1]

Absorption and Excretion of Nicotinic acid

Nicotinic acid is absorbed from both stomach and intestines and is stored in all the tissues as their co-enzyme. After absorption and storage, Nicotinic acid is excreted through kidneys partly as N-methyl nicotinamide.

Signs and Symptoms of Nicotinic acid deficiency

Deficiency of nicotinic acid occurs due to following factors:

(*a*) *Lack of absorption:* Digestive disorders, like: diarrhoea, dysentery, indigestion etc.

(*b*) *Excessive demand:* During pregnancy and lactation, growth, infections with high fever, thyrotoxicosis etc.

(*c*) *Excessive use of Lucine:* Consumption of foods such as: maize, jawar etc., in excess. These foods are rich in *Lucine* (Gopalan *et al.*).[8]

(*d*) *Prolonged use of I.N.H.:* It is reported that I.N.H. Therapy in Tuberculosis causes nicotinic acid deficiency (Harris).[9]

(*e*) *Tumours:* In carcinoid tumour a state of deficiency nicotinic acid occurs due to conversion of tryptophan into serotinin.[1]

The following manifestations are common in Nicotinic acid deficiency :

1. Gastro-intestinal manifestations

Changes in gastro-intestinal tract are earlier than the skin or nervous system. In the beginning the patient feels lack of appetite, and the tongue becomes sore and ulcerated, causing great pain while chewing even the bland diet. The tongue looks shiny, red with black vertical stripes over it. The corners of the mouth become ulcerated and cracked with thickened lips. The secretion of saliva increases and one keeps on spitting it frequently. There may be burning and tingling sensation in the throat and in the stomach after food. The patient often feels sick and sometimes starts vomiting after eating non-vegetarian food. Diarrhoea is a common feature of nicotinic acid deficiency. It becomes intense in the morning as soon as the patient leaves the bed and accompanies with more sounding flatus. The patient feels tired and exhausted after passing the stool.

2. Skin manifestations

Changes in the skin occur after the gastro-intestinal symptoms of nicotinic acid become more prominent. Parts exposed to sun become rough, thick, dirty and dry. There may be itching sensation. Skin of the elbows, hands, cheeks, neck may also get affected similarly.[1]

3. Neurological manifestations

The patient suffering from nicotinic acid deficiency shows markedly disturbed neurological changes. He becomes irritable, cries when contradicted, looses interest in all his daily affairs. Develops great forgetfulness, cannot remember what his wife requested him to bring on his way back to home from office.

He feels tired and exhausted after doing some work, starts yawning and broods on the silly subjects of the past. He desires death, but when he hears about somebody's death he is afraid of his own. There may be lack of sleep with overcrowding fearful thoughts which keep on changing from subject to another. He wakes tired and dizzy in the morning with great weakness. Other neurological changes like paraplegia, exaggerated jerks, extensor plantar responses, peripheral neuropathy, involvement of posterior columns leading to atoxia, degeneration of the spinal cord as one finds in macrocytic anaemia and multiple vitamin deficiencies appear later.[1, 2]

For all these manifestations of nicotinic acid we call by one name—PELLAGRA. Therefore, nicotinic acid is also called Anti-Pellagra-Factor (APF).

Nicotinic acid deficiency may also increase the chances of infections like Vincents' organisms, hook-worm, bilharziasis etc. There may be pathological changes in eye causing retrobulbar neuritis, dimness of sight due to other vitamins and mineral deficiencies that are associated with niacin deficiency.

Clinical manifestations of nicotinic acid

1. Hypercholesterolaemia

Several authors have confirmed that Niacin has a remarkable effect in reducing blood-cholesterol. Particularly the work of my teachers FITZGERALD *et al.*, of St. Vincent's Hospital, Dublin is worth mentioning. The authors report that in patients, who had more than 530 mg. of blood-cholesterol, remarkable fall touching 230 mg. of blood-cholesterol was reduced on continuous administration of niacin 3 g. daily in three divided doses.

The authors noticed some side effects like: flushing, gastro-intestinal disturbances, skin rashes etc., during the treatment, but these symptoms seldom necessitated to withdraw the treatment.

The authors conclude, 'this study confirms the findings of others (that prolonged administration of large doses of nicotinic acid produces a significant reduction in serum cholesterol level in most patients with high-blood cholesterol; high serum levels of total lipids may also be significantly reduced'. PARSONS *et al.*, also claim about the efficiency of niacin in hypercholesterolaemia.[3, 10]

2. Vascular diseases

Nicotinic acid 100 mg. three times a day is usually given in Cerebral thrombosis. But I did not find any marked effect from nicotinic acid in cerebral thrombosis of the old patients. However, the effect of nicotinic acid in the form of *Aluminium Nicotinate* (Nicinal-*cipla*) is more gratifying in cerebral embolism in young patients. The dose is 2 tablets t.d.s. or more according to the choice of attending physician. GOLDSBROUGH,[4] found that administration of nicotinic acid 50 mg. given in the form of injection or 100 mg. or dissolved under the tongue to reduce pain in Coronary thrombosis. In my opinion, in such serious conditions, there is no drug like morphine or pethidine with oxygen to help the patient suffering from intense pain which is the common cause of shock and death.

3. Hartnup's disease (Hereditary Pellagra)

Hartnup's disease is a hereditary disease in which the skin becomes rough, scaly, red on exposure to sun. It may become severe on over exposure to it.[5] It is a kind of photo-dermatitis as explained by LANGHOF.[6] JEPSON *et al.*, says that 'in Hartnup's disease the primary defect is of amino acid transport in the cell in the jejunum when amino acids, arginine, lysine and tryptophan are not absorbed and are passed into the colon where tryptophan is acted upon by the normal intestinal flora to form indole compounds which are absorbed and excreted in the urine.[7] Such excretion of indole can be stopped by sterilizing the gut with antibiotics. A corresponding defect in the amino acid in the renal tubules also produces amino aciduria.'[1]

How to cure nicotinic acid deficiency

Dietetic methods. Eating sheep's tongue, brewer's yeast (Marmite, Bovril with bread) and other foods rich in nicotinic acid prevents its deficiency.

Medicinal methods. In all the diseases caused by marked deficiency of nicotinic acid giving synthetic nicotinic acid 100-500 mg. orally or by injection along with the foods rich in niacin until the disappearance of the deficiency manifestations is advisable.

Administration of nicotinic acid causes *Vaso-dilation*, resulting in flushing of the skin with painful tingling sensation associated with itching. There may be nausea and vomiting with uneasy feeling in the stomach. This reaction can be prevented by giving *Nicotinamide* instead of nicotinic acid. Recently, a new preparation in the form of *Aluminium-nicotinate* is introduced to prevent such unpleasant episodes caused by nicotinic acid. PARSON says, 'from the standpoint of acceptance by patients and freedom from adverse effects during long term use, Aluminium Nicotinate is the most promising of several preparations. Supplementing *vitaminets-forte-Roche* 1 tablet daily is recommended to compensate the other minerals and vitamins. Excessive use of Nicotinic acid, produces *alterations in liver functions* and *elevates serum uric acid value, develops bilateral amblyopia* with *para-central scotomas*.[10]

Indications of nicotinic acid therapy

Apart from pellagra, nicotinic acid is widely used in various other ailments like: Atherosclerosis, Thromboembolic-vascular disease, Angina pectoris, Cerebral Arteriosclerosis, Meniere's disease, Cerebrovascular spasms, Migraine, Xanthomatosis, Arcus senilis, Chilblains, Nutritional psycoses, Alcoholic poisoning, Epilepsy after head injury, Various lessions of the brain causing psyconeuroses, Emotional disturbances, Headache, Corneal ulcers, Diabetic neuritis, Bell's palsy, Raynaud's disease, Toxic effects after excessive use of sulpha drugs and INH etc. (Goldberger and Gordon).

Patents of Nicotinic Acid

Pelonin—*Glaxo.* (Nicotinic acid), 50-250 mg./*tablet. Ampules:* 50 mg./2 ml.

Dosage: Prophylaxis, 50 mg. daily, Treatment, 100-500 mg. daily by mouth or by IM or IV slowly depending on the severity of the disease.

Pelonin-Amide—*Glaxo.* (Nicotinamide), 50 mg./*tablet* and 50 mg./2 ml. *ampule.*

Dosage: As Pelonin.

Nicinal—*Cipla. Bombay.* (Aluminium Nicotinate 250 mg. + Vitamin B_6 5 mg./*tablet.*)

Dosage: 1 to 2 tablets with or after meals for any nicotinic acid deficiency syndromes. For other serious indications, 8 to 16 tablets daily in divided doses with or after meals under the direction of a physician.

REFERENCES

1. Antia, F. P., *Clinical Dietetic and Nutrition*, pp. 70-78. 1st Edn. (1966) (Bombay).
2. Mujamdar, R. A., *Bed-side-Medicine*, pp. 1309-11. 9th Edn. (1953) (Calcutta).
3. Fitzgerold, O., *et al.*, *Revue Medicale*, p. 18. Vol. XVI, April 1965. No. 2, Dr K. K. Sen Gupta, Calcutta.
4. Goldsbrough, C. E., *Nicotinic acid in the treatment of heart-disease*, *Lancet*, ii, 675, (1960).
5. Baron, D. N. *et al.*, *Lancet*, ii, 421, (1956).
6. Langhof, *Dermatitis Solaris Subita recidivans*, *Arch. Klin. Exp. Derm.* (Germ.), 214, pp. 549-58, (1962).
7. Goldsmith, G. A., *J.A. Diet., Ass.*, 32, 312, (1956).
8. Gopalan, C., *et al.*, *Lancet*, i, 954, (1960).
9. Harris, L. V., *Vitamins in Theory and Practice*, 4th Edn., p. 89, (1955), Cambridge.
10. Parson, W. B., *Current Therapeutic Research*, 2, 137, (1960).
11. Hutchison's *Food and the principles of Dietetics*, 10th Edn., pp. 157-162, (1948).

36. PANTOTHENIC ACID (P.A.)

Chemistry of P.A.

Pantothenic acid is widely distributed in all the food-stuffs, therefore, its name is derived from (*pantothen* = every where). It is a peptide derivative and d-Pantothenic acid is thick oil isolated in 1938. In 1940, pantothenic acid was synthesized and today, it is commercially produced in the watersoluble form as *Calcium-panthothenate*, a crystalline substance [Williams, R. J. and Major, R. T. 'The structure of pantothenic acid, Science 91, 246. (1940)].[1]

Foods rich in P.A.

Pantothenic acid is abundantly found in beef-liver, chicken, eggs, milk, oysters, bran, soyabean, green-peas, mangoes, fish, groundnuts, potatoes (Sweet), dantu, drum-sticks, tomatoes, guavas, cauliflower, etc.

Daily requirement of P.A.

10-15 mg.

Pharmocodynamic action of P.A.

In our body, pantothenic acid is concerned with the acetylation reaction in the cells (Lipman); and it is for this reason it forms a part of co-enzyme A [Harris, L. J. 'Vitamins in Theory and Practice, 4th Edn., p. 271, Cambridge (1955)]. According to ANTIA, pantothenic acid is essential for the metabolism of amino acids, synthesis of fatty acids and cholesterol and formation of steroids.[1]

GOPALAN, states, 'This vitamin has been shown to act on adrenal glands, and helps the absorption of vitamin A. It is one of the components of vitamin B-complex and is present in all body tissues. However, its possible mode of action vary with different states. In case of burning feet syndrome, it will act by supplying the vitamin which is absent in the diet. In connective tissue lessions it is known that a deficiency of this substance leads to a greatly reduced co-enzyme A. Concentration in the tissues which may adversely affect many important reactions, such as *synthesis of acetylcholine* and the *acetylation of glucosomine* and *galactosomine.* These are the two components of connective tissues in which lesions may occur. Regarding paralytic ileus and post-operative distension pantothenic acid will cause firstly, increased formation of the acetylcholine, a parasympathicoimetic substance effective in stimulating prestalsis and secondly, P.A. influences supra-renal cortical functions' (Ind. Jour. Med. Nov. 1954, p. 814 and Ind. Med. G. 1946, p. 221).

Pantothenic acid plays a very important role in keeping the nervous system toned up by acting as a co-enzyme in the biosynthesis of acetylcholine. WIELAND,[2] stressed that disorders of the nervous system are concerned with the deficiency of co-enzyme A. OLSEN and KAPLAN[3] have shown that lack of co-enzyme A and acetylcoenzyme A checks the oxidation of pyruvic acid. This derangement of important metabolic process acts deleteriously on the nervous system. Prof. MAYER,[2] states, that the role of P.A. is great in the metabolism of acetic acid, its derivatives and the long chain fatty acids which are bound by co-enzyme A to other carbohydrate metabolites. It also excerts a great influence in the synthesis of glycogen in health and in diabetes.

Absorption and Excretion of P.A.

Pantothenic acid is absorbed from the alimentary tract and excreted in urine and milk. Omega-methyl-pantothenic acid is an antagonistic to P.A.[1]

Signs and Symptoms of P.A. deficiency

According to NOVELLI,[2] deficiency of pantothenic acid causes retarted growth and loss of weight; dermatitis, lesions of skin and adenexa; lesions of nervous system; disturbances of adrenocortical function, lesions of respiratory apparatus; gastro-intestinal disorders and changes in the gastro-intestinal mucosa, deficiency of protein metabolism; changes in blood coagulation factors. In addition, pantothenic acid has detoxicating functions and intervenes in anti-infections and immunobiological processes by its role in the formation of defensive factors of the organism; complement and specific antibodies.[2]

Pantothenic acid deficiency also causes muscular cramps, breathlessness as one finds in asthma and abdominal discomfort. Burning in palms and feet with undue tiredness, etc.

In all such deficiency states, administration of synthetic pantothenic acid 100 to 500 mg. daily or as directed by a physician is enough to bring a rapid cure.

Clinical manifestations of P.A.

1. Gastric disorders

It is proved beyond any doubt that nervous disorders are closely related to the origin of many digestive troubles and experiance has shown that neurotics are easy victims of gastric and duodenal ulcers. WISSMER,[3] proved that P. A. is known to exert a protective action on the *epithelial* tissues. HEBRAD,[4] tried P.A. 100 mg. with Vitamin B-complex and Vitamin C, 500 mg. one tablet each in the morning at breakfast time and his gastric pain subsided, the duodenal ulcer healed and in 5 years he never had any painful attack. Hebrad therefore, believes that P.A. along with Vitamin B-complex and Vitamin C has both preventive and curative effect in the treatment of gastro-duodenal ulcer.

Encouraged by the thesis, I used *Bepanthen-Roche*, 0.1 g., combined with *Becozyme-forte-Roche, Redoxon-Roche. Q.S.* 0.5 g. daily once at breakfast, in all the cases of duodenal ulcer who refused to get operated. Bland diet, usual antacid preparations and rest was continued for two months. After this, about 90 per cent of the patient were free from pain and the possibility of gastrectomy was avoided.

2. Anaemias

It is found that adrenal cortex is rich in co-enzyme A. MEYER, confirms that deficiency of P.A. is associated with adrenal dysfunction, which provokes eosinopenia, lymphopenia and insufficiency of hepatic glycogenesis. Deficiency of co-enzyme A also exerts a great influence on the formation of blood. Hence, it causes Iron-deficiency anaemias.[2]

3. Infections

STRAHAM and WEITZEL,[2] showed that P.A. has a very important function in the body during infections. They found that it has got a specific action of protecting the liver and its anti-infectious and detoxicating functions. They proved that addition of P.A. while treating infections with antibiotics; particularly Streptomycin etc., minimises the chances of drug-resistant-organisms and reduces the risk of untoward reactions to these antibiotics and increases antibodies in the body. The formation of antibodies according to MEYER, is due to normal metabolism of y-globulins in the presence of sufficient P.A. in the body. It is proved that protein deficiency reduces antibody formation.

4. Tuberculosis

LEE and WHITE[2] tried P.A. on coagulation time and prothrombin level and found that pantothenic acid has a direct influence on the coagulation factors II, V and VII, hence they recommend pantothenic acid as a regular medicament when antibiotics are used. Prof. MEYER, feels justified that pantothenic acid has a stimulating and protective action on mesenchymal tissues. There are various proofs that pantothenic acid exerts a beneficial action on ectodermal tissue and calcium level during streptomycin therapy in Tuberculosis.[2, 4]

5. Bladder incontinence

One of the most distressing complications that follow a gynaecologic operation is the inability to void properly. Because of the intimate relation between the urinary tract and the generative system, the surgeon is readily aware that injury or trauma to the bladder, ureter or urethra is possible.[6] It was stated by RADMAN and others, that in series of 16,335 gynaecologic and 27,456 obstetric cases 15 vesicovaginal and 5 ureterovaginal fistulas were reported by the gynaecologic service. Post-operative retention of urine, although not associated with the discomfort or disability of a fistula, is still a major concern. It is of interest from the obstetrician's standpoint to see that in the former years many Vesico-vaginal fistulas followed obstetric deliveries.

Atony of the bladder with resultant retention of urine has followed all types of operations. In addition, long-standing prolapse of the bladder or uterus anatomically predisposes to poor vesical tone.

As an adjunct in the maintenance of normal physiologic tone, D-Pantothenyl-Alcohol was given I.M. immediately after operation. The initial dose of 2 cc. or 500 mg. was followed by a similar amount in two hours, and then repeated every twelve hours for seventy two hours. This was considered effective, especially for retention in the bladder.

The basis for the use of pantothenic acid stems far from the work of JACQUES, LIPMAN and others. It has been demonstrated that P.A. forms a co-enzyme that is necessary for the production of Acetylcholine. Acetylcholine is the prerequisite agent for parasympathetic activity.

The detensor muscle, for all practical purposes, is considered to encompass all the muscular coats of the bladder. Innervation of this structure is supplied by elements of para-sympathetic and sympathetic nervous systems. Adequate care of the urinary bladder is the utmost importance in any post-operative course. A full bladder interferes with proper healing by imposing undue strain on the suture lines. Statis of the urine in the bladder encourages atony and increases the likelihood of infections in the whole urinary tract.

LEE, in a bacteriologic study of 411 post-partum patients treated with an indwelling catheter, demonstrated that 11 per

cent bacteriurea prior to delivery. The majority of clinical infections observed subsequently appeared in this group.

With intermittent catheterization the incidence of infection was reduced to 70 per cent. Under Lee's regimen in which Chlorohexidine diacetate was instilled into the bladder after each catheterization, there was a further reduction; the incidence was reduced to 13.5 per cent.

LEE considered D-Pantothenyl-Alcohol an effective adjunct in all types of gynaecologic cases; no deleterious side effects appeared.[7, 8]

6. Rheumatoid Arthritis

WRIGHT claims that administering P.A. 50 mg. by intramuscular injections daily gave relief in pain in patients suffering from rheumatoid arthritis after 7 days. However, discontinuation of therapy resulted in relapse after about a month. He says, that some other essential factors were involved in rheumatoid arthritis, failure of which leads in turn to breakdown of pantothenic acid metabolism. He confirms that patients can be treated both parenterally and orally.[5, 8]

7. Eczema

MATANIC found that the presence of calcium chromate in many occupational skin diseases like: *Cement eczema* can be prevented and cured by the administration of P.A. either orally or by injection or by topical application in the form of ointment or solution. The same can also be used for sun-burn and senile dermatitis with gratifying results. In practice of dermatology good results are seen by application of *Bepanthen-Roche* 5 per cent ointment or solution 3 to 4 times daily. It is particularly effective in severe skin irritation due to summer heat, acute or chronic eczemas without any secondary infection. In all such conditions one feels a marked relief in burning and itching after four or five days applications and with in a fortnight, the skin returns to its normal condition. Still marked relief can be achieved by substituting *Nebacortril Ointment-Pfizer or Betnelan-N Glaxo Ointment* if there is any allergy and infection. Any one of these ointments can be alternately used with Bepanthen Ointment to get the dramatic relief.

Indications of P.A. Therapy

Inflammatory conditions and catarrah of the upper respiratory tract, stomatitis, enteritis, colitis, post-operative intestinal atony, wounds, burns, eczemas, anal fissures, cervical erosions, sore fissured nipples, after care of tonsillectomy, laryngitis, pharyngitis, sun-burn, hair growth disorders, alopecia areata, loss of hair after infections, wounds after tooth extraction Gopalan's, syndrome etc.

Administration of Biochemic medicines like; *Kali-phos 6x*, with *Nat-mur 200x* 5 gr. t.d.s. once a week alternating with *Calc-phos 6x* and *Silicea 30x* 5 gr. each t.d.s. is found to aid absorption of pantothenic acid from food. (Sir, John Weir, Physician to Queen Elizabeth 11).

Patents of P.A.

Bepanthen—Roche. (Pantothenol) Lozenges 0.1 g, Ampules 0.5 g./2ml. Ointment 5 per cent, Solution 5 per cent 50 ml.
Calcium-pantothenate—T.C.F., Bombay, 50 mg./tablet. Injection 100 mg./ml.

REFERENCES

1. Antia, F. P., 'Pantothenic Acid' *Clinical Dietetics and Nutrition*, pp. 93-95, (1966).
2. Prof. Jacques Meyer, Strasbourg, France. 'Pantothenic Acid, Synthesizing Agent and Selective Filter of Defensive and Immunoprotective Factors' *The Roche Courier.* 8, Vol. XV, (1962).
3. Wissmer, B., 'Gastroentrologia' (Switz.) 84, 366-79, (1960).
4. Hebrad, P., Paris, (France) L'acide pantothenique dans la traitment de l'ulder-regastrique'. Presse, med. (France) 69, No. 16, 748, (1961).
5. Wright, *Lancet,* Oct. 26, p. 862, (1963).
6. Radman, *et al., Am. J. sung.* 103, p. 187, Feb. (1962).
7. Pakistan *Jour. Sing. Gynaec. & Obst.*, p. 235, Oct. (1963).
8. T. C. F., *Abstracts from current Medical Literature,* No. 2, 1964.

37. LECITHIN

The name Lecithin (Greek= Lekithos: yolk; first isolated from egg-yolk) is given to a group of *Phosphatides*.

Phosphatides are complex bodies of more or less fatty nature which are widely distributed in the body and it is believed that all cells contain more or less of these compounds.

Lecithin is a mono-amino-phosphatide. It is a mixture of diglycerides, stearic, palmic and oalic acids linked to the choline ester or phosphoric acid. Lecithin is widely distributed in animal organism particularly the brain, nerve and red-corpuscles of the blood. It is also found in the yolk of eggs and in seeds of plants.

Lecithin Content of Various Substances in per cent

Brain	16 per cent	Heart	4.5 per cent
Liver	4.3 per cent	Kidneys	8.5 per cent
Lungs	1.5 per cent	Spinal cord	11.0 per cent
Nerve Tissue (dry)	17.0 per cent	Red Blood Corpuscles	0.46 per cent
Mushrooms	0.90 per cent	Egg-yolk	12.0 per cent
Peas	1.12 per cent	Ergot	1.7 per cent
Yeast dry	2.00 per cent	Barley	0.7 per cent
Wheat and Rye	0.6 per cent	Green peas	0.15 per cent

Lecithin like choline possesses a lipotrophic action i.e., it corrects or checks abnormalities in the lipid metabolism. It reduces the position of fat in liver, kidney and thus cures obesity, sprue and cirrhosis of liver.

Patents of Lecithin

Leciphos—*Martin and Harris*, Calcutta.
Phospholecivit—*Wampole*. (Canada).

REFERENCES

1. Charles Wilson and O. Gisvold, *Organic Chemistry of Pharmacy*, pp. 124-125
2. Martindale, *Extra Pharmacopoeia*, pp. 340-341 (1952).

3. Goodman, L. S. and Gilman, A., *Pharmacological Basis of Therapeutics* pp. 1710-11.
4. Best, C. H. and Harshey, J. M., *Further observations on the effects of some component of crude Lecithin on the de paucreatized animal, J. Ph.* 1932, 75, 49, 55.
5. British Pharmacopial Codex, 1949.
6. Best, C. H. and Huntsman, M. E., *Effects of components of Lecithin upon depositing fat in the liver, J. Ph.*, 1932, 75, 405-412.

38. CHOLINE

Choline a nitrogen containing member of vitamin B Group, is a labile methyl group donor and is related to mobilization of fatty acids in the body. Choline by combining with fatty acids and phosphorous stimulates the formation of Lecithin in the body and in combination with alcohol it forms acetylcholine and supplies a labile methyl group for transmethylation. Choline helps the transportation of fats in the body. Therefore, deficiency of choline causes fatty liver. It is for this reason choline is indicated in cirrhosis of the liver with fatty changes. It aids the oxidation of fatty acids by forming lecithin (Antia, F. P. and Best, C. H.).

Foods rich in Choline

Choline is abundantly available in oranges, limes, strawberries, grapefruit, water-melon, pineapple, cabbage, spinach, wheat-germ, carrots, turnip, dantu, lettuce, mushrooms, fish, egg-yolk, skimmed milk, sheep liver, brain, kidney, heart, meat, soyabeans, yeast, ground nuts, green gram etc.

Daily requirement of Choline

The exact quantity and the mode of action of choline is not fully understood, however, 1 to 3 g. of choline is daily required for the maintenance of good health.

Signs and Symptoms of Choline deficiency

Though Choline is a very useful and essential metabolite, but still it cannot be classified as a vitamin, since it is synthesized in the body itself. Also, its daily requirement is much

more higher than other vitamins. However, the concentration of choline in blood plasma is constant between 4 to 4.2 mcg/ml.

It is proved that deficiency signs and symptoms of choline are multiple and resemble like those of protein and multivitamin. Therefore, diet rich in these food components, automatically prevents the deficiency of choline [Appelton, *et al.*, J. B. Chem. 205, 409, (1959)].

Indications of Choline Therapy

Haemorrhagic diathesis in kidneys, eye-balls, enlarged heart due to high blood pressure, atherosclerosis, etc.

39. INOSITOL

Inositol is also a member of vitamin B group and is considered as a nutritional factor in B-Complex deficiency in man. Like choline it is also a lipotropic substance and therefore, it is essential for the fat transportation in the body. It inhibits the growth of tumours and stimulates the growth of intestinal flora. Inositol is found in plenty in all the foods rich in choline, and no diet is deficient in this substance.

McCANCE and WIDDOWSON, state that inositol 1000 mg. is daily required and its deficiency causes, alopacia, gastritis, hypertension, fatty infiltration of liver, hardening of the liver etc.

40. METHIONINE

Methionine is a sulphur containing essential amino-acid which has a lipotropic effect and provides the labile methyl factor used by the body for synthesis of *Choline*, *Cystine*, and *Creatine*. It also provides sulphur necessary for the detoxifying activities of the liver. Thus methionine regenerates the liver parynchema in cirrhotic patients, irrespective of protein and vitamin contents of the diet.

Methionine, Choline and Inositol with B-Complex and Lysine is therapeutically indicated in the treatment and prevention of jaundice, ascitis, toxaemias of pregnancy, malnutrition during growth, pregnancy and lactation, allergy, chemical poisoning etc.

41. BIOTIN

Biotin is another substance which is as essential as the other lipotropics. In our body, biotin controls the proper distribution of colour pigment and acts as a co-enzyme-A to form malonyl Co-A which is an important step in the fatty acid synthesis and fat metabolism. Use of raw eggs which are rich in *avadin*, prevents the absorption of biotin. However, *avadin* in cooked eggs is destroyed and there is no fear of biotin deficiency by eating them (Antia, F. P.).

Deficiency of biotin causes muscular weakness, pains, pins and needles sensation in the muscles, lassitude, lack of appetite, falling of the hair due to malnutrition, baldness due to seborrhoea and brown peeling of the skin, ashen colour of mucous membranes etc.

Biotin is rich in eggs, fish, liver, milk and other foods rich in choline. GYORGY, and his associates state, that 0.15 to 0.3 mg. of biotin is daily required.

Patents of Lipotropic with B-Complex Vitamins

Elixir Apitolin—*G. D. Pharmaceuticals, Calcutta. Dose:* 2-3 teaspoons, 3 times daily.

Uni-Vit-C-Choline—*Unichem, Bombay. Dose:* same as Apitolin.

Delphicol—*Lederle.* 1 teaspoon 3 times daily.

Para-Aminobenzoic Acid

Para-aminobenzoic acid is a growth factor and a component of the folic acid molecule (Antia, F. P.).

REFERENCES

1. Antia, F. P., *Clinical Dietetics and Nutrition* (1966), pp. 96-97.
2. Mottram, V. H., and G. Graham, *Food and the Principles of Dietetics* pp. 160-61.
3. Apitolin Therapeutic Literature.
4. Mujamdar, A. R., *Bed-Side Medicine*, p. 17. 9th Edn., (1953).
5. McCance and Widdowson, *Nature*, 153, 650, (1944).
6. Gyorgy, P. Rose, C. S. and associates, *J. Amer. Med. Ass.*, 118, 1199.

42. VITAMIN C (Ascorbic Acid)

The story of Vitamin C is most interesting and more facinating than all the other vitamins.

Vitamin C was known to ancient Hindu physicians several hundred years before its scientific value was recognised. In Ayurvedic medicine Amla or Indian goose-berry is extensively used as a wonderful tonic and medicine for bleeding. CHARAKA who lived in 2nd century A.D. has written exhaustively in his book; CHARAKA-SAMHITA, about the medicinal value of amla in the treatment of tuberculosis, asthma, diabetes, nervous and general weakness, insanity etc. He formulated a combination of various herbs having the base of amla, which even today is the pride of Ayurveda as a very nutritive tonic. It is called: *Chyvanaprash.*

Mohammedan physicians like AVICEENA, RAHEZES, UMERQHIYAM, etc., also knew the therapeutic value of vitamin C. These physicians used *Rose-petals* and *Hips* to cure general weakness, palpitation of the heart, diabetes, tuberculosis, insanity, bleeding tendencies etc. But the ancient physicians did not know the chemical composition of either Amla or Rose-hips. However, they were the masters in therapeutics because their clinical indications of amla and rose-hips are unshakable even today. One wonders on comparing the scientific indications of Vitamin C with the medicinal uses of amla and rose-hips formulated by the masters of the past. Today, we admire that 100 g. of amla contains 700 to 1200 mg. of Vitamin C., and Rose-hips amounting to 1070 to 4800 mg./100 g. of this vitamin.

The beginning of the scientific research of Vitamin C took a tremendous shape after the confirmation of JAMES LIND, that fresh limes and oranges have a healing and preventing power over a mysterious disease which used to kill more sailors than the storms and ship-wrecks. Lind, a British Naval Surgeon, observed a strange phenomenon that sailors who were on a long voyage used to develop great feeling of tiredness, bleeding from gums and pain in the joints. These symptoms used to become worst associated with fever, and the unfortunate fellows had to suffer helplessly and die on the ship-board.

Some of those sick sailors attuned to get recovered completely when they ate fresh fruits like: limes and oranges and vegetables on returning to their homes. This acromatic change in the sick sailors health after eating fresh fruits and vegetables attracted the attention of the benefactor of humanity Dr. James Lind.

Impressed by this strange effect of fruits, Lind, in his next cruise in 1747 A.D., took a huge stock of fresh limes and oranges in his ship and distributed them freely to all the sailors on the board. One can imagine on looking a painting commissioned by Parke-Davis & Co., and painted by Robert Thom of U.S.A., that how Lind is distributing limes and oranges to the sick sailors on the ship-board.

To his great astonishment, Lind found that all the fruit eating sailors were healthy, even after a long voyage except those of control group. Then, Lind, put the sick navigators on fresh fruits and all of them recovered completely in a very short time. This wonderful experiment raised the hopes of Dr. Lind and afterwards his ships used to be laden with fruits by which the fortunate sea-men conquered the mysterious disease.

This was the beginning of the scientific research to discover the factor latent in fresh limes and oranges and its curative power in aborting the 'ship disease', which is known as *Scurvy*.

Chemistry of Vitamin C

Many researchers like; FROLICH, HOLST, ZILVIA, WAUGH, KING etc., tried to find out the substance in the fruits that acts as a medicine, but in 1928-29 SZENT-GYORGYI, a Hungarian, discovered, a crystalline reducing substance existing in various plants, citrus fruits and in cortex and suprarenal tissues of animals. GYORGI, sent a good source of paprika which contained more vitamin C, to HAWORTH at the Birmingham University Organic Chemistry Laboratory where its formula was evolved as : $C_6H_8O_6$. Later, Gyorgi, named it *Ascorbic Acid*. In 1933, *Ascorbic Acid* was synthesized by REICHSTEIN.

Vitamin C is a white crystalline substance soluble in water. It is stable in solid state, but, does not keep its potency in solution, because, Vitamin C is destroyed in the presence of Oxygen which it takes up. Vitamin C is also destroyed by heating it in contact with air or cooking it with alkalies like soda bicarb etc. Therefore,

cooking vegetables in plenty of water in uncovered vessels for a long lime is not advisable. Cutting vegetables finely, and keeping them hot for a long time also destroys the food-vitamin C. However, immersing vegetables directly in boiling water prevents loss of vitamin C by destroying ascorbic oxidase.[2]

All animals (except guinea-pigs and primates) and plants synthesize Vitamin C with the aid of three enzymes from *Glucose* in the liver, convert it into *Glucoromic acid*, then into *Gulonic-acid* and finally synthesize into *ASCORBIC-ACID.* (Isherwood, F. A. *et al.*).[1] It is the only vitamin which has the reducing property in acid solution (Harper).

Foods rich in Vitamin C (in mg./100 g.)

FRUITS	
Amla	*700-1200*
Currants	136–153
Orange	68
Lime	63
Pineapple	63
Papaya	46
Tomato	24
Mango	24
Banana	10
Raspberry	24
VEGETABLES	
Drumstick leaves	220–25
Drumstick	120
Rose hips[3]	1070–4800

Daily requirement of Vitamin C

Infants and children below 10 years	30 to 60 mg.
Adolescents	75 to 100 mg.
Adults	70 to 75 mg.
Pregnancy and lactation	100 to 150 mg.

Harper, H. A., Review of Physiological Chemistry, p. 69 (1961)

Pharmacodynamic action of Vitamin C

'St Gyorgi was of the opinion that the importance of ascorbic acid lay in its capacity to convert readily and reversibly into the oxidised form, dehydroascorbic acid. This capacity can be easily demonstrated in vitro.

Other investigators later discovered that the oxidised and reduced forms of vitamin C were in fact the extreme stages of a *redox* process. A third highly unstable intermediate stage, semihydroascorbic acid, plays an important part in the mechanism of action. The existence of this intermediate stage was discovered in enzymatic investigations and was later confirmed by electron resonance spectroscopy. Ascorbic acid compares favourably with other redox systems, such as glutathione or cysteine, for example, in the facility with which it can absorb or release hydrogen ions.

As a result the ascorbic acid controlled reactions the vitamin is oxidised or reduced, or—to put it the other way round—the vitamin fulfils the role of electron donator or receptor in these reactions. Thus we can differentiate between two groups of metabolic processes: one group where vitamin C is oxidised and the other in which it is reduced.

The following processes involve oxidation of vitamin C:

1. hydroxylation of proline to hydroxyproline in the synthesis of collagen, particularly in the granulation tissue of healthy wounds. This explains the speeding up effect exerted by vitamin C in wound healing;
2. hydroxylation of dopamine to noradrenaline. It is thought that the action is partly the basis of shock prophylaxis with high doses of vitamin C in surgery;
3. steroid hydroxylation in the adrenal cortex. Vitamin C plays an important role in the biosynthesis of the adrenal hormone cholesterol—lowering action of vitamin C and its great value in stress reactions;
4. the degradation of aromatic amino acids (e.g. tyrosine);
5. the incorporation of the iron atom into tissue ferritin. This reaction and improvement of intestinal absorption of iron explains the action of vitamin C in anaemia.

While there are several confirmed and a whole series of hypothecal reactions involving oxidation of vitamin C, we know with certainty of only one reaction which reduces the vitamin, namely the conversion of tryptophan into 5-hydro-tryptophan in the synthesis of serotonin. When one considers that this reaction

does not occur extensively in the body, and thus relatively little dehydroascorbic acid is reduced to ascorbic acid (the majority being irreversibly broken down), it is easy to understand the great discrepancy between the daily requirement of the B vitamins (a few milligrams) and vitamin C (70 to 150 mg). This rapid and irreversible degradation also explains why vitamin C must be given in higher doses to achieve a pharmacodynamic effect than other pharmaceuticals, such as sulfamides, antibiotics, cardiac glycosides etc. (Roche-*SO196770*).

Vitamin C, by virtue of its oxido-reduction properties and its role as a hydrogen bearer in various chains of metabolic reactions, plays a major role in the normal function of all cells in the human organism. It acts like an enzyme by undergoing a reversible oxidation to dehydroascorbic acid and aids the easy transportation of hydrogen to all the tissues and increases the tolerance to low oxygen pressure. Vitamin C helps the formation of collagen, a binding substance in the cells which forms the proper matrix of the bones, teeth, cortilage, acts as a cement substance in binding the tissues of blood vessels, particularly, the capillaries. Vitamin C, by the combination of Vitamin P, increases the elastisity of the tiney blood vessels and prevents the petichial bleeding which is common in various vitamin C deficiencies, most particularly, in scurvy. Vitamin C, increases the vital force of the body and neutralises the various toxins of micro-organisms during infections. It is closely related to aid normal metabolism of carbohydrates and absorption of iron in the body. It is also necessary for the formation of osteoblasts and for haemopoiesis.[1] It promotes tissue respiration, as it intervenes especially in processes involving free oxygen and exerts its tonic action and creates a feeling of well being during seasonal tiredness, particularly during the height of summer. It also prevents the excessive loss of sodium and iron through skin when there is excessive sweating during this season.

Unfortunately men are some of the few earthly creatures which, as a result of a missing enzyme, are unable to synthesize Vitamin C themselves. It is also unfortunate that like Vitamin A and D, Vitamin C cannot be stored in the body.

Absorption and Excretion of Vitamin C

Vitamin C is absorbed from intestines and forms a peak concentration of 1 to 1.2 mg. per 100 ml. of blood plasma. This

Plasma concentration of vitamin C falls below normal and remains between 0.1 to 0.3 mg. per 100 ml. if the daily intake of vitamin C ranges between 15 to 25 mg. During this low blood concentration phase, vitamin C is not excreted. But, if the plasma concentration of vitamin C increases either due to supply of more food-vitamin C or by therapeutic oral or I.V. administration, excretion of vitamin C occurs through kidneys. Therefore, administration of concentrated doses of vitamin C, causes more depletion. (Harper, H. A., Review of Physiological Chemistry, p. 69, 1961).

Signs and Symptoms of Vitamin C deficiency

Many research workers confirmed that vitamin C deficiency occurs due to *malnutrition, excessive demand during pregnancy, lactation, growth, infections* and *defective absorption due to gastro-intestinal disorders*, notably *diarrhoea*. Even then, one does not show any clinical manifestation of vitamin C deficiency until this deficiency state continues for about four months, and the body reserves of vitamin C are completely exhausted. Then, one begins to feel tired and exhausted by little manual work. The mental tension increases with marked irritability and poor memory. The first indication of vitamin C deficiency is the hyperkeratosis of the hair follicles of the thigh, calf and the abdomen.[6] The gums become painful, sore and bleed while cleaning and mastication of food. The dentine becomes spongy and loosening of the roots takes place resulting in the early fall out of the teeth. The chances of developing pyorrhoea and gingivitis are great. Deficiency of vitamin C forms defective teeth in children. The growth of bones becomes defective due to formation of bony matrix. Bleeding takes place under the thin covering of the bones and due to it, the movement of the joints become painful.

It is noted that in all iron deficiency anaemias, bleeding tendency is more marked. This is attributable to formation of fragility of the blood vessels caused by lack of collagen and iron-phosphate. It is already said that vitamin C plays a major role in the formation of collagen and controls the blood forming mechanism. Hence, vitamin C deficiency causes bleeding under the skin, alimentary and muscular tract and in the muscles. Bleeding from the

mucous membranes especially, from the mouth and nose is more common than the other orifices. Haemorrhagic effusion occurs in various bigger joints, pleurae and pericardium. Bleeding in the eyeball also takes place due to vitamin C deficiency causing blindness.

One frequently notices that his skin is becoming thicker, rough and dry. He finds that a little wound fails to heal quickly and persists with painful episodes. All these manifestations put together we call *Scurvy*, the most striking manifestation of Vitamin C deficiency. It was Scurvy which baffled the sailors as a mysterious disease.

Deficiency of Vitamin C in Children

Deficiency of vitamin C in children who are fed on condensed milk or on other foods poor in vitamin C is called *Barlow's Disease*. This is commonly seen in children of 8-12 months. These children deficient in vitamin C, look pale, restless, fretful, refuse to take food and cry when they are handled due to pain in the joints, which are tender to touch. There may be high fever and blood in the urine. Deficiency of vitamin C is commonly associated with Rickets in such wrongly fed children.[6]

How to prevent and cure Vitamin C deficiency

Vitamin C deficiency can be prevented by eating plenty of fresh citrus fruits like; oranges, lemons, tangerins, sweet-lemons etc. The cheapest source of vitamin C in India is Amla and germinated grains. Drumstick leaves and Coriander leaves, Fresh Rose Hips are the best and cheapest source of natural vitamin C. If *rose hips* are exposed to *radio active gamma rays* for 4 to 6 minutes, their vitamin C content can be increased and the quick loss can be prevented. By applying this method, a garden of beautiful orange coloured roses is sufficient to supply the entire quantity of natural raw vitamin C for the whole year if there is a vitamin C factory nearby.[8] All these sources supply more than what we need daily (about 50-100 mg.) and prevent vitamin C deficiency. Supplementing commercial vitamin C in the form of *Redoxon-Roche or Celin-Glaxo 50-100 mg.* in tablet form along with milk or any fruit juice is the surest way of preventing

vitamin C deficiency. Vitamin C must be regularly used by those who smoke tobacco. Because, smoking reduces the blood concentration of vitamin C. Taking an occasional dose of Biochemic *Nat-mur 30x.* alternating with *Ferrum-phos 6x. 5 grs. each*, along with vitamin C-rich food, lowers the chances of vitamin C deficiency.

Clinical manifestations of Vitamin C

1. Obstetrics and Gynaecology

JAVERT and STANDER, found that plasma concentration of Vitamin C, in pregnant women varies between 0.35 to 0.4 mg./100 ml. (normal vitamin C in non-pregnant women is 1.1 mg./100 ml.). Hence, vitamin C 100 mg. daily should be routinely given along with other multi-vitamins in the form of nutritious diet and *Gevrol-Lederle, or Vitaminets-Forte-Roche, 1-2 tablets a day*. Regular use of vitamin C, during the entire period of pregnancy prevents one from infections, helps the absorption of iron and prevents the early rupture of the bag of water. Administering vitamin C, 500 mg. along with vitamin B_1 100 mg. daily from a fortnight earlier than the *Expected Time*, makes the child-birth very easy and painless.[28]

In cases of threatened and habitual abortions administration of vitamin C 500 mg. along with Vitamin E 100 mg. daily has been found to be very effective. However, other measures like, *Progestrone therapy* and *bed rest* must also be considered.

In *Puerperal Psychosis*, DE SMIT and DE WART, confirmed that Vitamin C plays a very important role in reducing the mental episodes. They gave Vitamin C 2 g. in 500 ml. with 0.9 per cent saline by I.V. and repeated on alternate days until the total amount of Vitamin C reached 6 g. This Vitamin C therapy led to a gradual decrease in intensity and frequency of delusions and helped the patients to remain calm and sleep well. Both the authors recommend to continue Vitamin C 1 g. daily for at least 5-6 weeks by mouth to cure the mental disorder completely.

In a maternity hospital it is a common sight that some of the unfortunate mothers go out of mental gears and start behaving in a peculiar way. They become ill-tempered, abusive and use vulgar language, sing and dance, throw away the clothes and try

to run nude in the wards without caring about the environment. They shout that some devil is chasing and appeal to this imaginary hedious figure to forgive and leave them alone. For all such mental derangements the relatives take it for granted that the patients are occupied by a devil or haunted spirit and magical treatments are given instead of regular treatment by a physician. All such mental derangements can be cured by regular administration of vitamin C either by injections or by oral route. Administration of Vitamin C during the last three months of pregnancy will certainly prevent such unfortunate happenings, and other complications after childbirth.

How Vitamin C acts in such conditions is by rectifying the defective metabolism and neutralizing the excessive release of adenochrome which is found to cause certain forms of psychosis, or by the maintenance of nucleotide phosphate balance, which is important for intermediatry metabolism. It is observed that when plasma concentration of Vitamin C falls below normal, the level of *Adenosine-Tri-Phosphate* rises to a considerable extent causing post-partum dementia. When Vitamin C 2g. in a single oral dose was given, the ATP in the blood fell significantly reaching a minimum when Vitamin C level reached its maximum[9].

2. Surgery

An adequate supply of vitamin C in operations, fractures, burns and severe haemorrhage is important for more capillary impermeability and resistance to infection. Its accumulation in the damaged tissue, consumption during the healing process, and indispensability in the formation of cement substance and collagen make an adequate supply of Vitamin C appear necessary before and after operations. In addition, anesthesia and truma increase the Vitamin C requirement, and the formation of steroids as a reaction of the pituitary—adrenal system to stress also requires Vitamin C. Deficiency of vitamin C increases the danger of shock, either as the result of a disturbance of norepinephrine and serotonin production of a negative redox potential and the consequent formation of depressor amines and peptides, or of an inadequate secretion of corticoids.

In all such conditions a daily dose of 100-400 mg. of Vitamin C is adequate to support the healing processes.[12, 15] KOSTER and

KLASSON consider 1-2 g. daily to be appropriate. To prevent the occurrence of post-operative shock 500 mg. of Vitamin C should be given before and two or three similar doses during operation according to the state of the circulation, or an infusion containing 3 g. Vitamin C per litre can be begun before the operation and continued during its course.[18] Such a measure prevents appreciable fluctuations in blood pressure.

HUNT and FORSTER, believe that the administration of Vitamin C during the healing of wounds, fractures etc., should be maintained for some time, since newly formed collagen is particularly sensitive to deficiency of the vitamin C and undergoes involution. Low Vitamin C levels have been found as late as the 12th and 14th week of fracture healing. Vitamin C heals the wound and forms a mild keloid scar after operation. This is attributed to the formation of collagen in the presence of normal level of Vitamin C in the blood. In the absence of Vitamin C, collagen reticulum and the other supporting structures of the body atrophy, and the damaged tissues are not replaced. However, simply loading Vitamin C to form collagen in the absence of proteins fails to bring the desired result. Because collagen itself is a complex protein which constitutes about 30 per cent of all body protein. It and its precursor procollagen etc., are formed from the substrate substances by the intermediation of ascorbic acid, which is not by itself incorporated into the substance of the wound tissue during the healing process.

Collagen is made up of 18 amino acids (including proline and hydroxyproline) and other substances that go towards the formation of protein. Mucopolysaccharides (glycoproteins hexosamine and glucoronic acid) have been isolated from the healing wound by the sponge method and shown to decrease as the collagen content and tensile strength increase. It was the accumulation of these substances that gave rise to the expression '*substrate phase*'.

The sulphydryl radical has been shown to be fraction which is of the most significance and its mobilization for the healing of the injured part. The amino acids, cystine and methionine containing the sulphydryl radical are almost totally lacking in collagen, yet in the body the presence of methionine increases the ratio of collagen to non-collagen substrate. Here, then, is another substance which enhances the formation of collagen without becoming part of it and yet another reason for feeding

first class proteins liberally before and after operations and wounds.[11]

Feeding with first class proteins in large quantity forms practical difficulties in surgical patients and those who are badly injured due to burns etc. In such conditions, administration of pre-digested proteins like: *Protinules Alembic-Broda* or *Protinex-Pfizers* ½ to 1 tablespoon and a tablet of Redoxon-Q.S 0.5 gm. 2 to 3 times a day with a cup of milk, increases the rate of cellular proliferation, speeds up the healing and reduces the loss of protein.

3. Haematology

WILLIAMS, studied the effect of vitamin C on absorption of iron on gastrectomized patients and found that absorption of food-iron was appreciable when vitamin C in the form of ascorbic acid was given in addition. Therefore, it is particularly interesting that vitamin C supplementation along with antianaemic treatment consisting of iron and liver in the form of *Campoferron-Bayer*. 1 to 2 capsules a day or more according to the severity of the case is highly recommended. In plain iron deficiency anaemias, *Roncovit-Hoechst* or *Sybron-P-Davis*, along with *Redoxon-Roche*. 0.5 gm. 1 tablet or 1 teaspoon with vitamin C is found to be very effective in moderate cases (Williams, J., Clin. Sci. Engl.) 18, 521-25 (1959).

4. Infections

In infections, the part played by Vitamin C is highly praised as a vital factor in the defence of the organism. When the urine, blood or cerebrospinal fluid of patients suffering from an infectious disease is examined, an abnormally low level of ascorbic acid is found; additional supplies of this vitamin administered to such patients is not eliminated in the urine, as in the case with healthy subjects, and this shows that it is retained in the body. (The same phenomenon is observed in the case of intoxications of medicamentous or oxidental origin.) For this reason, the administration of high doses of vitamin C is indicated in an acute state of all infectious diseases, and should be continued in decreasing dosage until full recovery.

The regular use of amla or rose confection as advised by our ancient masters of medicine in the treatment of tuberculosis is now confirmed by clinical investigations that vitamin C has a deleterious influence on the pathogenic organisms, particularly of tuberculosis. SERI, in his researches on tuberculosis with vitamin C, gave 500 mg., of 1 per cent vitamin C solution every two or three days to all the patients suffering from acute pulmonary tuberculosis and found a favourable influence on the clinical course and X-ray findings. Investigating the possible mechanism of action revealed that haemoglobin levels were raised by up to 60 per cent in about two thirds of the patients, histamin sensitivity was reduced, inflammation checked and the tonus of the blood vessels improved. Electrolyte studies showed first increased sodium and decreased potassium and later a reversal of this state. The associated diuresis fecilitated respiration and circulation as the blood flow improved, the action of tuberculostatics also given in infusion was speeded up. Other effects were increased ketosteroid production and complement fixation and a positive *Thron-Test*. On the ground of these researches, SERI, recommends high doses of vitamin C should be regularly given along with I.N.H., Streptomycin, P.A.S. etc., to all the patients of tuberculosis, to prevent the chances of relapses, to reduce the treatment period, to lower the side effects of chemotherapy and to protect the cardiovascular insufficiency [Seri, I., Ther. Umsch. (Switz.), 18, No. 2, 72-76 (1961), Budapest, Hungary].

I have been using vitamin C in the form of *Redoxon-Roche, Q.S. 0.5 g.* one tablet twice daily along with *gallic acid 30 mg.* in the following acute infections with their indicated treatment with gratifying results.

Diphtheria, tuberculosis, tonsillitis, whooping cough, pneumonia, asthma with secondary infection, measles, chicken pox, smallpox, poliomyelitis, influenza, pleurisy, pyelitis, cystitis, nephritis, hepatitis, arthritis, and all the infections with staphylo and streptococci germs. During the administration of Cortisones, I always supplement vitamin C in 100 to 200 mg. t.d.s. Vitamin C is also indicated in intoxications of various substances. (Roche-C 066748).

BIBILE, S. W., head of the department of Pharmacology, University of Ceylon: writes in Med. News dated 20-1-67; that

vitamin C (ascorbic acid) has no influence in preventing common cold or influenza.

Honouring Prof. Bibile's opinion and attracted by the nature's combination of vitamin C along with gallic or tannic acid as one finds in *rose hips*, *amla*, *guava* etc., the most highly concentrated sources of vitamin C; I undertook the study of the effect of supplementing *gallic acid* with *ascorbic acid* in the prevention of colds.

The following table gives the details

No. of patients	Group A	Group B	Group C	Group D Control
40 of various ages	Vt. C 100 mg. + gallic acid 10 mg. daily	Vt. C. 200 mg. + gallic acid 20 mg. daily	Vt. C 500 mg. + gallic acid 30 mg. daily	Plain Vt. C in doses of 100, 200, 500 mg. daily
No. of Patients	10	10	10	3 + 3 + 2 for 2 (No. Vt. C)
Duration of treatment	4 months	4 months	2 months	4 months
Remarks: All the patients were asked to remain care-free during the treatment and winter.	4 had severe attacks 3 had mild attacks 3 did not report	6 had mild attack 3 had usual attacks 1 did not get any cold	8 persons had no attacks 2 had very mild attack for the first time in many years	Those 2 who had 500 mg. Vt. C had mild attack the rest had no change
Result	30%	60 %	80%	20%

For details ask referring No. 1286, Research Record, O.P.D., 67-68 Indo-American Hospital, N.R. Mohalla, Mysore.

It is observed that smokers have more chances to get common cold than others. (I thank *Roche Ltd.* for supplying *Redoxon* in various concentration to do research that is going on in larger scale and the report will be published after its completion.)

5. Cardiology

A peep into the ancient medicine, again confirms that its masters were fully conversed about the therapeutic value of vitamin C in the treatment of various heart diseases. *Charaka* and *Aviceena* have exhaustively written about the value of rose-

conserve and fresh amla-juice as a specific medicine for heart disorders.

Today, researchers in cardiology confirm that there is a very close relationship of vitamin C in the normal function of the heart and its muscles. Since heart is a special kind of muscle, which has billions of muscle-fibres that contract and relax automatically without the aid of central nervous system. This self activity of the heart is due to a peculiar type of electrical impulses generated from chemical energy by the action of certain chemicals like: *Actin, Myosin, Adenosine-triphosphate etc.* Among all these chemicals, *Adenosine-triphosphate* (*A.T.P.*), has been isolated by ST. GYORGI, and this substance is found to be very effective and active constituent of the heart muscle. It is a water-soluble nucleotide chemical consisting of a long chain molecule. It possesses about 11,000 calories of free energy which is the main source of power behind the activity of the heart. It is therefore, a store house of energy for both strength and activity of the wonderful heart. Prof. Gyorgi, believes, that without it, the muscle of the heart not only becomes inactive but also remains stiff and inelastic. This regulatory action of A.T.P. is demonstrated by DE WAART and DE SMIT, is controlled by the presence of vitamin C in the body. Both the researchers firmly conclude that vitamin C is an invaluable chemical aid in keeping the muscle-A.T.P., particularly in the heart muscles to go on functioning smoothly and to prolong health and longevity.

In the light of these cardiological researches, vitamin C has become a major tool in the treatment of various disorders of heart banishing all the fear that vitamin C is contra-indicated in acute cardiac emergencies such as: *Ischaemia of the heart, coronary or myocardial insufficiency etc.* It was believed that vitamin C may play a major role in increasing the blood coagubility of the patient, which is a serious consequence in an ischaemic heart victim. Thanks to Russian researchers: BUKOVSKAYA and APTEKAR, who, after years of extensive clinical study in cardiology proved, that vitamin C has no such effect in increasing the coagulation time in healthy subjects when 500 mg., of Ascorbic acid was administered I.V. They say, that there was an occasional reduction of coagubility in gastric or duodenal ulcer patients either a rise or a reduction was seen in arteriosclerotics However, daily doses of 200 mg., of Ascorbic acid I.V., were without effect in the latter cases.

9. Cancer

Cancer in advanced stages is incurable and inoperable. However, in such desperate cases REINHOLD, states that, daily administration of vitamin A 150,000-300,000 I.U. and vitamin C 1,200 mg. by mouth is very effective in creating a sense of well being by improving general health and appetite. He says, that vitamin A and C are physiological substances which inhibit the growth of tumour and can often maintain carcinoma patient in a tolerable, stationary condition for several years. Therefore, vitamin A+C along with other anticancer treatment can be given without hesitation for months. Though it is not a cure but surely an adjuvant therapy [Rienhold, H. and A. Hedfeld, *Z. ges. inn. Med.* (*Germ*). Magdeburg, 15, 651-58 (1960)].

10. Glaucoma

BIETTI confirms that administration of vitamin C is an important preoperative aid to glaucoma surgery. It softens the eye ball and eases the operations (Medical News 17-1-68. Antiseptic, Madras, Vol. 65, No. 2, 1968).

Indications of Vitamin C Therapy

Vitamin C is also indicated in haemoptysis, haematemesis, bleeding from nose, bleeding piles, melaena, erythemia nodosum, deep corneal ulcers, rhinitis, anoxia, (loss of smell) defective formation of dentine and enamel, dental caries, bleeding after tooth extraction, parodontitis, glositis, infantile dyspepsia, delayed growth and development, mongool-babies, rickets, hyperthyriodism, whooping cough etc. It is confirmed that adequate supply of Vitamin C along with B-complex vitamins during the entire pregnancy prevents the babies from congenital deformities. SYED, *et al.*, found that giving 400-500 mg. of Vitamin C before and after manual work reduces the muscle stiffness and cutshorts the feelings of pain by preventing the rupture of blood-vessels.

Vitamin C Patents

Redoxon—*Roche:* 50 mg., 0.2 g. and 0.5 g./tablet. Injections 0.1/2 ml. and 0.5/5 ml.

Celin—*Glaxo,* 50 mg., 100 mg., and 500 mg./tablet. Injections 100 mg./1 ml. and 500 mg./5 ml.

Cetamid—*Cipla:* 50 mg. and 100 mg./tablet.

Dosage: Prophylactic 50-100 mg. daily. Therapeutic 500-1000 mg. without any fear of toxicity.

REFERENCES

1. Antia, F. P., *Clinical Dietetics and Nutrition*, pp. 98-105 (1966).
2. Harris, I. J., *Vitamins in Theory and Practice*, 4th Edition, p. 133.
3. Hutchison's, *Food and the Principles of Dietetics*, 10th Edition, pp. 162-174.
4. Redoxon—Roche, *Literature Nos.* S 026760 and C 046748.
5. Szent-Gyorgy, A., *Science*, 110, 411-413, Oct. 21, (1949).
6. Mujamdar, R. A., *Bed-Side Medicine*, 9th Edition, p. 18. (1953).
7. Isherwood, F. A., Chen, Y. T. and Mapson, L. W., *Bio. J.*, 56, 1, (1954).
8. Michel Piberden and Krastasoof, *Soviet Union* (Urdu) p. 16, No. 1333, (1967).
9. Javert, C. T. and Stander, H. J., *J.A. Obst. and Gynaec.* 57, 878, (1949).
10. De Smit, N. W., De Waart, C., Amasterdam, *Med. T. Geneesk*, 105, 159-62 (1962).
11. Hunt, A. H., Pro Royal Society Med., 53, 41, (1960).
12. Coon, W. W., *Surg. Gynaec. Obst.*, (U.S.A.), 114, 522-34, (1962).
13. Crandon, J. H., *et al.*, *Ann. N.Y. Acad, Sc.*, 92, 246-67, (1961).
14. Haley, H. B., Jr. Williamson, M. B., *Surg. Clin. N. Amer.*, 42, 15-34, (1962).
15. Rogers, W. F., Gardner, F. H., *J. Lab. Clin. Med.* (U.S.A.), 34, 1491-1501, (1949).
16. Koster, H. J., *Zbl. Gynak.*, (Germ), 78, 1334-41, (1956).
17. Klasson, D. H., *N.Y. St. J. Med.*, 51, 2388-92, (1951).
18. Pataky, Z., Kendelenyi, E., Nagy, L., *Zbl. Chir.* (Germ.) 88, 1659-63, (1963).
19. Forster, E., *Schweiz. med. Wschr.* 67, 808 (1937).
20. Bukovskaya, A. V., *Dept. of Therapeutics, 2nd med. Inst. Moscow. Sovetsk* 1, 77-82 (1957).
21. Aptekar, S. G. and Lorie, K. M., *Klin. Med.* (*Rus.*), 36, No. 5, 121-127, (1958).
22. Cipla—Bombay, *Regeneration of Heart Muscle*, pp. 2-3.
23. Dumex—Bombay, *Insulins in Diabetes*, M. V. Raghunath, (1958).
24. Syed, *et al.*, *B.M.J.*, 304, 2, July 30 (1966).
25. Hakeem Syed Sultan, Pahelwano-kay-adviath (Medicines for wrestlers) Urdu, MSS. (1928).
26. Hakeem Abdulla Sahib, *Qhuas-e-Gulab-kay-phool*, (Effects of Rose flowers), Ur. MSS. (1953).
27. Majeed, S. A., *Zacha-kay-Junoon-ka-Illaj.* (Treatment of Puerperal Mania), Ur. MSS. (1930).
28. Aman, *Clinical Observations of Vitamin B_1 and C on the onset of labour.* F. No. 87, (1965-67), I.A.H., Mysore.

43. VITAMIN K (Acetomenaphthone)

Chemistry of Vitamin K

DAM, in 1939, discovered Vitamin K, which is a water-soluble vitamin essential to form *Prothrombin* in the liver. Prothrombin is a substance which controls the *Coagubility* of the blood. It is proved that blood clotting phenomenon as the sumation of inner action between prothrombin, thromboplastin and calcium producing Thrombin is related to vitamin K. Deficiency of one or more of these factors produces an abnormality in blood clotting. It is noteworthy that human blood may be severely deficient in prothrombin and still exhibit a normal or slight subnormal clotting time. Severe deficiencies of prothrombin, of course, produce, great prolongation of the clotting time. It has been found that the haemorrhagic diathesis in jaundice is almost associated with lowered blood prothrombin (Dr M. A. Kamath, *Pharmacology and Therapeutics*).

Foods rich in Vitamin K

Vitamin K is freely available in green vegetables particularly in alfalfa, cereals and animal food in the form of natural vitamin K_1 (phytonadione U.S.P.). Natural vitamin K is chemically known as *2-methyl-3-phytyl-1, 4-napthoquinone*. Another type of natural vitamin K which is derived by the bacterial action on putrified ash is known as vitamin K_2. Both the types of vitamin K are oil-soluble and can be used orally as well as by injection.[1]

Today, the vitamin K that we use in medical practice is synthetic and is chemically known as *2-methyl-1, 4-napthoquinone*.

Both the food-vitamin K and auto-prepared vitamin K by the non-pathogenic bacteria in the intestinal canal is absorbed from small intestines with the help of bile salts along with fatty-emulsion of the fats. Our body does not store vitamin K and its excretion is obscure.

Signs and Symptoms of Vitamin K deficiency

Deficiency of vitamin K occurs due to malabsorption of fats caused by excessive use of liquid paraffin, deficient intake of vitamin

K rich foods, destruction of intestinal bacteria due to prolonged use of antibiotics and sulpha drugs, biliary obstruction due to calculi, carcinoma etc., prolonged diarrhoea, deficient synthesis of vitamin K due to hepatitis and other liver diseases and anticoagulant therapy during cardio and neuro-vascular diseases. During the first week, a new-born infant may fail to synthesize vitamin K due to sterile intestines, but, soon the synthesis begins and the deficiency signs clear after the first week. However, cautious administration of vitamin K in the form of Synkavit—*Roche* or Kapilin—*Glaxo* 10 mg. 2 to 3 times a day in late pregnancy can prevent the serious consequences to the new-born infant [Lucy, J. F., and Dolan, R. G. *Pediatrics*, 23, 553, (1959)].

Daily requirement of vitamin K is not fully ascertained, however, 1 to 2 mg. of vitamin K is essential for the proper level of blood prothrombin. In a normal mixed diet consisting of fresh green vegetables, rich in vitamin A and C, this daily requirement of vitamin K is supplied if one has a healthy liver and is not addict to drugs.

Indications of Vitamin K Therapy

Antenatal and neo-natal haemorrhage, purpura, haemoptysis, haematemesis, bleeding gums, as a prophylactic in operations to control bleeding and other conditions of bleeding associated with low prothrombin, sprue, obstructive jaundice, urticaria in jaundice and other liver disorders, jaundice of the new-born infants, coeliac disease etc.

Vitamin K Patents

Synkavit—*Roche*, 10 mg./Tablet.
Kapilin—*Glaxo*, 10 mg./Tablet. Injection 10 mg./ml.

REFERENCES

1. Antia, F. P., *Clinical Dietetics and Nutrition*, pp. 127-132, (1966).
2. Dam, H., Tage-hansen and Plum, P. *Lancet*, 2, 1157 and 1162, (1939).
3. Hutchison's *Food and the Principles of Dietetics*, p. 184, (1948).

44. LAXOFLAVIN

Laxoflavin is a new vitamin isolated by Drs. GLADYS, EMERSON and KARL FOLKER from human heart. They state in Archives of the Institute of Cardiology, Mexico (1947), that this vitamin is abundantly present in myocardium and the smooth function of heart muscle is due to its presence in it. Hence, Laxoflavin is very much essential during hypertension and all other cardiovascular diseases in which heart as a whole is strained. Herzolan—*Cipla*, is as heart extract rich in Laxoflavin and can be used in such indications of Laxoflavin.

45. VITAMIN P (Bioflavonoids)

ST. GYORGYI, in 1939, called the attention that capillary bleeding is controlled by certain natural factors which correct the capillary permeability and stop bleeding in case of capillary haemorrhage. These natural substances are abundantly found in citrus fruits such as, lemons, oranges, etc., and they are named as *Citrin, Rutin or Hesperidin*. They are also found in other foods like; apples, amlas, cherries, blackberries, currants, guavas, plums, cabbage, rose-hips, lettuce, spinach, chillies, tomatoes, lemon-peel etc.

Vitamin P keeps the lining of the blood vessels intact by strengthening the intercellular cement substance. The endothelial cells of the capillaries are cemented together with the ground substance and fibrils. The cementing substance is strong if there is an adequate supply of bioflavonoids and vitamin C, as their effects are synergestic (Szent Gyorgyi and Bentsa'th, Nature 140, 426, 1937).

Vitamin P is widely used as an adjuvant therapy in rheumatic fever, habitual abortion, during anticoagulant therapy, in retinal haemorrhage, hypertension capillary bleeding from gums, poliomyelitis etc., in the form of *C.V.P-(U.S.V.)*, 1 to 2 capsules 3 to 4 times a day.

46. REASONS FOR VITAMIN DEFICIENCY IN GENERAL

1. Diminished intake

Food and eating habits
Ignorance
Low income
Therapeutics and reducing agents
Allergy
Anorexia
Psychoneurosis

2. Increased Requirement

Rapid growth
Pregnancy and lactation
Infectious diseases
Exercise
Hyperthyroidism

3. Poor Absorption

Chronic diarrhoea, bacillary dysentery, intestinal obstruction, cancer of gastro-intestinal tract, achlorhydria, Malabsorption syndrome, ulcerative colitis, intestinal tuberculosis, gastrocolic fistula.

4. Defective Utilization or Storage

Liver malfunctioning, hyperthyroidism, certain neoplasms, certain therapy.

5. Increased Excretion

Polyurea, blood loss, lactation, severe burns [Therapeutic Notes No. 2, p. 29. Parke-Davis & Co., Bombay (1961)].

REFERENCES

1. Goodhart, R. S., *Postgrad. Med.*, 27, 663, (1960).
2. Duncan, G. G., ed, Diseases of Metabolism, Ed. 4, Philadelphia, W. B. Saunders, (1959).

3. Chew, B. F. and Okuda, K., *J.A.M.A.*, 172-422, (1960).
4. Kountz, W. B., *Indus., Med.*, 27, 537, (1958).
5. A. M. A., Council on Food and Nutrition, *J.A.M.A.*, 169, 41, (1959).
6. Del Mundo, J., *Philippine Med. World* 21, 53, (1960).
7. Kalter, H., *Pediatrics*, 23, 222, (1959).
8. Hundley, J. M., *et al.*, *A.J. Clin., Nutri.*, 5, 316, (1957).
9. Law, D. H., *et al.*, GP, 20, 143, (Dec.) 1959.
10. Coward, K. H., *Biological Standardization of the Vitamins*, 2nd Edn., Williams and Wilkins, (1947).
11. Harris, R. S., *et al.*, *Vitamins and Hormones*, Academic.
12. Johnson, B. C., *Methods of Vitamin Determination*, Burgess, (1948).
13. Harper, H. A., *Review of Physiological Chemistry*, 8th Edn., (1961).

47. B-COMPLEX AND MULTI-VITAMIN PREPARATIONS OF GREAT USE

Becozyme-*Roche*. (Plain and Forte Tablets).
Becosules-*Dumex*. (Capsules).
B-Complex-*T.C.F.* (Tablets).
Rubraplex-*Squibbs*. (Dragees).
Becadex-*Glaxo*. (Capsules).
Uni-B-Complex. (Tablets).
Multibay-*Bayer*. (Capsules).
Bivinal-*Alembic*. (Capsules).

Multi-vitamins

Vitaminets-*Roche*. (Plain and Forte Tablets).
Geriplex-*P.D.* (Capsules).
Natabec-*P.D.* (Capsules).
Numerovites-*T.C.F.* (Capsules).
Mivets-*Alembic*. (Tablets).
Super-Fort-*Smith-Stanistreet*. (Tablets).
Eldec-*Parke-Davis*. (Capsules).
Gevrol-*Lederle*. (Capsules).
Mittavin-*C.F. Boehringer*. (Capsules).
Ralgertone-*T.C.F.* (Capsules).
Rarical-*J. & J.* (Dragees).
Theragran-*Squibbs*. (Capsules).

Regular supplementation of vitamins, minerals and hormones during convalescence, during pregnancy and lactation, during infancy and childhood during old age, etc., are very much essential. It is shown that at least 20 years of good health may be added to the lives of older patients maintained on these food-factors, along with ideal diet. They prevent cell degeneration and irritations.

48. ENZYMES

Enzymes are delicate protein-ferments which control the biochemic changes in the human body.

Enzymes are the machine tools of the human cellular factory which enable the tissues of our body to carry out the most amazing biochemical reactions that make Life's functions go on smoothly.

MAYERHOF and SUMMER, in 1925, extracted various enzymes from different kinds of foods. Other researchers also discovered many types of enzymes from both animal and vegetable sources. It is shown that all the enzymes possess the similar characteristics of Proteins. A great many of them are concerned with digestion.

Animal Enzymes

Lipase, *Trypsin* and *Amylase*. These are the pancreatic enzymes.

Vegetable Enzymes

Hemicellulases, *Cellulase*, *Diastase* and *Proteases*.

These enzymes have a great power in the digestion of food. The digesting power of *Amylase* is such that it can breakdown proteins and carbohydrates 20,000, times of its own volume in just half an hour.

There are other enzymes which only function if certain other compounds such as *Co-enzymes* are supplemented. For example, Niacin and Vitamin B_1 are not only found as Vitamins, but they also act as *Co-enzymes* in the body and help the biochemical changes that are regularly taking place in the organism.

For the smooth physiological functions of the body cells, only a very small quantity of enzymes and vitamins are required. It is known that our body is unable to synthesize its own vitamins and it is clear that without these food factors the enzymes cannot function properly. Hence, both vitamins and enzymes are inter-dependent and without each other the smooth functioning of our life is not possible. Anything that can alter, weaken or stop the function of these enzymes due to which the cells of the body die

and the life's function stops. Poisons like: Follidol, Cyanide etc., by their chemical disintegration stop the functions of enzymes and death occurs strikingly. In fact, the enzymes are the oil for the life's lamp. By the combination of vitamins they act as catalysts and keep the life go on. Enzymes improve digestion in sickness and old age, promote optimal absorption of vitamins, increase anabolic effect etc. They are also useful in industries dealing in chemicals and food technology.

Indications of enzyme Therapy

Gastro-Entropathy

Dyspeptic complaints, Putrefactive dyspepsia, Fermentive dyspepsia, Meteorism, Disturbances of Fat digestion., Gastritis, Gastro-entritis, Digestive-disturbances following gastrectomy, Malabsorption syndrome, Periodical palpitation due to intra-abdominal pressure, Passing of rancid flatus and belching, Indigestion during pregnancy, heart burn, Lack of appetite etc.

Pancreopathy

Excretory pancreatic insufficiency, chronic pancreatitis, Cystic pancreatic fibrosis, Digestive disturbances following pancreatomy etc.

Cholepathy and Hepatopathy

Hepatitis, Cholecystitis, Cholangitis, Digestive disorders in cirrhosis of the liver etc.

Enzyme Patents

Combizyme—*Luitpold-Werk. Munich.* 1-2 dragees swallowed whole during meals 2-3 times daily.
Uni-Enzyme—*Uni-Chem. Labs. Bombay, Dose:* As above.
Vitazyme—*E.I.P.*, Digiplex—*T.C.F.*, 1-2 tsp. t.d.s., after Ms.

REFERENCES

1. Enzymes, Discovery, March, 1951, London.
2. Schiffers, J. J., The Medical Encyclopedia, Pocket Books Edn. U.S.A.
3. Harper, H. A., *Review of Physiological Chemistry*, pp. 96-104, 8th Edn., (1961).
4. Boyer, P. D., *et al.*, *The Enzymes*, 5 Vols. Academic, (1959-61).
5. Dixon, M. and Webb, E. C., *Enzymes*, Academic, (1958).
6. Greenberg, *et al.*, *Enzymes in Health and Disease*, Eds., (1958).
7. Neilands, J. B., *Out Lines of Enzymes Chemistry*, 2nd Edn. Wiley, (1958).

PART II

FOODS

49. FRUITS

Fruits

Fruits are one of the means of natures own methods of propagation or dispersal of the seeds from place to place; mostly by the help of birds, animals, and man etc.

Fruits have been eaten by mankind from time immemorial, in fact *Adam* 'the first man' ate *'the forbidden fruit' of heavens. Vedas* state that the fruits form the base of the *Food of Gods.* It is believed that when *Lord Shiva* saw that there is no existence of the heavenly fruit *Mango* on the earth, which was the only favourite fruit of *Parvathi, Lord Shiva* to please His consort, created mango trees on this beautiful part of earth. Romans ate fruits for health and strength. *Holy Quran* states about the fruits like *grape, date, figs, olive, pomegranate* etc., as the gifts and heavenly fruits of God. All these facts signify that fruits are *health-giving* and *health-promoting.*

Chemical Analysis of fruits

Chemical analysis of fruits reveals that fruits are composed of the following chemicals:

1. Carbohydrate.
2. Protein.
3. Fats.
4. Minerals.
5. Vitamins.
6. Acids.
7. Pectin.
8. Water.
9. Volatile Oils.
10. Fiber.

1. Carbohydrate

The sweetness of the fruits is attributable to the presence of various sugars in the form of *dextrose, glucose, fructose, levulose* etc., in various concentration depending on the type and ripeness of the fruits. These sugars are quickly absorbed and disintegrated

in the body. Hence, they are very useful for sick and invalids for quick energy and heat. Fruits are indispensable for all to maintain good health and longevity.

2. Protein

Fruits are a poor source of protein, however, some fruits like: *guava, banana* etc., contain about 1.1 to 1.5 per cent of protein respectively[9].

3. Fats

Fats are not rich in the fruits.

4. Minerals

Fruits supply all the essential minerals like: *Calcium, phosphorus, iron, sodium, potassium, sulphur, magnesium, chlorine, copper* etc., in fact, *limes* and *oranges* supply more Calcium than other fruits[9]. The daily need of these minerals is already explained in the previous chapters.

5. Vitamins

Fruits supply number of vitamins like: Vitamin A in the form of *Carotene, B-Complex, C, E* and *P.* The value of these life giving substances is already known to you. CROMPTON and BELL found that natural *vitamine C* is more active in *haemorrhagic diathesis* than *Synthetic Vitamin C.*

6. Acids

Some of the most valuable *Acids* like: *citric, malic, acetic, tannic tartaric*, etc., are supplied by fruits. Many of these acids increase appetite, improve digestion, prevent biliousness and act as an antiseptic. They liberate carbon dioxide and water through lungs and kidneys. The acid-salts leave the alkaline bases to counteract the acidic products formed by protein metabolism. Therefore, fruits are indispensable for acid diathesis[2].

7. Pectin

Pectin of the fruits acts as a mechanical barrier and checks the infection. *Uronic acid* present in pectin helps the flow of mucous and thereby increases the action of self regulatory defence mechanism. (Bethea, Sullivan and Manville[9]).

8. Water

Water in the form of fruit juice is one of the safest means of pure water supply for human use. It is free from pyrogen and other impurities.

9. Volatile Oils

The essential aromatic oils of the fruits act as carminative, increase appetite and create an exhilarating sensation after eating fruits

10. Fibre

The fibre content of the fruits is lower than other *leafy* and non *leafy vegetables*. But there are some fruits like, *guava, grapes, pineapple* etc., that contain fibre which acts as an expander in intestines and helps the moisture retension. Hence, eating fruits regularly prevents and cures constipation.

Nutritive and Medicinal Value of Fruits

Nutritive and medicinal value of the fruits is attributable to the presence of the explained *food-chemicals*.

These Chemicals play a major role forming a protective food and help the regular *anabolism* of the body. It is proved that supplementing fruit juices in the form of *lime, orange, mango*-juice taken with milk, helps the easy digestion and imparts health and growth in children. (Fawns, Bourne, Barenberg *et al.*[9]). Fruits have a marked effect in retaining the minerals like Calcium, phosphorus, magnesium in the body (Eddy, Chancy, Hunscher, Millon, Rosenblath etc.[9]). Fruit juice taken with milk reduces the curd tension and makes it easy digestible[9].

Effects of fruits on various systems of body

(a) Central Nervous System

Fruits like: *apple, date, Mango, Sapota* etc., have a direct action on the central nervous system. The *phosphorus, glutamic* and *vitamin A* and *B-complex* of these fruits exert a protective and tonic effect on the nerves and keep one healthy and strong. Particularly, regular fruit-diet sharpens the memory and prevents one from nervous exhaustion, mental tension, psychoneurosis,

insanity, hysteria, insomnia and impotency. Fruits are particularly useful for those devoted to intellectual pursuits, neurotics, old and convalescents[5].

(b) Cardio-Vascular System

Heart is a very strong muscular pump which is constantly working in the body even before the birth. Its activity is regulated by self-generating energy. This energy is regularly supplied to heart as long as one eats a sound balanced diet in the form of fresh fruits and green vegetables. It is a remarkable discovery that *fruit-sugars, calcium, iron, vitamin A, B-complex* and *C* control the gradiation of this heart energy. Hence eating fruits like, *apple, banana, oranges, limes, pomegranate*, etc., aid the proper functioning of the heart and keep it healthy even in oldage. Fruit juices with rice-diet is found to be effective in reducing primary and secondary high-blood-pressure[9]. This is notably seen by giving *water-melon* and *the emulsion of its seeds.*

(c) Digestive System

It is already said that the *fruit-acids* play a major role in toning the digestive system. I have been treating gastric ulcer and other digestive disorders with *milk*, mixed with plain *grape juice* with gratifying results. Even rheumatism and gout can also be cured by giving a mixture of *orange, pineapple* and *mango juice* in early stages. But unfortunately, patients seek the proper medical or surgical help only when nothing could be done to cure gastric disorders or any other chronic disease. It can be emphatically said that regular eating of fruits and leading a sober life will certainly prevent all the incurable diseases.

In certain gastro-intestinal diseases like: *Irritable colon* and *Post-operative phase of abdominal diseases* fruit juices produce abdominal distension due to fermentation caused by *Raffinose* and *Stachyose* micro-organisms on the cane-sugar and citric acid[4]. This can however, be prevented by adding honey instead of ordinary sugar to fruit juices.

(d) Urinary System

SAYWELL[9], examined the basal diet having grapes and grape-juices on the Urine pH. He found that pH value of urine

increased from 0.8 to 1.2 units and ammonia excretion fell with an increased alkaline reserve. He confirms that fruit juices have a definite action on lowering the urine acidity. Potassium, magnesium and sodium content of the fruit acts as a diuretic. Therefore, fruit juices can be safely given during *B-coli infection, nephritis, pyelitis, cystitis cardiac oedema, toxaemia of pregnancy, albuminurea* etc. Fruit juices can also be used as adjuvant in the *treatment of salicylates, sulphanilamide* etc. *However, fruit juices should be given with care in kidney failure.*

(e) Infections

Fruits have no specific individual curative value on any known infection in its active phase. Therefore, any fruit can never be given as a specific medicine for any serious infection caused by lethal micro-organisms, such as, *streptococci, staphylococci, Koch's bacilli, Kleb's Loffler's bacilli*, etc. Proper use of antibiotics along with fruit juices should be used in these infections. However, eating fruits regularly prevents the infections caused by these micro-organisms and malnutrition.

This protective mechanism of fruits is due to extra action of *vitamin A, C* and *P*. These vitamins restore capillary permeability and check the penetration of large molecular proteins of viruses and molecules of bacterial polysaccharides[9]. Fruits supply ionised minerals along with pure water and remove waste products during infections. Because of these, nutritive and medicinal values of fruits, they are called the **Food of Gods.**

It is really unfortunate, that India being an agricultural country, its fruit cultivation and consumption is far below when compared to other countries. It is not because that fruits cannot be grown here, but because it is the mass ignorance of food science, particularly about the nutritive and medicinal value of fruits and vegetables, misconception of canned foods and poverty that discourages the fruit growers and food packers to limit their production in fear of economic loss.

How to rectify these causes

First of all the Government should educate the people by mass propaganda, holding fruit exhibitions in various parts of the country. Films about the food and curative value of these

protective foods should be shown regularly as documentary-films. Also the value of canned foods should be clearly emphasized in comparison to fresh foods. Community-canning developments should be formed by the Government to help the house-wives to can and preserve various fruits. During their season technical know how and materials for canning and preserving foods should be supplied on no loss, no profit basis, emphasizing 'EAT WHAT YOU CAN, "CAN" WHAT YOU CANNOT'.[10]

By adopting these methods I am optimistic that our standard of nutrition will certainly rise and our country's name will be erased from the list of *Malnutrition Countries.*

REFERENCES

1. Holy Quran, S. XVI. V. 66., S. XXXVI. V. 34.
2. Magee, H. E., *Fruits and Fruit-Juices, Health*, Vol. XXX, No. 3, p. 68, (1952).
3. Health for All, *Health*, Vol. 45, p. 168. No. 8, (1967).
4. Questions and Answers, *J.A.M.A.*, Oct. 25, Vol. 194, No. 4, p. 476, (1965).
5. Hurkat, P. C., *Rajasthan Med. Journal*, 6, 171, (1966).
6. Mico, *Technical Bulletin*, No. 18, Madras.
7. Zia, Mujahid, *Phaloon-ka-badsha* (King of fruits) *Salar*, Urdu Daily, p. 5, 2-9-1967, Bangalore.
8. Swaminathan, M. and Bhagawan, R. K., *Our Food*, Ganesh and Co., Madras 7, (1966).
9. Narayan Rao, M., Shastry, L. V. L., and Parpia, H. A. B., *What Nutrition Fruits Contain*, Indian Horticulture, pp. 87 to 95. Vol. II, No. 4, July-Sep. (1967), New Delhi.
10. Srivastava, D. N., *Canning for Community*—A Unique Development in Uttar Pradesh, Indian Food Packer, pp. 10-15, Vol. XXI. No. 6, December (1967).

There are about hundreds of kinds of fruits but only some of them are cultivated to use as food. Some of the edible fruits grow wildly but mostly they are used for their medicinal value.

The following fruits which are cultivated and are very popular as table fruits in their respective season:

Apple	Apricot	Banana	Bullock's-heart	Bread or Butter-fruit
Cashew	Cherry	Custard-apple	Currants	Date
Fig	Cluster-fig	Grape	Guava	Jack-fruit
Jambul				

Citrus Fruits

Lime	Grape-fruit	Pomelo	Orange	Sweet-orange
Bitter-orange	Citron			
Loquat	Mango	Melon	Palmyra	Papaya
Passion-fruit	Peach	Pear	Pear-avacado	
Pineapple	Plum	Pomegranate	Rasberry	Strawberry
Tomato	Toddy fruit	Wood-apple	Zyzyphus.	

Miscellaneous Fruits

Lichi	Mangosteen	Mulberry	Langast	Fox-berry
Kamrak	Belamboo	Sapota	Phalsa	Prune Quince.

50. APPLE

Apple: *Pyrus malus, Syn. Malus sylvestris:* (Botonical name); *Sebaphala:* (Sans.); *Seb:* (Hindi, Urdu, Dak, Pers.); *Tuffah:* (Arab.); *Seb-hannu:* (Kan.); *Apple-pazam:* (Mal.); *Saffar-chand:* (Guj.); *Seu:* (Beng.).

Family: Rosaceae.

Zodiac: Scorpio.

Food Value per 100 g. approximately

Carbohydrate	13 g.	Vitamin A	90 I.U.
Protein	0.3 g.	Vitamin E	0.7 mg.
Fat	0.2 g.	Vitamin B_1	120 mcg.
Calcium	10 mg.	Vitamin B_2	30 mcg.
Phosphorus	20 mg.	Vitamin B_6	0.03 mg.
Iron	1.7 mg.	Folic Acid	1 mg.
Potassium	94 mg.	Niacin	0.2 mg.
Sodium	3 mg.	Pantothenic acid	0.07 mg.
Sulphur	7.3 mg.	Biotin	0.3 mg.
Magnesium	5 mg.	Vitamin C	56 mg.
Chlorine	1 mg.	Oxalic acid	1.5 mg.
Copper	0.29 mg.	Digesting Time	2 Hrs.
		CALORIES	**56**

Acid Base Balance/100 g.c.c. N/10 Alkali 30

Constitution: Hot and wet 2°.

Physiopharmacology and Therapeutics

Apple is a very popular international fruit eaten all over the world for pleasure taste and health. There are number of varieties of apples like: *Jonathan, King Cola, Golden Delicious, Granny Smith, Baldwin Steward, London pippin, Rome, Beauty, Domacrat* etc.,[1] having different size and taste, that depends on the soil and the climate in which they are grown. Apples grown in India, Kashmir, Pakistan, Peshawar and Afganistan-Kabul, are very delicious and the sweetness is more due to high concentration of *fructose* in them.

The old proverbs like: 'An apple a day keeps the doctor away'. 'Eating an apple going to bed; will make a doctor beg his bread' and 'Chewing an apple every day will keep the dentist far away', signify the *nutritive* and medicinal value of an apple. But today we have forgotten them as Dr James writes:

> 'An apple a day keeps the doctor away,
> And we w'll have no medical bills to pay'
> —Or so the public used to say
> In the good old days before LBJ.
> But, now, it isn't that way—
> In fact, I heard an orchardist say:
> 'Once I was rich, but now I am broke;
> The apple business has had a stroke.
> It's a heck of blow, for my trees still bear,
> But who needs apples with medicare?'

James O. Nall, M.D., Marion Ky. *J.A.M.A.*, 20-3-67. *Health*, (Madras) Vol. 45, No. 8, Aug. (1967).

The medicinal secrets of an apple are attributed to various chemicals present in it. For example, *Vitamin* B_1, *phosphorus, potassium* etc., which help the synthesis of a wonderful chemical substance in our body that is known as *Glutamic acid.* This chemical controls the wear and tear of nerve-cells and recharges them when their bio-currents are negatively discharged due to *nervous exertion, malnutrition* etc. In health, *Glutamic acid* controls the entire nervous system and helps us to live long. If something goes wrong in the synthesis of *Glutamic acid,* the nervous system begins to flash alarming symptoms like:

great tiredness even when one is not working, lack of concentration, lack of memory, mental irritability, lack of interest in one's daily affairs and family, constant depression for no reason, suicidal thoughts, cold sexy feelings, laziness etc. For all such nervous derangements eating an apple with honey and milk daily, acts as a very effective nerve-tonic and recharges the nerves with new energy and life.

From time immemorial, apple with honey is considered as a very effective medicine for the functional disorders of heart that are common in anaemic and neurasthenic persons. *Dhanavantra* and *Aviceena* recommend and they used to treat the neuro-cardiac symptoms such as: palpitation, fainting episodes etc., with fresh apples, honey and rose flowers. When personally tried them, I found gratifying results in periodical palpitation due to intra-abdominal pressure, or due to anaemia particularly during pregnancy, neurasthenia and in tuberculosis. I used the following ingredients in the preparation of *apple medicine:*

Fresh sweet apples	... 1 kg.
Pure honey	... 1 kg.
Rose petals (Rosa)	... 1 kg.
Rose water (triple distilled)	... 4 ounces
Saffron (Kashmiri)	... 1 g.
Cardamom	... 1 g.

Method of preparation: Cut apples with stainless sterilized knife after washing them in tap water and wipe dry. Remove the seeds and core and cut into small pieces with skin. Put them in clean sterilized dry transparent glass jar. Pour honey over the apple-bits. Then powder the cardamom and tie in a muslin cloth and boil it in an ounce of water to extract the aroma. Dissolve saffron in rose-water and mix the extract of the cardamom. Mix it in honey and stir the whole ingredients with a clean wooden ladle. After they are sufficiently mixed, add fresh rose petals in the jar and stir the mixture again for about 15 minutes continuously. Cork the jar tightly. Expose the jar to the morning sun, for four hours daily for at least forty days and keep on shaking the bottle for ten minutes every day.

After this period, use one to two teaspoonfuls of this preparation every night with milk as a food-medicine in all neuro-circulatory and respiratory disorders caused by malnutrition. This preparation is particularly useful for children to help them grow healthy

and strong. Its regular use during the entire period of pregnancy protects the health of both mother and the child. It prevents the congenital deformities and eases the child-birth. Also, it prevents the mother and child from infections. The secretion of the breast milk will be abundant by continuing this preparation after child-birth. Paste of this preparation 1 teaspoon 2 times daily can be given with excellantly good results in growing children.

Taking this preparation with a pinch of table salt and pepper powder, acts as an effective expectorant. Therefore, it is used once or twice a day during the treatment of bronchitis, asthma, emphysema, tuberculosis etc., with gratifying results.

Using this preparation with a teaspoonful of fresh *coriander leaf-juice* twice daily is a medicine for hysteria, insomnia, mania after childbirth, giddiness, etc.

Apple and Gastro-Intestinal Diseases

From ancient times apple is considered as a medicine to prevent dental, stomach and intestinal diseases.

Dental Diseases: 'An apple a day may not keep the doctor, but it may help to keep the dentist away. In a group of 171 children, 90 were given apples to eat after every meal and after anything between meals, the remaining 81 acted as a control group. At the end of two years the incidence of the gum disease was significantly lower in the apple group than in the control group. The incidence of caries was also lower in the apple group. The action of apples appears to be two-fold. The flow of saliva is stimulated by the low pH of the apple and the mastication of the fibrous apple fragments whilst the mechanical cleaning action of the apple, sweeping over the teeth and gums in the presence of increased saliva flow, removes debris and stimulates the gum tissues[7]'. Eating an apple by biting with teeth immediately after food is found to be more effective than eating it peeled and cut with knife. Cutting apples with a knife causes brown discolouration which is due to formation of an Isoenzyme *Phenylase*.[9]

Stomach Diseases

Excessive swallowing of saliva along with some food is reported to have a protecting effect from gastric ulcer. MALHOTRA *et al.*, confirmed this protective action of saliva in the stomach.

HEUPEKE claims much success in the treatment of peptic ulcers by giving plenty of apple-juice for 5 days before the patient is put on bland diet. It is therefore, eating an apple is the simplest way of protecting one from gastritis[2]. Eating an apple after a heavy non-vegetarian meal prevents the fermentation in the stomach and intestines. The formation of uric acid is also prevented by easy digestion of the proteins. Col. CHOPRA advises that eating apples in the empty stomach and by those who are addict to whisky should be avoided to prevent indigestion and alcoholic intoxication.

Apple and diarrhoea: TISSOT in 18th century introduced apple-cure in acute diarrhoea and recently VON-MORO and HESSLER revived its curative value in the treatment of diarrhoea. The beneficial effects of the *apple-medicine* is attributed to its *pectin* and *malic acid* content. The pectin swells and engulfs the bacteria that cause the diarrhoea and the malic acid inhibits the bacterial growth. In severe types of diarrhoea supplementing apple-juice with specific treatment is found to be very effective[2]. If apple is not available, giving a teaspoonful of PECKTOKAB-*Chemo-Pharma* which contains apple pectin and kaolin is equally effective. Giving apple-juice during the treatment of sprue and dysentery is also found to be effective. Mixing a banana with apple juice has given me very good results in the treatment of acute and chronic diarrhoea.

Baked apple applied over the eyes for an hour before going to bed, cures eye strain caused by constant reading and sun glare. Spreading scraped apple over the face for an hour is a very useful beauty-aid to increase complexion and cure pimples.

In spite of all these *nutritive* and *medicinal value*, apple consumption in India is lowest being 0.4 lb. *per capita*, as against 110 lb. in *Swiss*, 98 lb. in *Sweden*, 65 lb. in *Germany*, 58 lb. in *Italy*, 50 lb. in *Belgium* and *Netherlands*, 29 lb. in *U.K.* and 28 lb. in *U.S.A.* Total yearly production of apples in India is 2.4 million Monds.[31] Though apples perish quickly, but they can be kept fresh by wrapping them in tissue paper and packing them in saw dust or hay crates[9-30].

How to prepare unfermented apple juice

Select fully developed *Kashmir apple* (Ambri) or *Bangalore apple* (Rome Beauty) with good flavour and aroma and wash them

in cold water. Grate the fruits in stainless steel or tin grater. Press out the juice by wrapping the grated fruit in a thick cloth. Collect the juice in an earthen or stainless vessel.

Strain the juice through a coarse muslin cloth and heat it rapidly to a temperature of 82-85°C in an aluminium pan.

Pour the hot juice at once into clean hot, sterilized bottles till it overflows. Immediately seal air-tight with sterilized crown cork. It should be remembered that the temperature of the juice, while filling and sealing remain below 82°C. Maintain the temperature by immersing the bottles in a pan containing some folded cloth in the bottom and water at 80°C. Leave the bottles in water for half an hour and then remove them and store in cool, dry place.[8]

How to prepare apple-cider[8]

Select *Baldwin* or *Yellow Newton Pippin* which contain high tannin in them. Wash them in cold water and express the juice as explained above.

Collect the juice in a glass carboy or winchester bottle. Add *potassium metabisulphite* at the rate of 215 mg./kg. and sugar to raise the Brix to 22°. Add pure wine yeast to start fermentation. Keep the mouth of the vessel plugged with cotton wool and maintain the temperature between 18-21°C. If the fermentation becomes slow, add 0.02-0.05 per cent *ammonium hydrogen phosphate* to supplement the food for yeast.

When the juice is fully fermented and the Brix density shows 0 or 1 per cent allow the juice to stand for some time so that sedimentation should take place. Filter the clear fluid and keep it in an oak-wood barrel for maturing or put some oak shavings in it. After the cider is matured in few months pasteurize the fluid at 66°C, cool and filter. Carbonate the cider with carbon dioxide under 0.7-1.05 kg. pressure in pressure resistant bottles. Pasteurize the bottles at 60°C for 30 minutes in water.

Uses: Apple-cider is a very cooling drink having slight alcohol in it. It supplies potassium and increases urinary output, aids digestion and gives a tranquillizing effect.

How to prepare Apple-cider Vinegar

Wash the fresh apples and crush them with their peel by adding little water. Adjust the sugar to 12-15 per cent adding more

sugar or diluting by adding water if the sugar content in the juice is high.

Heat the juice until it boils and clean it by filtering through a cloth. Then fill the juice in a clean carboy with cotton wool plugged in its mouth. Add a cake of pure wine yeast to ferment the juice and allow it to ferment at 25-30°C as far as possible.

When the Brix hydrometer shows 0-1°, store the fermented juice for 1-2 weeks for sedimentation.

Decent the clear fluid into another clean carboy and fill it up to 3/4. Add unpasteurized mother vinegar in the ratio of 1:10 and allow it to ferment at 20-25°C for 8-10 weeks.

Filter the clear fluid by passing it through a clean cloth into sterilized bottles and cork them air tight. Pasteurize the bottles by immersing in water at 71-77°C for 15-20 minutes. Keep the bottles in cool dark place for about two months for ageing and then use it.

Uses

Dr Jarvis writes in his 'Folk Medicine' that **Apple-cider vinegar** can be used as a medicine in the following diseases:

High blood pressure	Chronic-headache	Chronic fatigue
Functional sterility	Sore-throat	Morning sickness
Bilious indigestion	Sour eurectation	Heart burn
Diarrhoea	Piles	Dysentery
Chest Pain	Giddiness	Food-poisoning etc.

Dose: One tablespoonful with equal quantity of honey in a glassful of warm water 2-3 times or more according to severity of the condition.

External Uses: Apple-cider vinegar is also recommended by Dr Jarvis as an external application to cure: Trauma, Poison-ivy, Shingles, Night sweats, Burns, Varicose-veins, Impetigo, Ringworm etc. Apply apple-cider vinegar by mixing it with equal quantity of water 3-4 times daily[4].

Leaves

Paste of the tender leaves is used as a shampoo to lengthen the hair and to keep them silky soft. Its regular use prevents, dandruff, pre-mature greying of the hair and hair fall. The fresh leaf juice is instilled in the eyes to prevent senile cataract.

Bark

Bark of the root is astringent and its paste is applied over ringworm and scabies. Charcoal of the bark mixed with 1/8 part of alum, pepper powder and salt makes a very effective dentifrice to cure bleeding from the gums and pyorrhoea in early stages.[6]

REFERENCES

1. *Reviews in Food Technology*, Vol. 1, page 48. C.F.T.R.I., Mysore, (1961).
2. Aman, *The Medicinal Secrets of Apple, The Health*, Oct. 1966, Madras.
3. Magee, H.E.B.B., D.Sc., M.R.C.P., *Fruits and Fruit Juices, Health*, March, 1952.
4. Jarvis, D. C., *Folk Medicine*, Pan Books Ltd., London, (1961).
5. Chopra, R. N., *Indigenous Drugs of India.*
6. Hakeem Abdulla, *Seb., as medicine*, Urdu. MSS. Arsikere, (Mysore State).
7. *Unichem Medical Notes*, p. 14, No. 3. (1961).
8. Shankar, J. V., *et al., Home Scale preparation of Fruit and Vegetables*, p. 18, C.F.T.R.I., Mysore (1962).
9. Meigh, D. F., *Dept. Sci. Indus. Res.*, Special Bull., (1948).
10. Smith, W. H., *Nature*, p. 183, 760, (1959).
11. Burg, S. P., *Plant Physiol.*, p. 33, Abst. XLVI., (1958).
12. Claypool, L. L. and Davis, L. D., *Food Technology*, p. 13, 208, (208).
13. Eaks, I., California, Citrograph, p. 38, 296, (1953).
14. Nel, R. I., *Farming S. Agr.*, p. 31, 132, (1956).
15. Gane, R., *Tropical Agriculture*, p. 29, 150, (1952), Trinidad.
16. Wolf, J., Dstch, Lebensmith, Rdsch., p. 47, 199 and 230, (1951).
17. Baker, *et al., Proc. Amer. Soc. Hort. Sci.*, p. 66, 111, (1955).
18. Colbert, J. W., *Refrig. Engng.*, 265, 306, (1952).
19. Smock, R. M., *Food Indust.*, p. 21 (4), 105, (1949).
20. Winter, J. D., *Pre-pack-age*, p. 7, 16, (1955).
21. Stell, *et al.*, B.R.P., *Abstracts*, 4, (4), 4. (1958).
22. Martin, D. R., *Food press. Quart.*, p. 9, 5, (1949).
23. Hardenburg, R. E., *Proc., Amer. Soc. Hort. Sci.*, p. 57, 277, (1951).
24. Anandaswamy, B., *et al. Food Science*, p. 10, 276, C.F.T.R.I., Mysore (1961).
25. Stanl, *et al., Proce. Flori. State, Hort. Soc., Tampa*, November, (1949).
26. Anon, *Ibid.*, p. 32. (350) 97, (1960).
27. Srivastava, H. C., *Bull.*, C.F.T.R.I., 4, 118, (1954-55).
28. Carlesen, *et al.*, U.S.D.A., *Agi. Inform. Bull.*, No. 29, (1951).
29. Siegelman, *et al., Pre-pack-age*, 6, (12), 16, (1953).
30. Anon. *Ibid.*, 3, (5), 13, (1950).
31. Thaper, A. R., *Apple Cultivation in India, J. Indian Horticulture*, Vol. II. No. 4, pp. 28-30, Sep. (1967).
32. Laljeet Singh and Kareer, K. S. C.F.T.R.I. Mysore, *Annual Report* (1966).

51. APRICOT

Apricot: *Prunus-armeniaca:* (B.N.); *Khubani:* (Urdu); *Jinde-hannu:* (Kan.); *Zardalu:* (Pers., Sindhi); *Mish mish:* (Arab.).

Family: Rosaceae.

Zodiac: Aquarious.

Food Value per 100 g. approximately

Carbohydrate	19 g.	Vitamin A	3,000 I.U.
Protein	0.6 g.	Vitamin B_1	10 mg.
Fat	0.1 g.	Vitamin B_2	0.05 mcg.
Calcium	18 mg.		
Phosphorus	22 mg.	Folic acid	3 mg.
Iron	0.37 mg.		
Potassium	320 mg.	Pantothenic acid	0.30 mg.
Sodium	1 mg.		
Sulphur	6.1 mg.	Vitamin C	20 mg.
Magnesium	12.3 mg.	Digesting Time	32 Hrs.
Chlorine	1 mg.		
Copper	0.12 mg.	CALORIES	2

Acid Base Balance /100 g.c.c. N/10 Alkali 84.

Constitution: Cold 2°—Wet 2°.

Physiopharmacology and Therapeutics

Apricot is a very popular fruit in Western countries. There are number of varieties of apricot but some of them like : *Moor park, St. Ambrose, Charmagz, Turkey, Kaisa,* etc., are very popular. *Turkey* variety is most suitable for Canning.[12] In India about 84,000 tons of fruits are annually produced. It is a fruit rich in vitamin A, potassium etc. Therefore, it is a very valuable fruit in the prevention of all the diseases caused by vitamin A deficiency and low potassium content of the blood. Apricots can be safely given during the use of oral chlorothiazide diuretics to prevent the potassium depletion.

Fresh juice of apricots mixed with glucose or honey is a very cooling drink in summer and during fevers. It quenches the thirst and eliminates the waste products from the body. It tones up the eyes, stomach, liver, heart and nerves by supplying suitable vitamins, minerals etc. Its regular use cures piles, urticaria, biliousness, and indigestion due to faulty food habits. Dry fruits are laxative and diaphoratic.

Apricots eaten with honey is a very effective nerve-tonic. It increases blood and cures habitual constipation. It prevents infections, and lowers the chances of developing degeneration of cells. Seeds can be used as a substitute for almonds.

Canned apricots are equally nutritive but they become sour due to tritable acids, metals and citrates, but after 2 months of packing the acidity does not increase[6-10].

Apricots can be kept fresh by packing them in polythelene bags and stored in 40°F. Bags must have ventilation if the storage is required for higher temperature[1, 2, 3].

Leaves

Fresh juice of apricot leaves is applied over skin diseases like scabies, eczema, sun-burn, itching of the skin due to cold exposure etc. Decoction of the leaves acts as an anthelmintic.

Roots

Paste of the apricot-root is applied over glandular swellings, traumatic inflammations and blood boils. Fumigation of the roots drives away the mosquitoes.

Decoction of the dry roots is given to increase breast milk. Few drops instilled in the nostrils twice daily cures chronic rhinitis and keeps the sinuses free from infection.

REFERENCES

1. Srinivasan, A. *et al.*; *Reviews in Food Technology*, p. 68, Vol. 3, C.F.T.R.I. (1961).
2. Sigeiman, H. W. and Gerhardt, F., *Pre-pack-age*, 6 (12), 16, (1953).
3. Johar, D. S. and Anand, J. C., *Ind. J. Hort.*, p. 8 (4), 45, (1951).
4. Prof. Mathar, R. C., *Systematic Botany*, p. 86, (d), 5th Edn, (1965).
5. Muzafar Hussan Aivan, *Qhuas-ul-advia*, p. 238.
6. Agarwal, J. D. and Date, W. B. *J. Food Science and Technology*, vol. III, July (1966).

7. Nelson, E. K., *J. Am, Chem. Soc.*, 44, 2506 (1925).
8. Anet, E. F. L. J., and Reynolds, T. M., *Aust. J. Chem.* 8 (2), 267 (1945).
9. Hoos, J. W., Leonard, S. J. and Luth, B. S., *Food Res.*, 21 (5), 571.
10. Lugg, J. W. H., and Overoll, B. T., *Aust. J. Sci. Res. Ser.* 1 (11), 8, (1948).
11. Nauriyal, J. P. *Stone Fruit cultivation Indian Horticulture.* pp. 75-78, July-Sep. (1967).
12. Saha, N. K. *et al., Annual Report* C.F.T.R.I. Mysore, (1966).

52. BANANA

Banana: *Musa-sapientum:* (B.N.); *Kadali:* (Sans.); *Kela:* (Hindi, Urdu, Guj., Mar.); *Mouz:* (Dak.); *Bale-hannu:* (Kan.); *Mong:* (Arab. Pers.); *Nandra* or *Valaipazham:* (Tam.); *Arthi-pandu:* (Tel.); *Mandram-valai:* (Mal.); *Kewiro:* (Sind.); *Kadalai:* (Ori); *Kalo:* (Beng.).

Family: Musaceae.

Zodiac: Virgo.

Food Value per 100 g. approximately: (one medium size)

Carbohydrate	19.2 g.	Vitamin A	230-340 I.U.
Protein	1.5 g.	Vitamin E	0.4 m.
Fat	0.2 g.	Vitamin B_1	150 g.
Calcium	6.8 mg.	Vitamin B_2	30 mcg.
Iron	0.41 mg.	Vitamin B_6	10 mg.
Potassium	348 mg.	Folic acid	0.6 mg.
Phosphorus	28.1 mg.	Niacin	0.30 mg.
Sodium	9.7 mg.	Pantothenic acid	0.20 mg.
Sulphur	13 mg.		
Magnesium	41.9 mg.	Vitamin C	15 mg.
Chlorine	78.5 mg.	Digesting Time	2¼ Hrs.
Copper	0.16 mg.	**CALORIES**	85

Acid Base Balance. /100g.c.c. N/10 Alkali 79.

Constitution: Moderate and Wet 2°.

Physiopharmacology and Therapeutics

Banana is a tropical fruit cultivated all over India. It grows well in warm humid climates better than cold dry climates. I requires abandant supply of water along with good manuri

Banana fruit as well as its plant is considered to be a very auspicious in all the religious and social ceremonies in India. There is a common belief that banana is the food of celestial beings.

Banana is a food-fruit for mases packed with all the necessary energy and health-giving elements which are hygienically protected by a safe cover in the form of peel. It is readily available in almost all parts of the world. Banana are popular in India and about 2,667,596 tons are yearly grown here.[22]

There are many varieties of bananas such as: *Plantain: Kachcha kela:* (Hindi), (*Musa-Paradisica*); *Banana: Kela* (Hindi), (*M. Sapientum*); *Chinese* or *dwarf banana* (*M. chinensis*) etc. In South India, *Red-banana* and *Sawan-mouz Ras-bale:* (Kan.) etc., are very popular. But all of them contain more or less the same chemical composition and medicinal value except the slight variation of the taste. It is one of the cheapest fruits mostly consumed for its delicious taste and medicinal value by both rich and poor. It is estimated that U.S.A. and U.K. consume about 12,10,000 and 2,72,000 tons of bananas annually. Bananas can be preserved by packing them in cellophane bags or coating them with wax emulsion[14-20]. Pasting bananas with anti fungal pastes like; *peps*, Prinzon-Cos and Brassi-Col 75 per cent prevents the fruits from stem end rot.[23] Treatment of bananas with methyl ester of *indolyl-3-acelic acid* increases the storage life from 25 to 35 days. Also irradiation with 20 krad of cobalt 60-gamma rays increases the storage life up to 40 days at 19°C.[24]

(*a*) **Musa paradisica** (Plantain): Plantain is green in colour and becomes yellowish-green when it is ripe. The green pulp contains more starch and the fruit is mostly used for culinary preparations and eaten as vegetable after cooking. Plantain can be used as a nutritious-carbohydrate-food in place of rice and the conjee made from the flour of the dry fruit can be safely given to patients suffering from gastro-intestinal disorders like: *diarrhoea, dysentery*, etc. Cooked unripe fruit with the fresh juice of bitter-gourd is given as a medicine in the treatment of diabetes. The ripe fruit mashed with butter-milk is used to cure excessive burning in the soles, burning micturation, burning in the eyes etc. A raw fruit boiled in milk is used as a food-medicine in the treatment of gastric ulcer, piles, burning in the rectum after passing the stools.

Seeds

According to *Dr Bras De Assa of Goa*, the seeds of *wild plantain* (M. Paradisica Sylvestris), are specific in both the prevention and cure of *small-pox*. He says, that the powder of the dry seeds given as follows is found to be excellently good when it is given once a day with honey for 3-7 days only.

Infants below one year	1¼	gr. (one seed).
Children 1-5 years	2½	gr. (two seeds).
,, 5-10 years	3¾	gr. (three seeds).
Adolescents	5	gr (six seeds).
Adults	10	gr. (twelve seeds).

In **Municipal Hospital of Arthur Road, Bombay,** and **Bombay Jivediya Mandal 149, Ashraf Bazaar, Bombay 2,** the seeds are also used for this purpose with very gratifying results.[25]

Method of use

Powder of one to twelve seeds with milk and honey according to the age is given for three days as a preventive and for seven days as a curative medicine for small-pox. No other treatment should be given during the use of these seeds.

Shri Shankar Vajeepaday Shastry in his book '*Granth Arya Bhishak*' also confirms about the medicinal value of the plantain seeds in the prevention and treatment of small-pox.[25]

Suchitra Ayurveda. Jan. 1962 states that the use of plantain-seeds during the acute phase of small-pox acts excellently and heals the rashes without much pus formation and protects the eyes from severe ulceration.

Shri Babu Haridasji Vaidaraj author of '*Chikitsa Chandauday*' writes that the seeds of plantain are specific for the prevention and cure of small-pox. (Dhanvantri Bijaygadh Gupta Siddhaper yog Attock).[25]

Seeds are given with *bitter gourd* juice as a folk-medicine for diabetes.

Flower

The juice of the flower mixed with curds is used in dysentery and excessive bleeding during menstruation in young girls.

The juice mixed with a glassful of *cucumber juice* is given as a specific medicine to cure scanty urination and gonorrhoea.

Stem

The sap of the stem with *tender coconut* water is given as a medicine for hysteria, epilepsy, nervous insomnia, etc. A glassful of the plain sap is drunk in dysentery, diarrhoea, piles etc. It is given with *lime juice* in cholera and severe vomiting. In excessive thirst in summer and diabetes, the sap is used with very gratifying results. The sap of the plant and the young leaves are used as cool dressing for blisters.[12]

(*b*) **M. Sapientum** (Banana): This variety is mostly grown as a table-fruit and is very popular throughout the world. Unripe banana of this variety is also cooked and used as a vegetable but not so commonly as *M. Paradisica*. When the green banana begins to ripe, the colour changes into greenish-yellow and becomes golden-yellow when it is fully ripe. After some time it begins to change into black colour. It emits a pleasing aroma and all the starch converts into crystallizable and uncrystallizable fruit sugars like: fructose, glucose etc. It is estimated that a fully ripe banana contains about 22 per cent of these high quality sugars.

Banana as a tonic-food

If one looks at the food value of a medium sized banana and compares its food-value with other staple foods he will realise that how wonderfully God has packed the energy in such a cheap fruit like this. It is a precooked fruit-food which undergoes easy digestion and releases the same energy as one gets by eating *three big apples, or one and a half fresh egg, or 150 g. of mutton*, or drinking *400 g. of pure cow's milk*. It supplies more vitamin A than one gets from *3/4 kg. of mutton*. Therefore, banana can be safely given as a cheap tonic food to all healthy persons without any fear. Infants can also be fed with banana-meal mashed in honey and milk. It helps the normal growth and protects them from infections. Eating bananas with *figs, dates, honey and milk* every day is nature's one of the best *tonic-foods* to supply proper energy and nourishment to the worn-out cells of the body. It supplies

sufficient *folic acid* during pregnancy and prevents Nutritional megaloblastic analmias. It tones up the uterus, strengthens the foetus and eases child birth. It increases the blood, feeds the nerves with phosphorus, strengthens the muscles by supplying more glycogen and keeps one young and healthy.

Giving a ripe banana every night to a young person suffering from spermatorrhea, pre-mature ejaculation, functional impotency etc. It acts as a specific medicine and cures by resetting the nervous function and rectifies the excretory mechanism of the bowles.

Banana as a medicine in Gastro-intestinal Disorders

CONELL, *et al.*, discovered that a ripe banana contains *Serotonin (5-hydroxy-tryptamine)* a chemical which has a marked effect on the excessive secretion of hydrochloric acid in the stomach under the influence of inflammatory processes in it, namely; gastric ulcer, gastritis etc. In such conditions when banana is given with milk, the acid is neutralized by the action of milk and the further secretion is prevented by the action of Serotonin. The pectin present in banana acts as a mechanical barrier by coating over the inflammed surface and Vitamin C helps to heal the ulcer quickly. One more advantage of pectin is, it prevents the absorption of toxins produced by the pathogenic organisms by covering the naked surface in the gastro-intestinal tract. SANYAL confirms that banana can afford a protection against ulcers produced by stress situation. He also advises that a banana should be regularly given during the administration of certain drugs like: *aspirin*, *salicylates*, *phenylbutazone* etc. It is noted that banana prevents internal bleeding caused by excessive use of these drugs. Banana is a medicine for stomatitis due to *iron* and *folic acid* deficiency, particularly during pregnancy.

It is commonly believed that banana with butter-milk should not be used simultaneously, because it causes indigestion and other gastric troubles. It is not true. There is no incompatibility between banana and butter-milk. On the other hand this diet can be safely given during the treatment of typhoid, dysentery, diarrhoea, colitis, piles, hepatitis and during the convalescing period after acute infections and surgical operations. It increases the activity of *lactobacillus-acidophilus* and also helps the absorption and synthesis of B-complex vitamins in the intestines.

Banana as an ideal-food in infections

A banana mashed in a glassful of tender coconut water sweetened with honey or glucose and strained through a muslin cloth, given two to three times a day is a very safe diet during the treatment of infections like; measles, small-pox, typhoid, viral hepatitis, catarrhal jaundice, tonsillitis, diphtheria, tuberculosis, etc.

Banana in Diabetes and Obesity

It is a common belief that a diabetic should not eat banana because it contains sugar, but one does not hesitate to take a plateful of cooked rice because it is not sweet. If one compares the calorific value of banana and rice then only he understands that 4 oz., of rice gives 400 calories whereas the same quantity of *bananas*, *mangoes*, *apples* or *oranges* liberate only about 80 calories.

A diabetic person who is not taking insulin is allowed to consume only about 1550 calories a day. One who is not passing sugar in the urine and he is taking regular treatment by a physician can go up to 2100 calories a day. However, it is therefore, taking a medium sized banana with restriction of other starches does no harm to a diabetic and it is noted that banana appears to be well tolerated by diabetics.[8] *It should be remembered that a diabetic is a physician for his own health and must learn what to eat, how much and when.*

Banana can safely be taken by an obase person instead of sweets and carbohydrates. Taking the diabetic diet also helps the reduction of the weight. (For detail read Diabetic Diet).

Banana in Heart, Kidney and Liver diseases

A medium sized banana contains fat (largely unsaturated) 0.2 g. and contains no cholesterol at all. It is therefore recommended by *American Food and Nutrition Association* as a simple diet after the second week of cardiac ischaemia, in high blood pressure, congestive cardiac failure etc.[10]

The fat content is so minute in a banana that it has no harmful effects in liver diseases[10].

Taking a banana regularly is useful in scanty urination, cystitis, nephritis, pyelitis etc. *Banana is contraindicated in kidney failure because of its high potassium content.*

Banana in Lung diseases

According to *Unani* and *Ayurvedic* theories banana is said to cause phlegmatic disorders and it is forbidden in diseases such as asthma, bronchitis, tuberculosis etc. It is noticed that banana does not agree with asthmatics. This exciting effect of banana is attributable to the presence of a chemical substance *Serotonin* in this fruit. The bad effects of banana in asthmatics can be cured by using Serotin antagonist: *Methylsergide 0.5 mg.* by daily atomizer inhalation for about 10 to 12 days[11].

Modern researches also confirm that banana causes allergic reactions in certain sensitive persons and they are advised to keep away from this fruit.

In a person who is not allergic to banana giving it in all the diseases does no harm. Particularly in tuberculosis of the lungs, one can get a great benefit by eating banana with *honey* and *curds* to improve the general resistance of the body and weight.

For chronic bronchitis, eating two *cloves* and five *corns* of *pepper* which are left inside a banana overnight; is found to be effective in curing the disease. This should be repeated every day for a fortnight to get a marked effect. After eating the banana, eating a *cardamom* prevents the bad effects.[3]

Taking a banana with a glassful of *milk* every night is a medicine for constipation, bleeding piles, sprue, coeliac disease, insomnia etc. Developing a habit of taking this every night helps one to live healthy, strong and long.

Pulp of a ripe banana with a teaspoonful of the fresh *rose-flower juice* is applied over the face daily once in the night and allowing to remain over the face for an hour. Later it is washed with warm water. Continuing it every night will increase the softness of the face, prevents from pimples, blackheads, dryness and early appearance of the wrinkles on the face.

Application of the pulp over the blood-boils hastens the formation of pus and opens them early. It gives the soothing effect and heals them quickly.

Peel

Decoction of a banana peel given with sugar is a medicine for diarrhoea, dysentery, excessive thirst due to dehydration, scanty urination etc. It can be also applied over the traumatic affections as a lotion to reduce pain and swelling.

Banana Flower

Banana flower is eaten as a vegetable and medicine for diabetes, chronic cough, dyspepsia, constipation etc. Cooked flower eaten with curds is a medicine for dysmenorrhoea and profuse menstruation. Perhaps, banana-flower may increase the *progestrone hormone* and reduce the bleeding. A glassful of fresh flower-juice mixed with 2-5 grs. of *potash-nitrate* is given as a specific medicine for gonorrhoreal urethritis and scanty urination in ascitis (Charaka). A ripe banana mashed in plain cow's milk into it a tablespoonful of fresh banana flower juice is added, and is given 2-3 times a day (with restriction of sweets and fried foods) to reduce extra weight. This recipe is effective when it is used for a couple of months. It helps the weight reduction by supplying low calories and by increasing urinary output and washing out the extra sodium chloride from the body.

Stem

Fresh juice from the porous stem is rich in potassium, vitamins and other minerals. A glassful of juice taken early in the morning acts as a very powerful diuretic in all conditions where profuse urination is indicated. It can also be used as a medicine for excessive thirst due to diabetes, summer heat, cholera, and in acute fevers. DHANAVANTHRA, praises that banana-stem juice is a very valuable remedy when one is bleeding from lungs due to tuberculosis or from rectum due to piles. Banana stem juice can also be given as a medicine for epilepsy, hysteria, alcoholic or opium intoxication, diarrhoea, leucorrhoea, cystitis, gonorrhoea etc[4]. Few drops of fresh juice are put in eyes if they are swollen due to exposure to Arsenic oxide fumes. (Dr. M. A. Khiliq, Mysore). An ounce of juice mixed with ghee is given as a purgative in the early morning to children and pregnant women. The stem-juice is said to have curative power in snake bite.

Dry powder of the stem one teaspoon mixed with honey and is given with cold water to cure simple type of jaundice.

Ash of the stem 20 grs. 1-3 times a day after meals acts as an antacid in hyperacidity of the stomach, gastric ulcer, morning sickness, abdominal distension, colic due to round worms etc. Ash mixed with coconut oil is used as an ointment and soothing dressing in burns, abscesses, blisters etc.

'Fresh banana root juice is also equally effective, but, it is particularly useful during the treatment of diabetes, gonorrhoea, cystitis, biliousness, goitre, glandular swellings, intestinal worms, bronchocele and stromous affections'.[8]

Leaves

In India banana leaves are extensively used as plates to serve food. It is said that eating food in clean banana leaves increases hunger.

Ash of the fresh banana-leaves 5 grs. *Onion juice* 5 drops, *Honey* 1 teaspoon. *Common salt* 20 grs. mixed together is used once a day as a very effective medicine for whooping cough, bronchitis, asthma and hiccough[3].

Ash of dry leaves mixed with *coconut oil* is used as a very soothing dressing in burns and scalds, blisters and blood boils. Its application hastens the formation of pus and drains it quickly[7].

REFERENCES

1. Aman, *The Medical Secrets of Banana, The Health*, Sep., (1966), Madras.
2. Connell, A. M., Rowlands, E. N. and Wilcox, P. B., *Gut.*, 1, 44, (1960).
3. Pandit Shiva Kumar, *Arogya Darpana*, (Kan.), Bangalore.
4. Pandit Chandra Bhan Singh, *Halli-Chikitsay*, (Kan.), Mysore.
5. *Brit. Med. Jour.*, Vol. 2, 1449, (1964).
6. Muzaffar Hussain *Kitab-ul-Mufradat*, (Urdu), p. 400, (1965), Lahore.
7. Majeed, S. A., *Tibbe-Rahamani.* (Urdu), (Mans.).
8. Nadharni, K. M., *Indian Materia Medica*, Vol. 1, p. 824, 3rd Ed. (1962).
9. Sanyal, A. K., *et al.*, *F. Pharmacy and Pharmacology*, Nov. 1963.
10. *J.A.M.A., Summary of Diets, Modified Fat Content*, 181, 411.
11. Hajos, M. K., *Acta Allergologica, State Inst. of Rheumatology, Budapest*, 17, 385, (1962).
12. Mathur, R. C., *Systematic Botany*, p. 413, 5th Edn. (1965).
13. Majeed, S. A., *Tibbe-Rahamani*, Urdu Mss., (1926).
14. Anon, *Fruits*, 11, 113, (1956).
15. Lieberman, *et al.*, *Pre-package*, 4 (4), 24, (1950).
16. Anon, *Good package*, 17 (6), 14, (1956).

17. *Reviews in Food Technology*, Vol. 3, 1961, p. 68, 4.
18. Carolus, *et al.*, *Pre-package*, 6 (8), 16, (1953).
19. Wallace, *et al.*, *Bull.* No. 158, *Agri. Ext. Service., Univ. of Rhode Island*, Kingston, (1954).
20. Rao, *et al.*, (un-publiished report C.F.T.R.I., Mysore).
21. Swaminathan, M. and Bhagawan, C. K., *Our Food*, 3rd Edn., (1966).
22. *Fruit and Vegetable preservation Industry in India*, Directorate of Marketing and Inspection, Ministry of Food and Agriculture, Govt. of India Nagpur, (1965).
23. Dalal, V. B. *et al.*, C.F.T.R I., Mysore, *Annual Report* (1966).
24. Mathur, P. B., C.F.T.R.I., Mysore, *Annual Report* (1966).
25. Kaviraj Jaganath, *Tibbey Jawahirath*, pp. 196-201, (1966).

53. BULLOCKS-HEART

Bullocks-Heart: *Annona-reticulats:* (B.N.); *Sūdā:* (Sans.); *Ram Phal:* (Hindi, Dakhni, Mar., Guj.); *Ram-phala hannu:* (Kan.); *Ram-phala:* (Tel.); *Parangachakka:* (Mal.); *Sita-Rajamba:* (Ori.); *Nona:* (Beng.).

Family: Annonaceae.

Zodiac: Libra.

Food Value per 100 g. approximately

Carbohydrate	... 20.9 g.	Phosphorus	... 10 mg.
Protein	... 1.4 g.	Iron	... 0.5 mg.
Fat	... 0.2 g.	Digesting Time	... 2½ Hrs.
Calcium	... 12 mg	**CALORIES**	... **100**

Constitution: Hot 2°—Wet 2°.

Physiopharmacology and Therapeutics

Bullocks-heart usually grows wildly in the forests and it is also grown as a back yard tree for its fruits and good shade.

The fruit is not very popular and has no commercial value on the large scale. However, the creamy pulp is nutritious, cooling and quenches thirst in fevers. Fruit eaten with honey or sugar is a tonic-food for the growing children and nursing mothers. The pulp can be used as a flavouring media in home-made sweets, and ice-cream.

Seeds

Seeds contain a gastro-intestinal irritant and is harmful to teeth if they are chewed. Paste of the seeds mixed with *Kerosene*-oil is applied over the scalp to kill the head lice.

Leaves

Leaves of this fruit contain a volatile oil, which emits a nauseating smell when they are bruised. The paste of the tender leaves mixed with salt and turmeric powder is applied as a poultice to hasten the suppuration in the blood boils, and to kill the lice in the cattle.

Bark

Bark of the tree is very astringent, therefore, its dry powder 5-10 grs. with honey is given 3-4 times a day as a medicine for diarrhoea and dysentery.

54. BREAD FRUIT

Bread or Butter Fruit: *Artocorpus-insisa:* (B.N.); *Bread-jcnnu:* (Kan.); *Bilaiti-chakka:* (Mal.); *Madar:* (Beng.).

Family: Urticaceae.

Zodiac: Capricorn.

Food Value per 100 g. approximately

Carbohydrate	20 g.	Phosphorus	30 mg.
Protein	0.7 g.	Iron	0.3 mg.
Fat	0.3 g.	Digesting Time	3 Hrs.
Calcium	40 mg.	**CALORIES**	**85**

Constitution: Hot 1°—Wet 2°.

Physiopharmacology and Therapeutics

Bread fruit is imported in India from Java and in some places it is cultivated for its commercial value and cheapness. It is

yellowish-pale creamy fruit having a soft pulp like butter. The pulp has a creamy taste and can be used with honey to taste it better. Its excessive use causes biliousness and is contra-indicated in diabetes.

55. CASHEW-FRUIT

Cashew-Fruit: *Anacardium-occidentale:* (B.N.); *Sophtrara:* (Sans.); *Kaju:* (Hindi, Urdu, Guj., Dak.); *Geru-hannu:* (Kan.); *Jeedi-padu:* (Tel.); *Parangi-manga:* (Mal.); *Lanka-samba:* (Ori.); *Hijli-badam:* (Ben.).

Family: Anacardiaceae.

Zodiac: Libra.

Food Value per 100 g. approximately

Carbohydrate	11.1 g.	Vitamin B_1	288 mcg.
Protein	0.8 g.	Vitamin B_2	234 mcg.
Fat	0.6 g.	Vitamin C	200 mg.
Calcium	4 mg.	Digesting Time	3 Hrs.
Phosphorus	21 mg.	**CALORIES**	53

Constitution: Hot 2°—Wet 1°.

Physiopharmacology and Therapeutics

Cashew fruit is cultivated all over Malabar Coast. Nuts are attached to the fleshy portion of Cashew apples which are beautifully crimson red and yellow in colour. Cashew apple-juice is sweet and rich in vitamin C, but it is not popular in India due to its astringent taste and irritable property. However, with improved processing techniques formulated by C.F.T.R.I. Mysore, very valuable tasty products like: *juice, syrup, jam, candy* etc., can be prepared from cashew apples. (About 91,860 tons of cashew-apple are yearly produced in India).

Fresh cashew-apple juice 1 tablespoon mixed with honey is given once daily to cure diarrhoea, scurvy, general dropsy, scanty urination, high acidity of urine, cystitis, painful menstruation in young girls etc. It is locally applied as an analgesic liniment to cure

neuralgic pains, and rheumatism[1]. Fruit contains a rubefacient oil named *cordol*. Due to its rubefacient effect it is used with some benefit in the treatment of leprosy psoriasis, corns, and can be used as a substitute for *iodine* for topical application.

Cashew-apple Juice[2]

Place washed cashew-apples on a perforated stand provided with each Prestige pressure cooker and cook them in it for about 7 minutes with 15 lb. pressure weight. In India this weight is fixed whereas in England detachable weight control is provided with this brand of pressure cooker. Afterwards rinse the fruits in cold running water. This process removes the astringent taste and softens it.

Extract juice by pressing the cooked cashew-apples in a juice extractor or basket press. Strain the juice through a coarse muslin cloth.

Add gelatine to the juice at the rate of 430 mg./kg. mix the ingredients well and allow it to stand for quarter of an hour. Then strain again the clear juice through a mull cloth and add sugar at the rate of 60 g. per kg. of the juice to get the sweetness and desired flavour of the fruit.

Heat the juice till it boils for about 5 minutes and after keeping it for ten minutes off the fire add *sodium-benzoate* at the rate of 1 g./kg. juice. Fill it in pre-boiled bottles and close them with crown cork, if they are not available screw corks will do. Heat the bottles in water and boil them for about half an hour, then allow them to cool.

Store the bottles in cool place. This juice is a very valuable drink in off-season.

Cashew-apple Syrup[2]

To the juice as explained before add 60 g. of lime juice and some gelatine so as to settle the suspended matter. Allow the juice for quarter of an hour and strain it through a coarse cloth. Add sugar at the rate of 670 g. per every litre of the extract.

Mix the ingredients well and strain it again through a cloth. Add *sodium-benzoate* at the rate of 1 g./kg. of the juice.

Preserve the syrup in air tight bottles. Dilute with 3-4 times its volume of water to use as a very refreshing cooling drink.

Cashew-apple Jam[2]

Dip fruits in 2 per cent common salt solution under the weight of some a wooden block and allow the fruits to remain in the solution for 3 days. Steam the cashew-apples in a pressure cooker for 4 minutes. Trim off the black portions with a stainless steel knife. Crush the fruits with a wooden ladle.

Add sugar at the rate of 1 kg. per 1 kg. of crushed fruit and cook the mixture till a soft mass is formed. Add a pinch of citric acid towards the end of cooking process.

Put the hot jam into clean open mouth sterilized jars. Seal them with wax, and store them in cool dry place.

Cashew-apple Candy[2]

Immerse the washed well ripe cashew fruits in 2 per cent salt solution every day so that in 5 days time it reaches the concentration of 10 per cent. Add Potassium metabisulphite (625 mg./kg.) and keep the fruits in this solution for 2-3 days more. Then wash the fruits thoroughly in water and boil them for 5 minutes by placing them on a perforated metal stand; follow it up by steaming in pressure cooker for 5 minutes. After cooling the fruits perforate them with bamboo prickers.

Prepare syrup by dissolving sugar at the rate of 300 g. in every litre of water. Add 1 per cent citric acid to it and boil for about 10 minutes. Pour the hot syrup over the fruit so as to cover the entire fruits. Keep the fruits immersed in the syrup by placing a flat cover over them for 24 hours. Drain the syrup next day and boil it for 5-7 minutes by adding required quantity to raise the Brix from 30° to 35° Brix. Repeat this process alternate day until the Brix of the syrup rises up to 70° Brix. Then leave the fruits in this syrup for 5-6 days for complete absorption.

Strain the syrup and finally dry the fruits to make a candy. Pack it in dry sterilized screw capped jars and store in a cool place.

Cashew Wine

As out 300,000 tons of cashew-apple are wasted after removing the nut. Instead good quality wine can be prepared by adding *tamarind concentrate.*[3]

REFERENCES

1. Dastur, J. F., *Medicinal Plants of India and Pakistan*, p. 1, 27, (1962).
2. Shankar, J. V. *et al.*, *Home Scale preparations of Fruits and Vegetables*, pp. 13 to 16. 4th Edn. (1962).
3. Subba Rao, M. S. *et al.*, C.F.T.R.I. Mysore, *Annual Report* (1966).

56. CHERRIES

Cherries: *Prunus-cerasus:* (B.N.).

Family: Rosaceae.

Zodiac: Aries.

Food Value per 100 g. approximately

Carbohydrate	11.9 g.	Vitamin A	100 I.U.
Protein	1.1 g.	Vitamin B_1	10 mcg.
Fat	0.5 g.	Vitamin B_6	0.05 mg.
Calcium	15.9 mg.	Folic acid	6 mg.
Phosphorus	16.8 g.	Pantothenic acid	0.12 mg.
Iron	0.36 mg.	Biotin	0.08 mg.
Potassium	275 mg.	Vitamin C	62 mg.
Sodium	2.4 mg.	Digesting Time	3 Hrs.
Sulphur	5.9 mg.		
Magnesium	9.6 mg.		
Chlorine	1 mg.		
Copper	0.6 mg.	**CALORIES**	57

Acid Base Balance/100 g.c.c. N/10 Alkali 73

Constitution: Hot 2°—Wet 1°.

Physiopharmacology and Therapeutics

Cherries are not so popular in India as they are in the western countries. Cherries are a very good source of vitamin C and other vitamins and minerals. Eating cherries, prevents cold and other infections common during winter months. Fruits are used as nerve tonic. Cherry-brandy made from cherries is a very valuable alcoholic beverage.

Paste of the seed rubbed with water and is applied over ring-worm infection and cracked soles. About 2,970 tons of cherries are yearly produced in India.

57. CUSTARD-APPLE

Custard-apple: *Annona-squamosa:* (B.N.); *Subhā:* (Sans); *Shariefa or Sitaphal:* (Hindi, Urdu, Guj., Kan., Mar., Dak.) *Sita-pazam:* (Tel., Tam., Mal.); *Ataphal:* (Beng.).

Family: Annonaceae.

Zodiac: Cancer.

Food Values per 100 g. approximately

Carbohydrate	21.8 g.		
Protein	1.7 g.		
Fat	0.6 g.		
Calcium	12 mg.		
Phosphorus	51 mg.		
Iron	1 mg.	Digesting Time	2½ Hrs.
Potassium	578 mg.	**CALORIES**	**100**
Sodium	13.8 mg.		
Sulphur	26.7 mg.		
Magnesium	23.9 mg.		
Chlorine	40 mg.		
Copper	0.15 mg.		
Acid Base Balance/100 g.c.c.	N/10	Alkali 119	

Constitution: Hot 1°—Wet 2°.

Physiopharmacology and Therapeutics

Custard-apple grows wildly in the tropical jungles all ove. India. Raw fruit is nauseating and hard to digest owing to its high starch content. On ripening, it emits a pleasant odour and the pulp becomes creamy. It contains pentose as a reducing sugar which amounts to about 6 per cent.

Drink made from creamy sweet pulp with water or milk is a very cooling beverage to quench thirst in fevers and summer months. Pulp can be used as a fine flavour for ice-puddings. Pulp with honey or jaggery can be given as a nutritive tonic for growing children and lactating mothers.

Raw pulp can be used as a poultice to hasten pus formation in the boils and along with tamarind pulp 2 teaspoon is given as a medicine for simple dysentery.

Seeds

Seeds are harmful to teeth, therefore, they should never be chewed. The dry powder of the seeds is applied as a shampoo and it prevents dandruff.

Leaves

Fresh leaves emit a kind of unpleasant smell, hence, the bruised leaves can be used as a smelling agent for unconscious hysterical patients. The paste of the fresh leaves is applied as a poultice over foul smelling maggot infested ulcers of small-pox and hard blood boils. Paste of the leaves mixed with equal quantity of Pipal (Ficus-religiosa) is applied over Guinea worm sore.

58. CURRANTS

Family: Euphorbiaecae.

Zodiac: Libra.

Food Value per 100 g. approximately

Carbohydrate	9 g.	Vitamin A	300 I.U.
Protein	0.5 g.		
Fat	0.9 g.	Vitamin B_1	10 mcg.
Calcium	60 mg.	Vitamin C	136-353 mg.
Phosphorus	43.2 mg.		
Iron	2 mg.	Digesting Time	2 Hrs.
Potassium	372 mg.	**CALORIES**	**30**
Sodium	2.7 mg.		
Magnesium	17 mg.		
Chlorine	15 mg.		

Acid Base Balance/100 g.c.c. N/10 Alkali 88.

Constitution: Cold 1°—Wet 2°.

Physiopharmacology and Therapeutics

Black currants are rich in vitamin C, hence, its fresh juice can be taken as an antiscorbutic medicine. The richness of its potassium makes it an ideal diuretic in all kinds of scanty urination with high acidity. It keeps the urine alkaline and prevents urinary infections in nephritis, congestive heart failure, general edema etc. Eating currants with milk and honey is a very valuable laxative medicine. It tones up the bowels and eliminates the waste products regularly.

The fresh juice applied externally over the face acts as a beauty aid and it removes the pimples and keeps the skin soft and clean. The juice of red currants is more or less like black currants in both food and medicinal value.

59. DATES

Dates: *Phoenix-dactylifera:* (B.N.); *Pinda kharjura:* (Sans.) *Khajur:* (Hindi, Urdu, Dak., Mar.); *Qurma:* (Pers.); *Kharjura* (Kan.); *Kharjuram:* (Tam.); *Khejuri: Pericham-pazam:* (Mal) (Ori.); *Khejur:* (Beng).

Family: Palmae.

Zodiac: Leo.

Food Value per 100 g. approximately

Carbohydrate	50 g.	Vitamin A	670 I.U.
Protein	2.8 g.	Vitamin B_1	125 mcg.
Fat	0.3 g.	Vitamin B_2	40 mcg.
Calcium	65 mg.	Niacin	0.8 mg.
Phosphorus	75 mg.	Vitamin C	Trace
Iron	10 mg.	Digesting Time	3½ Hrs.
Potassium	537 mg.	**CALORIES**	30
Sodium	13 mg.		
Magnesium	58.5 mg.		
Chlorine	290 mg.		
Copper	0.21 mg.		

Acid Base Balance/100 g.c.c. N/10 Alkali 80.

Constitution: Hot 1°—Wet 2°.

Physiopharmacology and Therapeutics

Date-palm grows wildly in the hot climate of the desert and thrives well there.

There are various kinds of dates, but, their chemical composition is more or less the same. Dates are one of the best and choicest foods of nature and are a treasure house of the highly soluble natural iron, calcium, potassium and other vitamins.

Dates contain a high concentration of tannic acid combined with fibrous cellulose. Therefore, dates can be used as a medicine for relaxed conditions of the intestines. Dates are effective for both diarrhoea and constipation due to malnutrition and atony of the bowels.

A handful of dates soaked in fresh *goat's milk* over night and are ground in the same milk in the morning. To this preparation a pinch of *cardamom* powder and honey is added and is used as an useful natural iron, calcium and phosphorus tonic to promote growth and health. It is particularly effective to improve sex stamina, functional sterility, nervousness and malnutrition. Its regular use during the entire period of pregnancy helps the growth of the baby and eases child birth.

The secret of the virility of Arabs is attributable to date-meal, *honey* and *wheat-bread*. Eating this food regularly, increases the blood, tones up the nervous system, thickens the semen and makes one feel years younger even when he is dominated by grey thoughts. Fresh dates are given to children as natural sweets to promote growth and to prevent tooth decay.

Eating seven dates with ten fresh *curry-leaves* every morning is said to prevent and cure diabetes[3].

For sterility due to functional disorders; the following preparation of dates is found to be effective.

Dates (seedless) 15, pure *Black Cow's milk* 2 pints and pure golden colour *honey* 2 tablespoons: Boil dates in an earthen vessel in milk. When the milk begins to thicken add honey and keep on stirring till the milk becomes more thick. Take this preparation from fire when it is still hot and put it into a clean glass jar which is boiled in water. Store it in a cool place with a tight lid.

Use a tablespoonful of this preparation once or twice a day after meals after the cessation of the menstruation. Continue it for 20 days and have conjugal union on 12, 13, 14, 15 and 16th day after the commencement of the menstruation. Repeating the same process for a month or two, helps one to become fruitful[3].

Small bits of dates roasted in butter and mixed with sugar can be used as a safe food while travelling.

A date tied to the wrist of a baby and allowed him to suck during teething time hardens the gums and prevents the other complaints such as: fretfulness and diarrhoea. A teaspoonful paste of the date prepared with honey is given three times a day, as a very effective medicine for teething diarrhoea and dysentery.

Date-toddy is rich in B-complex vitamins. Jaggery prepared from unfermented toddy is nutritious and cooling.

Seeds

Seed is a very nutritive fodder to the animals. Paste of the seed is applied over eye-lids as a medicine to cure corneal opacities, keratitis and ophthalmia.[3]

Few seeds burnt with date-kernel are mixed with *mustard oil.* It is applied over leucoderma patches and the spots are exposed to radiating heat from a glowing charcoal. Repeating this every day for a month or two, changes the colour of the white patches. Plain whole date-charcoal 20 grs. t.d.s. supplemented during the treatment of diarrhoea, typhoid, jaundice, colitis and other intestinal infections; prevents the absorption of the toxins and reduces the changes of developing drug resistance. Piles exposed to the fumes of burning date-seed is said to be effective.[4]

Decoction of the burnt date seeds can be used as a refreshing drink with milk and sugar. The same decoction in which the whole dates are left overnight can be given as a cooling drink in fevers, thirst, asthma and dehydration[3].

REFERENCES

1. Muzafar Hussain Aivan '*Kitabul-Mufaradath.*' p. 392. 4th Edn (1965).
2. Mathur, R. C., *Systematic Botany*, p. 451, 2, 5th Edn (1965).
3. Majeed, S. A., *Kanaz-ul-Mujerebath*, Urdu MSS, (1930).
4. Nadkarni, K. M., *Indian Materia Medica*, Vol. 1, p. 945, (1954).

60. FIGS

igs: *Ficus-carica:* (B.N.); *Anjura:* (Sans.); *Anjeer:* (Hindi, rdu, Dak., Guj., Mar.); *Teen:* (Arab); *Anjurhannu:* (Kan.); *hi-pazam:* (Tam., Mal.); *Dimir:* (Ori.).

amily: Urticaceae.

——odiac: Capricorn.

ood Value per 100 g. approximately

arbohydrate	17.1 g.	Vitamin A	2070 I.U.
rotein	1.3 g.	Vitamin B^2	50 mcg.
at	2.0 g.	Niacin	0.3 mg.
Calcium	260 mg.	Vitamin C	2 mg.
Phosphorus	90 mg.	Digesting Time	2 hrs.
Iron	4.2 mg.	**CALORIES**	**75**
Potassium	1015 mg.		
Sodium	87.11 mg.		
Sulphur	Trace		
Magnesium	92 mg.		
Chlorine	166 mg.		
Copper	0.24 mg.		

Acid Base Balance/100 g.c.c. N/10 Alkali 45

Physiopharmacology and Therapeutics

Figs are grown all over the world and they are very popular as both fresh as well as dry fruits.

Figs are harvested during March and May—and are rich in high class amino-acids like: *Tyrosin, Lipase, Protease, Protose, Cravin, Lysin,* and *Grape-sugar.* Therefore, eating figs with milk is one of the best means of proteins in vegetarians, and in the prevention of protein deficiency diseases.

Eating figs with *honey* is a very valuable natural medicine for the treatment of bleeding from the lungs due to pulmonary tuberculosis, chronic cough, asthma, bleeding piles, constipation, rectal fissures, cirrhosis of the liver, jaundice, portal obstruction, slow healing of the ulcers, fractured bones etc.

Figs contain a digestive enzyme in the sap, hence, : figs can be used as a digestive tonic in all kinds of dy: heart burn, etc. There is a high concentration of potassiu figs, hence figs can be used in the treatment of urinary — with scanty urination, stones in the bladder, and the kidn strangury, phosphaturia and metabolic disorders of carbohydr such as ketosis and acidosis. (*diabetics should use figs with cauti* Figs can also be used as an energy-food in cardio-vascular disor under the care of a physician.

In the treatment of nervous vaginismus in young girls; giv figs with *butter-milk* daily thrice for a month relaxes the vag muscles and stops the spasm. This is tested in many cases found effective. Chewing figs regularly, not only hardens gums but also stops bad breath and keeps the teeth healthy strong.

An ounce decoction of ripe figs given three to four time day during infancy and childhood, supplies all the necessary calcium, iron, phosphorus, proteins and other minerals to effec healthy and strong growth. It prevents the convulsions by avoiding constipation in the babies. Those who eat figs regularly during pregnancy do not suffer from prolonged labour and weakness after child-birth.

Leaves

Paste of fig-leaf is used as an external medicine to cure scabies.

61. CLUSTER-FIGS

Cluster-Figs: *Ficus-glomerata:* (B.N.); *Udambra:* (Sans.); *Gulair:* (Hindi, Dak., Urdu); *Jumeez:* (Arab), *Ahamaq-anjeer* (Pers.,); *Atti:* (Kan.); *Umbar:* (Mar.).

Family: Urticaceae.

Zodiac: Aquarious.

Constitution: Hot 2°—Wet 1°.

ysiopharmacology and Therapeutics

Cluster-figs grow wildly in all the jungles of India and the es are planted as road-side trees from ancient times to give ade and fruit to the weary travellers.

Cluster-figs are not commercial fruits and are not very popular able-fruits. However, they are used in various medicinal parations to cure diabetes.

Raw cluster-figs are highly praised by ancient Ayurvedic sicians. *Charka*, states, that, the sap of the raw figs con- iously used for two years prevents and cures diabetes. Eating w fig every day along with honey or taking a teaspoonful of sh sap from the raw figs along with sugar for a fortnight stops rmatorrhoea, strangury, scanty urination, gonorrhoeal ure- itis, bleeding from nose and leucorrhoea etc.

Eating ripe cluster-figs every day prevents tuberculosis, asthma, vous debility, and mental disorders. (Rajnaghatu). *Bhava-prakash* says, that, eating cluster-figs along with honey and little rock salt is a very effective medicine for jaundice, biliousness, stomatitis, insanity, and threatened abortion.

Leaves

Juice of the fresh and tender leaves applied in the vagina one day before the expected time checks excessive menstruation in young girls. The same can be regularly used as a very powerful medicine to stop excessive white discharge. Chewing tender leaves is effective for curing stomatitis and bad smell in the mouth. Fresh juice mixed with *wheat-flour* is applied as a poultice to open blood-boils. Daily application of fresh juice heals chronic ulcers.

Bark

Fine powder of the sun-dried bark of the stem 5 to 10 grs. 2 to 3 times used with butter-milk is a very effective medicine for diarrhoea, dysentery, piles, sprue etc. The same quantity of the powder taken with ½ ounce of pure fresh *Bitter gourd* juice 3-4 times a day is found to be very effective medicine for diabetes in its early stages. It is observed that this medicine should be continued for at least six months to have its full benefits.

Decoction of the fresh bark of the roots made by boiling in water for half an hour and a glassful of it is given 2-3 times day from the time of conception up to four months regularly to prevent habitual or threatened abortion.

Dry powder of the root-bark mixed with equal quantity of dry powder of the ripe cluster-figs 20 grs., with milk used before going to bed is a very useful and effective medicine for spermatorrhoea, pre-mature ejaculation etc. It is a very good uterine tonic too.

Sap

Sap obtained by incision of the roots is mixed with *cummin seeds* 10 grs. is used with *tender coconut water* once in the morning as a medicine for gonorrhoea. Sap mixed with honey is applied over gladular swellings is said to be curative. Sap soaked in cotton is applied to stop tooth ache due to caries. (Dr T. R. Mudliar)

62. GRAPES

Grapes: *Vitisvinifera: or labruseana* (B.N.); *Draksha:* (Sans.); *Angoor:* (Hindi, Dak., Urdu, Ori., Beng.); *Unab:* (Arab); *Kishmish:* (Pers.); *Drakshi-hannu:* (Kan.); *Nalla-draksh:* (Tel.); *Mundiringa:* (Mal.).

Family: Vitaceae.

Zodiac: Scorpio.

Food Value per 100 g. approximately

Carbohydrate	15.5 g.	Vitamin A	15 I.U.
Protein	0.8 g.	Vitamin B_1	40 mcg.
Fat	0.4 g.	Vitamin B_2	0.02 mcg.
Calcium	4.2 mg.	Vitamin B_6	0.10 mg.
Phosphorus	20 mg.	Folic acid	6 mg.
Iron	0.34 mg.	Niacin	0.3 mg.
Potassium	316 mg.	Pantothenic acid	0.05 mg.
Sodium	1.6 mg.	Vitamin C	28 mg.
Sulphur	11.4 mg.	Digesting Time	2 Hrs.
Magnesium	4 mg.	**CALORIES**	68
Chlorine	1 mg.		
Copper	0.10 mg.		

Acid Base Balance 100 g.c.c. N/10 Alkali 72.

Constitution: Hot and wet 1°; Cold and dry (raw fruit).

Physiopharmacology and Therapeutics

Grape is one of the oldest fruits grown in Rome, Spain, France, Persia, India etc., and from ancient time, grapes are cultivated as food and for making wine. Amongst the various kinds of grapes, *Black prince*, *Shakri*, *Bhokri*, *Kali sahib*, *Unab-shai* etc., are very popular as commercial fruits. Grapes can be safely packed in rectangular baskets and semi moisture proof anchorcoated cellophane bags of $8\frac{1}{4}'' \times 7\frac{1}{4}''$/size[10]. In India, 44,356 tons of grapes are yearly produced.

Raw grapes are rich in *oxalic*, *recemic*, *malic* and *tartaric acid* and *ozotised* matters. The presence of these acids make them taste sour and tart. Pickled raw grapes in pure *malt vinegar* with *salt* and *pepper* are used in empty stomach in the morning as a very valuable medicine to stop the feelings of morning sickness, nausea due to biliousness, giddiness, excessive accumulation of water in the mouth, anaemia, piles etc.

White grapes are sweet due to presence of glucose and they are superior to black grapes, which are sour and are irritant to throat.

Eating white grapes regularly is said to prevent the development of stomach cancer, rheumatism, tuberculosis, anaemias of pregnancy and childhood, formation of bladder and kidney stones, acidity of the urine, scanty urination etc. Grape juice is a very cooling drink in summer and quenches thirst. In fevers, grape juice increases the urinary output and washes the internal toxins. Diabetics get immense relief in thirst by drinking a cup of unsugared grape juice. Grape juice mixed with honey is a very good blood and nerve-tonic. It banishes the tired feelings after any mental and manual work by supplying the readily available grape sugar. Plain grape juice expressed from white or black grapes is externally applied as a cure for scorpion sting.

Raisins are dry seedless grapes used as medicine to cure impotency, indigestion, constipation etc.

Seeds

Seeds of all the types of grapes contain fixed oils and tannins.

Leaves

Grape-leaf juice 2 teaspoons 2-3 times a day is used to cure diarrhoea, sprue and gonorrhoea. An ounce of fresh juice taken with *carrot* juice daily prevents the formation of urinary stones. Juice is applied as a cure for scorpion sting.

Bark

Grape-wood-ash 5-15 grs. 2-3 times with water is given for urinary stones and orchitis: (Inflammation of the testicles).

How to prepare and preserve grape-juice

Select good quality grapes and clean them in cold water and remove the stalks and blemishes if any. Put the clean grapes in stainless steel vessel and pour cold water sufficient to cover them above one inch. Heat the vessel until the grapes begin to split evenly. Then take the vessel from the fire and cool it by immersing it in cold running water. Squeez the grapes in the same water and strain the thick liquid through a muslin cloth and put the juice in another clean stainless vessel. Take sugar equal to the weight of the grape juice and put it in another vessel and add very little water just to dissolve the sugar and heat it to boil. To remove the scum and purify the syrup add a little milk when the syrup is boiling. Remove the scum from a spoon and strain the syrup which is sufficiently thick. Add cold grape juice little by little to this hot syrup and keep on stirring constantly. When all the juice is mixed, add a few drops of *Portilo* (*Bush*) and a little grape colour (Bush) and stir it well. To this finished preparation add *Potassium metabisulphite 5 grs.* each pound of the finished juice, by dissolving it in a teaspoonful of hot water.

Pour it into a clean sterilized bottle leaving a head space of 1-1½ inches. Cork it air tight and store it in cool dark place.

Use it with some cold water and enjoy the health giving cool drink to feel refreshed. Adding a glassful of ripe *wood-apple* pulp makes it more delicious.

How to make good quality wines

Wine has been called as the drink of Gods and it is used as a sacred drink from the time of Vedas. It is said that INDIRA,

the god of rains in Indian mythology, prepared wine and distributed to all the other gods and holy sages to attain Mukti or immortality. The particular wine which was used for this purpose is called *Soma* in Vedas. Romans believed that their gods cultivated grapes in heavens to prepare wine from them. *Holy Bible* and *Holy Quran* state, that there is a kind of wine in heavens which gives everlasting life on drinking it. From time immemorial wine has been praised by poets, physicians and others and many immortal poetries are written in praises of wine. It is titled as *Red Fairy*. Particularly, the most enchanting literary work on wine is *Rubaiyat-e-Umer Qhiyam*, which is a classical Persian Poetry.

Commercial wine making is a very complicated process but making wine at home is a simple process by fermenting any fruit juice such as: *apples*, *bananas*, *cashew-apple*, *pineapples*, *oranges*, *honey*, *sugar-cane*, *grape-juice* etc. But, the most delicious and good quality wine can be made only from *grape-juice*.

Buy some good quality sweet grapes and clean them in cold running water and remove the blemishes if any.

Crush the grapes well and strain through a coarse cloth, and get the maximum yield of the juice. Then heat the juice along with the coarser pulp for about half an hour at a temperature of 140°F—150°F, to make the wild yeast inactive and to set the dirt down in the juice.

Cool the juice and decant the upper clear portion of it in a clean carboy and adjust the sugar content to 23° Brix by adding it if it is low in the juice. If there is high content of sugar, dilute it to fix it to the required Brix. If one has not a Brix adjusting meter, simply add sugar, one fourth the weight of the juice. Then add *tartaric acid* 10 grs., *ammonium sulphate* 2 grs. and *tannic acid* 2 grs. per each pound of the juice. Get some yeast strains, preferably *Saccharomyces ellipsoides* var, *Burgundy* from bacteriological laboratory and put them in four ounces of pasteurized grape juice in a clean sterilized bottle and allow the organisms to multiply for about three hours until the froath begins to appear on the surface of the juice. Later, pour this fermenting juice in to the other juice which is already collected. The ratio of fermented and the other grape juice should be 1:10. Mix all the ingredients well and pour the juice in a clean carboy and plug it with a sterile cotton wool gauze and

maintain the surrounding temperature between 80°-85°F, and allow it to ferment for about 3-weeks. Meanwhile, if the fermentation slackens, areate the filtered air into the juice, but usually it is not necessary if the correct temperature is maintained. After the juice is fully fermented, syphon off the clear ruby red wine into another big jar having some oak wood shavings, which give flavour through oxidation. Allow the wine to mature for atleast one year and then fill it in sterilized bottles and pasteurize at 150°F for half an hour. Blending of the wine with extra addition of brandy increases its alcoholic contents[21,22].

There are various brands of commercial wines having different concentration of alcohol and sugar. They are:

Sherry	20 per cent	Alcohol	14-27 g. sug./bottle.
Port	20	,,	,,
Burgundy	14	,,	,,
Champan	10	,,	,,
Maderia	20	,,	,,
Claret	10	,,	,,
Vermouth	14	,,	,,
Hock	10	,,	,,

(Hutchisons, Food and the Principles of Dietetics, pp. 484-520.)

There are some medicated wines like: *Wincarnis*, *Bovis* etc., which are blended with meat and kola extract, iron, pepsin etc., to increase the tonic effect of the pure port wine. Such wines are usually given after acute febrile conditions and during lactation.

Chemical Composition of wine

Wine contains: *ethyl alcohol, glucose, fructose, tannins, acetyl-dehyde, furfural-dehyde, tartaric, malic, acetic, formci, lactic, butyric acids, iron, copper, glycerol, nitrogenous substances* and *essential oils.*

Uses of wine

According to *Aviceena*, wine is the elixir of life. Taken it in moderate doses, increases the body's heat, nourishes the tissues, alerts the mental faculties, banishes tiredness, increases the blood, aids digestion, protects from colds, and keeps one feel happy and young. However, wines do not contain any specific curative

power to use them as medicine. There is no evidence of any bad effect if wines are taken occasionally in moderate doses.

Dangers of wine drinking

Drinking wine or any alcoholic preparation in excess and become an addict to it is very injurious to health. It is asserted that all alcoholic substances damage the liver, heart and the nerves. LIEBER, states that, the development of fatty liver in alcoholics is due to malnutrition. He says, that persons addict to alcoholic drinks are neurotics and they eat too little food and drink too much of alcohol.

REGAN, confirms, that alcohol has a direct influence on myocardium. Moderately intoxicating amounts of alcohol lead to a decrease in both coronary flow and myocardial contractibility. He observed changes in coronary venous blood resembled those seen in obstruction of the coronary vessels. During this phase of alcoholic intoxication, he noticed, the release of *potassium* and *phosphate* ions from the heart muscle into the circulation, and *serum glutamic oxaloacetic transaminase* (SGOT), leaked from the myocardium producing the signs of necrosis of the heart. He further noted that uptake of free fatty acids (FFA), the major substrate used by the fasting heart, decreases markedly, accumulating more *triglyceride* in the myocardium, which REGAN attributes it to be the cause of alcoholic intoxication.

WENDT, proved that alcohol produces impairment in myocardial metabolism and cardiomyopathy may be caused due to direct toxic effect of alcohol itself. He asserts the release of *intramitochondrial* enzymes in most of the alcoholics. In chronic alcoholics; impairment of membrane permeability of the myocardial cell, altered metabolism of citric acid, increase in arterial lactate and triglycerides and decrease in myocardial glucose associated with lowered pyruvate levels is commonly detected. Several chronic alcoholics showed remarkable release of *dehydrogenase* and *zinc* in coronary venous blood and *isocitrate dehydrogenase* in myocardium. All these changes in heart and blood are directly related to a change in the oxidative coenzymes and depelation of liver glycogen due to direct harmful effects of alcohol.

It is truly said, **Alcohol has drowned many families than the Mighty Oceans have sunk the ships.** Therefore, never become an addict to alcohol and ruin your health and career.

After-effects of various alcoholic beverages

WILLIAMS, the head of the Department of Neurosychiatry. Howard University, after studying more than 500 alcoholics, states that various types of alcoholic drinks produce different symptoms:

Wine

The intoxicating effect of wine is on eyes and brain. It produces blurred vision, red blood-shot eyes, loss of interest in self and the world and dry mouth.

Gin

Gin is a distilled spirit obtained by fermenting *mash of rye* and *malt*, *Juniper-berries*, *coriander*, *salt* etc., are also added and redistilled to taste better and give flavour. Gin is mostly prepared in Holland and contains 37 per cent of alcohol by volume.

Excessive use of gin causes low back pain, rapid heart beat, great fear and delusion as if one feels he is walking on cotton and he staggers while walking with a peculiar gait. On listening the heart one commonly hears a kind of unexplained murmurs. There may be bilious headaches and nervousness.

Whisky

Whisky is a very popular alcoholic drink mostly distilled in Scotland from *fermented malt* and other *grains*. It contains 37 per cent of alcohol by volume. *Johny Walker*, *Vat No. 1*, *Black and White* are some of the very popular brands of Scotch's whiskys.

Drinking whisky regularly upsets stomach, causes diseases of the pancreas, nervousness, severe hangovers, and mental hallucinations.

Brandy

Brandy is prepared by the distillation of *fermented grape-juice*. *Conac* in France is one of the leading places of brandy distillation in the world. Brandy also contains more or less the same amount of alcohol as one finds in whisky. *Bisquet*, *Bee-hive brandy* etc., are very popular brands of *Conac* France.

Brandy causes both liver and heart damage.

Rum

Rum is a very popular alcoholic beverage of Jamica. It is distilled from *fermented molases*. Drinking excessive rum causes squinting of the eyes, redness of the lower lip, palpitation of the heart, and talkativeness. WILLIAMS, says, 'All rum alcoholics reported a fainting funny feeling in the abdomen with water as a chaser'.

Beer

Beer is a low alcoholic beverage prepared by *fermentation of malt* and *hops*. *Stout*, *Lager*, *Pale-ale* are some of the common brands.

Beer causes quick weight gain, pot-bellies, bitter taste in the mouth, restless and severe thirst followed by an urge to drink.

Effect of alcohol on gravid uterus

In 1963 during Christmas, it so happened that one of my patients who was attending antenatal clinic phoned me up that she has started labour pains as usual in her eighth month. Previously she had lost four children by giving premature births and she was sure to loose the fourth coming child too. On examining her, the uterus was firm and hard with moderate contractions. She was perspiring and was in a state of shock. She asked my opinion whether she could take some whisky just to relax and be merry for Christmas. Permitting to take some whisky I left her instructing to come to hospital immediately, if the pain becomes intense.

The night passed and next day she phoned me to see her. When I examined her, and to my great astonishment I found the uterus was relaxed and there was no pain.

Having great curiosity about the effect of whisky I advised her to continue to take an ounce of whisky diluted with honey and water daily and I kept her in my hospital for observation. Days passed, and there was no sign of labour even after passing 38th week, really a great change for the first time in her married life. Later I stopped giving her whisky and after 3rd day of the stoppage she started labour pains and gave birth to a full term male baby who is $4\frac{1}{2}$ years old now.

After this, I tried *whisky, brandy, rum, gin* an ounce daily in 60 premature labour cases separately and had the equal marvellous results. Among them, 40 patients completed the full term, the others who did not take alcchol regularly failed to complete the full term.

How alcohol works as a medicine in premature labour is not fully known. I presume, it might act on cerebral spheres depressing the pituitary gland checking the premature release of oxytocin.

At present I have taken the systematic Biochemic study of alcoholic effects on endocrine glands, and soon the results will be published to the profession. It is requested to inform me in detail if any one has done some work on this line.

It is advised that alcohol has a deleterious effect on liver and heart, therefore, one should not attempt to try this method unless fully supervised by an obstetrician. Use of alcohol is contra-indicated in toxaemias of pregnancy, liver and heart diseases even if there is medical supervision. Alcohol has no useful effect on a gravid uterus having fibroids.

How to stop drinking alcohol

To stop drinking alcohol is very simple if one determines and understands the bad effects of drinking too much. In Japan, a new method of the treatment of alcoholism is developed which lessens the cravings for alcohol. Patients having great urge to drink alcohol are given *Cyanamide 10-60 mg. daily* and it has been found to be very effective.[3] In Britain, *Antabuse* is used as drug to reduce the desire to drink alcohol. However, persons, who are indulging in excessive use of alcohol can be greatly benefited by their own determination to give it up, rather than using drugs. *There is no drug so strong as one's own mind.* Desire to live healthy, happy and long is the key note to cure alcoholism. Remember, drinking alcohol causes premature death.

REFERENCES

1. Muller, E. *Therap. d. Gegenw.*, 69, 289, (1928).
2. *Lancet* 2, 1135, (1898).
3. Felix Enrlich, *Alcoholic Fermentation*, p. 167, (1932).
4. McCance and Widdowson, (1942), *op. cit.*
5. Lieber, Charles, S., *Alcohol Directly Damages both Heart and Liver*, J.A.M.A., 6, 33, (1964).

6. Regan, J. Timothy, M.D., Capsule., *Himco*, p. 11, Sep. 25, (1964).
7. Wendt, Veron E., *Medical News*, J.A.M.A., April, 19, p. 3, 37, (1965).
8. Williams, E. Y. Capsule, *Himco*, p. 100, Oct. Nov. 1966.
9. Beckett, A. G., Livingstone, *et al.*, *Brit. Med. J.* ii, 1113, (1961).
10. *Reviews in Food Technology*, p. 74, 12. C.F.T.R.I., (Mysore,) (1961.)
11. Hawes, *et al.*, *Food Package*, 14, (2) 22, (1953).
12. Iyengar, *et al.*, C.F.T.R.I., *Food Science*, 89, (1961).
13. Folsom, D., *Produce Package*, 2, (8), 17, (1959).
14. Ulrich, P., *Fruit d'outre Mer.*, p. 3, 404, (1948).
15. Nel., T. G., *Delicious Fruit Growers*, p. 10, 34, (1960).
16. Bester, J. J. A., *Farming, S.fiAgr.*, p. 147, 29, (1954).
17. Claypool, L. L. and Davis, L. D., *Food Technology*, p. 13, 208, (1958).
18. Davar, G. S., *Assoc. Thesis*, C.F.T.R.I., Mysore (1961).
19. Crook, *et al.*, *J. Agri. Sci.*, p. 40, 227, (1950).
20. Van Hiele, T., *Meded. Dir. Tuinb.*, p. 12, 761. (1949).
21. Amerine, M. A. *et al.*, *The Technology of Wine making*, 2nd Edn., A.V.I. Publishing Co., Inc. West Port, Connecticut, U.S.A. (1967).
22. Shankar, J. V., *Home Scale Preparation of Fruits and Vegetables*, p. 27 (14.1) C.F.T.R.I., Mysore (1962).
23. Bammi, R. K., *Prospectus and Problems of Grape Breeding in India, Indian Horticulture*, pp. 55 to 57. No. 4, (1967).
24. Capoor, S. P., *Virus Diseases of Fruits, Indian Horticulture*, pp. 64-69. No. 4, (1967).

63. GUAVA

Guava: *Psidium guajava* (B.N.); *Amrutha-phalam:* (Sans.); *Amrud:* (Hindi, Urdu, Arab., Pers.); *Jam:* (Dak.); *Sebayhannu:* (Kan.); *Jami pandu: Natu-perrakka:* (Mal.); (Tel.); *Jam rukh:* (Guj.); *Pujili:* (Ori).

Family: Myrtaceae.

Zodiac: Aquarous.

Food Value per 100g. approximately

Carbohydrate	14.5 g.	Vitamin A	Trace
Protein	0.9 g.	Vitamin B_1	30 mcg.
Fat	0.3 g.	Vitamin B_2	30 mcg.
Calcium	23 mg.	Niacin	0.2 mg.
Phosphorus	42 mg.	Vitamin C	319 mg.
Iron	1 mg.	Digesting Time	3 Hrs
Potassium	289 mg.	CALORIES	66
Sodium	4 mg.		

Constitution: Cold and Wet 1°.

Physiopharmacology and Therapeutics

Guava is extensively grown all over India and there are about 13 varieties of *white-fleshed guava* such as: *Apple colour, Behat-coconut, Chittidar, Dharwar, Habshi, Lucknow-42 and 49, Mirzapuri, Nasik, Safena, Allahabad, Sindh, and white-Supreme X Ruby.*

Red flesh Guavas are: *Ankapalle, Florida Seedling, Hybrid, Red Supreme, Kothrud, Red fleshed Allahabad.*

Among all these varieties, *White Supreme X Ruby* contains the highest concentration of *vitamin C* (319 mg. per 100 g.), but for canning *Safeda Allahabad* stands first. Next comes *Smooth Green, Lucknow-49, Chittidar* and *Habshi*[1].

Guava tree is an ever green plant and in most of the south Indian homes it is grown as a fruit giving decorative tree. About 656,110 tons of guavas are yearly produced in India.

Unripe guava is rich in *tannic, malic, oxalic, phosphoric-acid* combined with *calcium-oxalate* and *manganese*. Therefore, eating tender fruit causes intestinal colic. But chewing them is a very effective tonic for gums and teeth. It stops the bleeding from gums due to the styptic effect and richness in vitamin C. Eating an ripe fruit every day in empty stomach is a medicine for palpitation of the heart due to nervousness and anaemia.

Infusion of the tender fruits given with butter-milk is a sure remedy for simple diarrhoea, dysentery, sprue, morning sickness, chest pain due to strain on the chest muscles.

Ripe fruit is one of the cheapest source of vitamin C and each fruit supplies as much vitamin C as one gets from eating *six oranges*. The pulp emits a very pleasing aromatic flavour which makes guava a very popular fruit. Eating too much of the pulp along with seeds is bad for stomach and accumulation of pips may cause appendicitis. However, the pulp of a ripe guava mixed with milk and honey used after straining it through muslin cloth is a very effective natural vitamin C and calcium tonic and can be used during childhood, pregnancy and lactation. It gives strength and energy during the treatment of tuberculosis,

asthma, bronchitis, weakness of the heart, jaundice, hepatitis, gastric-ulcer, after operations, for painful menstruation and premature senility.

Leaves

Leaves contain more *tannins* and *oxalates*. Hence, infusion of the tender leaves mixed with a pinch of common salt is a medicine for stomatitis, ulceration of the mouth, bleeding from gums, pyorrhoea, relaxed throat etc. It is usually gargled once or twice a day as the case may be. Infusion used as a douche acts as a powerful vaginal astringent to cure leucorrhoea, relaxed walls of the vagina due to multiple births etc. Washing the prolapsed rectum in children with infusion of the leaves every day for a month is a sure non-surgical remedy in mild cases. Chewing tender leaves cures bleeding from gums, stops bad breath, and keeps the teeth healthy.

Paste of the guava leaves is applied over the face to cure pimples, and the same mixed with turmeric powder is applied as a medicine for scabies. If a teaspoon of *Ascabiol—May and Baker*, is mixed with the paste and applied over the scabies, it acts as a specific medicine for it. Washing it later with *Tetmosol-soap* (*I.C.I.*), is always advisable. Application of the same kills the head lice too. Its regular application over the body during bath stops the bad smell of perspiration.

Bark

Bark of the tree or the root also contains more tannins. Therefore, the infusion of the bark or the powder is given 5-10 grs. with water 2-4 times a day acts as a medicine for diarrhoea, dysentery, spermatorrhoea, itching of the anus, mild food-poisoning, vomiting due to high acidity in the stomach, sore-throat, bleeding piles, colds and indigestion. Taking 5 grs. of the dry powder along with a ripe guava every day is a surest remedy for the prevention of scurvy, colds and infections.

Flowers

Macerated flowers are applied over the painful conditions of the eyes due to trauma, conjunctivitis, eye-strain etc.

How to make Guava-jelly[7]

Select fresh and half ripe sound guavas and wash them in clean running cold water. Cut the fruits into small pieces with a stainless-steel knife and cover them with water adding *citric acid* 1.5-2 grs. of per kg. of fruit.

Put the vessel on the fire and bring the whole mass to boil and crush the mass with the handle of a wooden ladle while it is boiling. Strain it through a muslin cloth to separate the extract.

Add some water to the pomace (Mass) and take another extract and mix it with the previous one. Allow the mass to stand in a deep vessel for an hour and slowly decant the upper part of the liquid. Take an ounce of the juice and mix a teaspoon of spirit into it. If it clots, then it is alright with enough pectin. Add *sugar* 1.5 kg. per kg. of the juice and boil until the whole mass becomes thick. Pour it into open mouth jars after adding a little lemon colour and close the lid air tight. Use the jelly with bread or any other fruit salad to enjoy good health.

REFERENCES

1. Taotia, S. S. and Awasthi, R. K., *Studies on Varietal Suitability of Guava Fruit by Canning, Indian Food Packer*, pp. 28 to 33. Vol. XXI, No. 2, March-April, (1967).
2. *Association of Agricultural Chemists, Methods of Analysis*, 9th Edn, Washington, D.C. (1960).
3. Woodman, A. G., *Food Analysis* Published by McGraw Hill Book Co., Inc. New York, (1941).
4. Mack, L. and Tressler, D. K., *J. Biol. Chem.*, 118, 735, (1937).
5. Taotia, S. S. and Awasthi, R. K., *Indian Food Packer*, 20 (3), 10, (1966).
6. *Food Science*, Vol. 1, July No. 2, (1964).
7. Shankar, J. V., *et al., Home Scale Fruit and Vegetable Preparation*, p. 25, (1962).

64. JACK-FRUIT

Jack-Fruit: *Artocarpus-integrifolia:* (B.N.); *Shandaphala:* (Sans.); *Phanuss:* (Hindi, Urdu, Dak, Guj., Mar.); *Chakki:* (Pers); *Halsu-hannu:* (Kan.); *Pansa-pandu:* (Tel.); *Chakka-pazam:* (Mal.); *Pansa:* (Ori); *Kanthal:* (Beng.).

Family: Moraceae.

Zodiac: Scorpio.

Food Value per 100 g. approximately

Carbohydrate	26 g.	Sodium	2 mg.
Protein	1.9 g.	Vitamin A	540 I.U.
Fat	0.3 g.	Vitamin B_1	30 mcg.
Calcium	22 mg.	Niacin	0.4 mg.
Phosphorus	38 mg.	Vitamin C	10 mg.
Iron	0.5 mg.	Digesting Time	3 Hrs.
Potassium	407 mg.	**CALORIES**	110

Constitution: Hot 2°—Dry 1°.

Physiopharmacology and Therapeutics

Jack-fruit is cultivated all over India and there are many wild varieties too. However, only about five varieties of fruits are edible and are popular all over the country.

A well ripe fruit emits a very pleasant smell. Under the thorny skin, there are fleshy and juicy pericaps having hard starchy seeds in them. There will be one seed per each pericap. The fleshy pulp is sweet and aromatic and is very delicious to eat, but, eating pulp with honey and raw kernel of coconut makes it more digestible. A good quality wine can be fermented from the juice of the pericap.

Unripe, tender fruit is used as a vegetable and many side-dishes can be cooked from it. Eating uncooked fruit causes indigestion and abdominal colic.

Leaves

Infusion of the tender leaves or the roots is given for snake-bite, diarrhoea, dysentery, chest pain etc. Root juice is instilled in the nose to cure headache.

Sap

The sticky sap is applied over gladular swellings, snake bite and blood-boils. *K. M. Nadkarni*, recommends its application with vinegar for these purpose.

Wood

Wood of the jack-fruit tree is rich in a yellow chemical substance known as *morin* and *cyanomaclurin* which gives the beautiful colour. It is used to make decorative furniture.

Jack-fruit Nectar

Select well ripe juicy pericap bulbs and cut into long thin stripe-like pieces removing the seeds. Boil them in half of their weight water until they are soft. Then mash them to make a fine pulp. Strain it through a fine sieve and rub the pulp again to make it soft.

Prepare sugar syrup or mix it with golden syrup twice the bulk of the juice; adding some water, *citric acid* 30 grs. and *potassium metabisulphite* 17 grs. per kg. of the finished product. Preserve it in air tight jars. It is a delicious and nutritive cool drink. (Shankar *et al.*).

Jack-fruit Jelly

A good quality jelly can be made from the waste of the jack-fruit comprising the prickly rind and the inner undeveloped bulbs. These contain a very high concentration of pectin which is the base of all kinds of jellies. All the parts of the fruit are cut into small bits and are boiled in water and a clear yellow extract is taken. To this juice 1 kg. of sugar, 7.5 grs. of citric acid per litre of the juice is added. Then it is cooked for an hour or until the syrup begins to thicken. Hot fruit syrup is poured into jars and let it to set into a fine yellow looking jelly. (Shankar *et al.*, C.F.T.R.I., Mysore).

65. JAMBUL FRUIT

Jambul Fruit: *Eugenia-jambolina:* (B.N.); *Jambu:* (Sans.); *Jaman:* (Hindi, Urdu, Dak.); *Naga-pazam:* (Tam.); *Narda-pandu:* (Tel.); *Nairle-hannu:* (Kan.); *Jambool:* (Mar., Guj.); *Jamo-koli:* (Ori.); *Kallo-jam:* (Beng.); *Lambool:* (Hill tribe language).

Family: Myrtacae.

Zodiac: Taurus.

Food Value per 100 g. approximately

Carbohydrate	19.7 g.	Phosphorus	10 mg.
Protein	0.7 g.	Iron	1 mg.
Fat	0.1 g.	Digesting Time	3 Hrs.
Calcium	20 mg.	**CALORIES**	83

Constitution: Wet and dry 1°.

Physiopharmacology and Therapeutics

Jambul fruit grows wildly all over India and its big trees are planted on high ways. There are two varieties of Jaman the big one is oval *Suva Jaman* and the small one is round in shape is commonly called as *Kutta-jaman.*

Both the types of fruits contain more or less the same chemicals except the sweetness which is more in the bigger kind and the smaller ones are more concentrated in *oxalic acid* and *tannic acid.* Harvest of the fruit is during monsoons.

Unripe fruit is green and contains more tannic acid, hence, its infusion can be used as a styptic lotion to control bleeding and can be gargled with a pinch of salt in sorethroat, stomatitis, etc. Lotion can be used as a douche to cure leucorrhoea and vaginitis. Powder of the tender fruits 5-10 grs. with butter-milk is a specific remedy for dysentery and diarrhoea.

Ripe fruit is black outside and violet inside having a greenish yellow seed. Pulp is sourish-sweet and is astringent. Due to this property, jaman fruit and its syrup is used as a specific remedy for diarrhoea and dysentery from ancient times. Recent researches show that jaman-fruit has some blood-sugar reducing quality and therefore, its regular use is advised for diabetics. Natural acids in the fruit act on the stomach and increase the digestive power. These acids play a major role in the secretion of digestive enzymes and stimulate the liver functions. *Charaka,* used jaman-fruit in the treatment of enlargement of the liver and the spleen. A glassful of fresh jaman juice taken with honey is a very cooling and refreshing drink to quench thirst in summer and in fevers. It is a very effective medicine for strangury, scanty urination, bleeding piles, burning in the feet and the soles, sleeplessness and burning in the eyes. It exerts a tonic effect on the heart and nerves. Excessive use of the fruits is bad for throat and chest. It causes cough and accumulation of sputum in the lungs. Eating the fruit with *pepper* and *salt,* prevents from the harmful effects.

A very useful iron-salt can be prepared from the fruit-juice in the following manner:

Take a litre of fresh jaman—preferably of the smaller variety;

and put it in a glass or earthen vessel. Put a handful of washed iron-fillings in the juice and cover the mouth of the vessel with cloth and keep the vessel in sun for about two hours daily. Pour fresh juice after a week and continue the same process for another 3 weeks. After the juice is evaporated completely, scrape off the residue and grind it into a fine powder. Preserve it in a clean dry bottle. This preparation is a wonderful iron-salt in the form of *Ferrous Oxalate.* Five to ten grs. of this salt with *honey* or any fruit juice or *butter-milk;* given 2-3 times a day after meals, is a very effective iron-tonic in all types of iron-deficiency anaemias. Like other chemical iron salts, it is not a gastro-intestinal irritant and requires lesser quantity for its therapeutic purpose. It is observed that by using this iron-salt, haemoglobin rises quicker than other iron-salts such as : *Ferrus sulphate, Ferrus gluconate* etc.

Dhanavanthra the most celebrated physician of the ancient India states that administering Jaman-iron about 5 grs. mixed with a teaspoonful of *honey* and a teaspoonful of fresh *amla juice* or *pink-rose flower* juice 3 times daily for a month or two is a sure remedy for all kinds of general weakness caused by blood loss either due to severe menstruation, or due to childbirth, abortion and other minor injuries. Its regular use is an invaluable tonic to increase sex-vigour, new-blood, new-life and energy. It also prevents malnutrition, increases life's span and keeps one healthy, happy and strong.

Pandit Chandrabhan Singh of Mysore, recommends, *Jaman-iron 10 grs.* twice a day with honey 1 teaspoon and *fresh karela juice 1 oz.,* a specific remedy for diabetes. *Hakeem Mohiddine Khan of Mysore,* says, that *Jaman-iron* is a specific in the treatment of swelling of the body due to anaemia or due to liver disorders. He uses *Jaman-iron 15 grs.* twice a day with *goat's fresh liver juice,* extracted after it is roasted over charcoal-fire. He says, that he is using this medicine from 50 years with gratifying results. Its regular use helps the prevention of pre-mature greyness and fall of the hair, impotency, weakness of the liver, heart and brain. The same preparation used during pregnancy eases child birth and helps the baby to grow healthy and beautiful. In the treatment of tuberculosis and rheumatism, *Hakeem Khan* uses the same iron along with *3 cloves of fresh garlic, honey* and *ass-milk.* He has number of praising letters from the tuberculosis of patients who had recovered as long as 10 years ago. On his advice I tried this

, medicine in number of cases in early stage of tuberculosis and found it to be effective, but, it requires about 2-3 months to get the desired effect. With effective medicines such as *Streptomycin, I.N.H., P.A.S.* etc., supplementing *Hakeem Khan's* medicine not only is an ideal way of speeding up the treatment but also preventing its relapse. We also use chemical *iron-salts* and *calcium* as a routine tonic during the treatment of tuberculosis to prevent iron-deficiency caused by malnutrition and toxaemia. However, the superiority of *ass-milk* is attributable to its highly soluble *calcium* and from the ancient times it is being used as a milk-medicine to heal the ulcers in the lungs. Except in serious toxaemic open cases, after a course of streptomycin injections *Jaman-iron 10 grs., ass-milk 2 oz.*, mixed with cow's milk and *Niazone—T.C.F. or Isozone-Forte—Pfizer* one tablet or taken once daily with a monthly check up by a physician is a very cheap and effective domicillary treatment for tuberculosis.

Leaves

Leaves contain a high concentration of *gallic* and *tannic acid.* Due to the astringent effect of these acids, the infusion of the tender leaves 1-2 ounces twice or thrice daily is given as a medicine in dysentery, diarrhoea and bleeding piles. Infusion of the fresh leaves (tender), is given along with *honey* or *butter-milk* as a specific remedy for sterility and miscarriage due to ovarian or endometrium functional disorders. Perhaps the leaves may stimulate the secretion of *progestrone hormone* and help the absorption of *food-vitamin E.*

Fresh leaf-juice, applied under the arm-pits acts as a deodorant by inhibiting the growth of smell causing germs. Juice applied over scorpion sting is found to be effective. A cupfull of tender leaf juice is given as an antidote for snake-bite.

Chewing fresh tender leaves, stops bad breath, bleeding from gums and keeps the teeth healthy and strong. Water in which tender leaves are boiled is used as a gargle to cure sore-throat, relaxed uvula and the same is douched to cure leucorrhoea.

Bark

Infusion of the fresh bark is an effective medicine for bleeding from nose, mouth and lungs. A cupfull of the infusion

given with honey is a medicine for diarrhoea and dysentery. It is gargled to cure ulceration of the mouth and toothache.

Ash of the bark is mixed with *coconut-oil* and is dressing for burns and scalds. With *vinegar*, ash of the bark is applied over sprains, dislocations and other glandular swellings.

Seeds

Seeds contain *jambolin* and *ellagic acid*. From ancient times the powder of the seeds dried in the shade is used to cure diabetes, diarrhoea, dysentery. It is given 5-10 grs. with *karela juice* or plain water thrice a day to reduce blood sugar.

REFERENCES

1. Majeed, S. A. *Tibbe-Rahamani*. (Mans.). (Urdu.).
2. Maharaj Dhanavanthra. *Medicinal Bits*. (Sans: Mans.).
3. Nadkarni, K. M. *Indian Materia Medica*. Vol. 1.
4. Swamy Siva Kumar, *Arogya Darpana* (Kan. P.M.).
5. Sikand, *Ind. TB., JI.* 11, 38, 1963.
6. WHO, 8th *Technical Report*, 290, 14, 1964.

66. CITRUS FRUITS

Fruits which contain *Citric acid* are known as *Citrus fruits*. These fruits are very popular all over the world for their taste and health giving property due to the presence of the most wonderful *VITAMIN C*. The health giving quality of these fruits is also attributed to the chemical change of *acid citrates* of the citrus fruits into *alkaline-carbonates* in the body. On taking sufficient quantities of these fruits the acidic urine becomes alkaline and neutralization of *uric acid* takes place in the body. The common citrus fruits are: *Lime, Lemon, Grape-fruit, Pomelo, Giant-lemon, Orange, Tanjurine, Sweet-orange, Bitter-orange, etc.* All citrus fruits produce allergic manifestations if one is sensitive to them. BENDERSKY, and his associates state that simple to serious allergic-anaphylactoid reactions such as; *rhinitis, shock* etc., can occur even if oranges are given to sensitive persons. Persons who complain of cold like running nose after taking any one or more of the citrus fruits should be considered as sensitive to citrus fruits and they are advised to be careful in using them in excess. All citrus fruits belong to a single family *RUTACEAE* or *Aurantiaceae*.

67. LIME

Lime: *Citrus acida:* or *aurantifolia* (B.N.); *Jambha:* (Sans.); *Kagazi-lemoo:* (Hindi, Urdu, Dak. Arab., Pers.); *Nimbay-hannu*; (Kan).; *Elumichhai-pazam:* (Tam.); *Nimma-pandu:* (Tel. Mal.); *Limbo:* (Mar.); *Lembu:* (Ori.); *Nimboo* or *Niumb:* (Guj.); *Cherunarkan, Samyasi:* (Burm.).

Family: Rutaceae.

Zodiac: Virgo.

Food Value per 100 g. approximately

Carbohydrate	9 g.	Copper	0.26 mg.
Protein	1.5 g.	Vitamin A	Trace
Fat	0.2 g.	Vitamin B_1	20 mg.
Calcium	107 mg.	Vitamin B_2	2 mcg.
Phosphorus	207 mg.	Vitamin B_6	0.6 mg.
Iron	0.25 mg.	Folic acid	7 mg.
Potassium	163 mg.	Niacin	0.2 mg.
Sodium	6.5 mg.	Pantothenic acid	0.20 mg.
Sulphur	12.3 mg.	Vitamin C	63 mg.
Magnesium	11.6 mg.	Digesting Time	1½ Hrs.
Chlorine	5.1 mg.	**CALORIES**	41

Acid Base Balance./100 g.c.c N/10 Alkali 85.

Constitution: Cold 2°—Wet 1°.

—Physiopharmacology and Therapeutics

Limes are grown all over the world in temperate zones and several varieties are indigenous to the Himalayas. About 64,406 and 350,683 tons of lemons and limes yearly are grown all over India for their food and medicinal value. Many persons get confused and think that a *lime* and a *lemon* (citrus limonem) is the same, but it is not true. The difference between a lime and lemon is; that lime is round, smaller, has thin skin and sweet smell and contains less juice than the lemon. The shape of a lemon is oval, the skin is thicker and contains more juice. It is

suitable for *pickles*, *squash*, *syrup*, *cordial*, *jam*, *jelly* and *marmalade*. Though the chemical composition is more or less the same in both the types, but still, *lime* is mostly used for medicinal purposes.

Fresh lime-juice contains *citric*, *malic*, and *phosphoric acid*, also it contains *citrates of potassium*, *non-reducing sugars* and *other bases muscilage* and *ash*. *Lime peel* contains a very sweet smelling volatile oil, *hesperidin* and *citrin:* A bitter crystalline glycoside mostly found in the rind. Hesperidin is sparingly soluble in *boiling water* and *ether*, but is readily soluble in *hot acetic acid* and in other *alkaline solutions*. In its soluble form it functions as *Rutin* or *Vitamin P*.

Fresh lime-juice is being used in medicine from hundreds of years in India. In *Vedas*, lime is considered as a sacred fruit and even today one does not miss a lime in both happy and mourning ceremonies. Cutting limes after reciting certain religious hymns or *manthras* is considered as a most powerful means of driving the evil spirits and breaking the spell of black magic. *Charak* and *Sharangdhara* of the ancient India have mentioned about the curative value of limes in various diseases of bones and joints. *Aviceena*, the Persian Glen, says, that lime rectifies the Humourous disorder of *Bile* and cures all the bilious diseases. Adding *honey* to fresh lime-juice counter-acts its bad effects in the body. However, the scientific value of lime came into light only after the investigations of *James Lind*, who treated *scurvy* on the ship with fresh limes.

Lime-juice taken internally, enters the blood as *alkaline citrates*, *potassium salts* and *phosphoric acid*. Later, *citrates* are oxidized into *carbonic acid* and *water*. The presence of *vitamin C*, *potassium salts* and *phosphoric acid* helps the absorption of food-iron and increases haemoglobin in the blood. The alkaline salts of the juice neutralize the free *uric acid* and precipitate it. Therefore, excessive use of lime-juice is found to cause the formation of renal calculi. But moderate use acts on the calculi and dissolves them. Lime-juice is supposed to dissolve the waste products in the body and hence it is used in the treatment of fatty degeneration of arteries. *Citric acid* acts as natural antiseptic and kills the germs in the stomach.

Juice of a fresh lime mixed with six teaspoonfuls of sugar in a glass of ice-cold water is one of the most pleasant cool-drink

when one is intensely thirsty either due to high fever or due to manual work in summer. It is a very agreeable drink to increase appetite and to stop the feelings of nausea and vomiting in pregnancy or in indigestion of the food. It cures the bleeding tendencies, piles, dysentery, enlargement of spleen etc.

A fresh lime squeezed in a glass of warm water with four teaspoonfuls of *honey* and a quarter teaspoonful of *Common salt* is sipped in acute tonsillitis with very gratifying results. It checks the formation of crystalurea due to excessive use of sulpha drugs. A glassful of the same taken every night regularly is the most wonderful natural preventive medicine for common cold, influenza, habitual constipation etc. Sucking lime-juice immediately, dissolves the sticking fish bone in the throat. Eating food with lime-juice, prevents indigestion, biliousness and kills the harmful germs in the food.

A teaspoonful of fresh lime-juice mixed with equal quantity of *honey* is licked to stop bilious vomiting, indigestion, burning in the chest due to high acidity in the stomach, excessive accumulation of saliva in the mouth etc. Adding a pinch of common salt and *sodium bicarbonate* to lime-juice and massaged it over the teeth and gums, cleans teeth and stops the bleeding from the gums due to scurvy or pyorrhoea. Its regular use as a dentifrice is advised to prevent oral diseases. Excessive sucking fresh lime is bad for teeth, because the acid damages the delicate enamel of the teeth and makes them sensitive. Excessive use of limes weakens digestion and impoverishes the blood.

A fresh lime boiled in water for half an hour to make its skin soft and the juice is mixed in a glass of warm water with a teaspoonful of *malt vinegar*, a pinch of *salt* and a tablespoonful of *honey* is sipped with gratifying results during the treatment of broncho-pneumonia, common colds, bronchitis, asthma, tonsillitis, pharyngitis, laryngitis, relaxed uvula, burning in the throat etc. It builds the body's own natural defence and reduces the duration of treatment.

A teaspoonful of lime-juice is put in six ounces of boiling water. After cooling, two ounces of it is given every two hours to stop burning and bleeding in cystitis or pyelitis.

A fresh lime squeezed into a *tender coconut* and the water is given during the treatment of typhoid, nausea and vomiting,

particularly in children due to round worms. It acts as a specific medicine and expels the worms via mouth. For scanty urination due to congestive heart failure, nephritis, toxaemia of pregnancy, hypertension, cystitis, pyelitis, etc., giving fresh lime-juice one teaspoonful in a glassful of *cucumber juice* or *tender coconut water* or *carrot juice*; once or twice a day causes profuse urination and reduces the swelling. Fresh lime-juice 2 to 4 teaspoons mixed with *butter-milk* or *water* is given as a specific antidote for *Coroton seed* poisoning.

Juice of a fresh lime, mixed with a pinch of *common salt* stirred in a glassful of *aerated water* is drunk as a specific remedy for indigestion, belching of sour eructations, excessive thirst during summer and after heavy non-vegetarian food, nausea and vomiting due to biliousness, colic due to indigestion and accumulation of gas in the intestines etc. (A. Taj.)

A teaspoonful of lime-juice mixed with equal quantity of fresh *white onion juice* and *Borneo natural camphor* 1 gr. is given 3-4 times as a specific remedy in cholera, food-poisoning due to salmonella infection dysentery etc., without camphor, the same medicine is also given for enlarged spleen and liver, malaria etc.

Fresh juice of a lime mixed with a glassful of cold water sweetened with pure *old honey* is taken every morning in empty stomach for a couple of months to reduce the weight. Of course, one should eat *low calorie-food* to get the desired result. A lime squeezed in six ounces of *sheep's milk* is given as a medicine for dysentery and diarrhoea.

A teaspoonful of lime-juice mixed with water and a pinch of *sodabicarb* is given as a most effective medicine to reduce the acidity in the stomach and as a powerful carminative in case of indigestion. Due to release of *carbonic acid* gas a marked sedative effect is produced in the stomach. Sugared juice of two limes in a glassful of water taken daily stops formation of calculi, excretes spontaneously if they are small and the treatment is 50 per cent effective.[4]

Externally, fresh lime-juice is medicinally used to cure scorpion sting. Put a crystal of *potassium-permanganate* on the place where the scorpion has stung and put a drop of lime-juice over it and wait for ten minutes and see how quickly it cheers him up. Plain juice applied over the exposed parts protects one

from the mosquito-bite. A tea spoonful of the fresh juice mixed with a pinch of powdered *sulphur* is applied over scabies as a specific medicine. Few drops of warm lime-juice diluted with water are instilled in the ears to stop pain and in the eyes to cure conjunctivitis. Its regular use with pure *rose water* (1:4) is said to prevent old-age Cataract. Application of lime juice over the shaved head and bathed daily in cold water cures insanity, hysteria etc. A complete examination by a physician should be done before starting this treatment. Persons with hypertension are contra indicated for this treatment.

Lime-juice can be used as a best cosmetic. Squeeze a fresh lime in a glassful of *whole milk* which is fully boiled. Add a teaspoonful of *glycerine* in it. Leave it for half an hour and then apply the milk on your face, hands and feet. Let it dry and go to bed without washing it. Repeating it every might helps one to look young and beautiful. The same milk can also be applied to cure cracked and chopped soles and palms, pimples, freckles, dryness of the face and hands, to protect the face from hot and cold winds, sun-burn etc. If one is interested to keep the hair healthy, soft and long add few drops of fresh lime-juice in a tumbler of warm water and rinse the hair with this water after shampooing. Massaging few drops of lime-juice with amla-juice every night before going to bed, stops hairfall, cures dandruff, lengthens hair and prevents premature greyness etc. Rubbing lime juice over the scalp before taking bath is a useful beauty aid. Regular application of lime juice over discoloured and rough skin, bleaches and softens it. Its application on nails, prevents brittleness and makes them look healthy and beautiful.

Lime juice can also be used as a safe and simple hair remover by mixing it with melted sugar and applied over superfluous hair. Fresh-lime juice can also be used in place of waxing. Drinking the juice of fresh-lime juice with a glassful of *butter-milk* early in the morning regularly is a very effective *beauty-tonic* and adds youthful years. Squeeze half lime in a cup and put the required *castor oil* and then squeeze other half lime over the oil. Drink it early in the morning. It is a safe purgative for pregnant women in the last months. It masks the taste of castor oil and prevents the sick feelings.

Lime-juice can be used to remove ink and other stains from clothes and to clean the kitchen utensils.

Mix a teaspoonful of lime juice with equal quantity of *castor oil* and rub it over the painful joints to reduce pain and stiffness. At the same time drink a teaspoonful of juice in a cupful of warm water with *honey*. It reduces the *uric acid* in the blood and relieves the stiffness and tenderness of the joints. Massaging the whole body with the same oil and giving the juice internally in warm water increases the superficial blood circulation and reduces the blood pressure. However, care and advice of a physician is always necessary in the management of a hypertensive patient.

Rubbing lime juice in between the palms and taking a teaspoonful of juice mixed with a ripe banana and honey, is found to be a very effective and harmless food-medicine to cure jaundice, dysentery, diarrhoea, colitis, and piles. On the recommendation of Dr. K. C. Mehta, M.B., B.S. of Bombay, I tried lime with *banana* in dysentery, diarrhoea and piles, with very gratifying results. Rubbing a cut lime over the blood boils helps them to subside.

Cotton or sponge tampoon dipped in a teaspoonful of lime juice with a pinch of common salt can be inserted in vagina before half an hour of conjugal union is a safe home contraceptive.

Lime-Peel: (*Lemonis cortex, B.P.*)

Fresh yellow lemon or lime-peel is rich in a volatile oil *hesperidin*. The pleasing smell of the peel is due to the oil. According to *Aviceena*, smelling of a fresh ripe lime creates a pleasing sensation, strengthens heart, cures hysteria and palpitation. The inner surface of the lime is rich in *pectin*. Rubbing fresh peel over pimples cures them permanently. Fresh peel steeped in alcohol with a few drops of *Mysore-sandal oil*, forms a pure *Eu-De-Colone*. Leaves and blossoms can also be added along with the peel to make it more fragrant. Peel boiled in *til-oil* is a good liniment to cure painful conditions of the joints. A piece of lime-peel kept in clothes prevents from moths.

Discarded lime peel after removing the juice; is burnt and 2 to 7 grs., of ash is given 2 to 3 times daily to cure nausea and vomiting. Tasty marmalade can be made from fresh lime-peel.

Oil of Lemon: (*Oleum-Limonis, B.P.*)

Oil of lime or lemon can be extracted from fresh peel. It contains *Terpenes, d-limonene, l-limonene, Pinene, Sesquiterpene*

and traces of *Phellandrene*. The pleasing smell of oil is due to the presence of oxygenated constituents like: *Aldehyde citral, Citronellal, Geraniol, Geranyl acetate* etc.[9] Oil is also rich in *Stearoptene* from which yellow and white crystalline substances are isolated.

Oil is chiefly used for flavouring purposes. Giving a drop of lemon-oil with a pinch of *soda-bicarb* acts as a carminative in acid indigestion.

Leaves

Leaves contain a volatile oil and tender leaves ground into a paste and boil-in *til-oil* is usually used as an analgesic liniment. It is massaged over the painful joints, muscular pains, sprains etc., with excellently good results:

A handful of tender leaves are finely ground into a paste and is mixed with *ghee* or *butter*. The mixture is left overnight and is heated to clarify the butter. The resulting butter-oil is kept in airtight bottle and is used as a liniment for rheumatism, sprains and neuralgia.

A tablespoonful juice of the tender leaves mixed with equal quantity of *honey* is given internally to remove round worms.

Application of the tender leaf paste with a pinch of *turmeric powder* over the face, cures pimples, increases the complexion, softens the skin and makes it look lovely.

Seeds

Seeds are bitter, and when used orally cause dryness and heat in the body. Paste of the dry seeds or the root is applied as a cure for scorpion and other venomous bites and stings. Dry powder 5-10 grs. with water is also given for the same purpose. Roasted seeds with pepper and salt is a medicine for cholera[8].

How to prepare and preserve Lime-juice[6]

Select fresh and sound limes and wash them in cold water. Wipe them with clean cotton cloth and cut them into halves with stainless steel knife.

Extract juice with the lime-squeezer and strain through a fine cloth. Prepare a thick syrup from clean sugar double the weight of the juice and add the juice into the hot syrup. Add

potassium metabisulphite 10 grs. to each pound of the juice, by dissolving it in a little hot water. Add little *lemon-yellow colour* and few drops of the *lemon essence* (Bush) to the mixture; stir it well with a wooden ladle and fill it in sterilized clean bottles with air tight corks. Use it by diluting the juice with three parts of water and enjoy the healthy drink.

How to prepare lime-barley water[6]

Extract fresh lime juice and add equal quantity of *barley extract* which is made as follows:

Mix about 1 oz. of barley flour with some water and make it into a thin paste. Keep on adding water little by little while stirring until one pound of water is used. Heat the mixture over the gentle fire so as to disperse the barley flour. Cool the mixture and strain through a cloth.

To the mixture of barley extract and lime juice add 2½ lb. of sugar and mix it well and warm it gently. Add *potassium metabisulphite 5 grs./1 lb.* of the mixture. Preserve it in sterilized bottles and store in cool dry place.

Lime in vinegar

Select fresh and well ripe limes and wash them in hot water and wipe them. Pierce them with a wooden sharp stick and puncture each lime in many places. Put them in a jar and pour pure *malt-vinegar* (Mohan's) up to the neck of the jar and cork it tightly. Put the jar in sunshine every day for a month and then use it with a pinch of salt and pepper. Eating a piece of it with food, acts as a very good appetizer, prevents indigestion, rancid eructation etc. A piece sucked with honey is a medicine for morning sickness, bilious nausea and vomiting, diarrhoea, catarrhal jaundice etc.

With all these food and medicinal value, lime is praised by Dr Reddie Mallet, '*If medicinal values of limes were only realised, mankind would raise altars to the precious fruit and worship it.*' *Also Wilheim Schole* of Germany says, *If sufficient number of limes are taken daily; life may be indefinitely prolonged. It is a genuine Elixir Of Life.*

Dr K. C. Mehta says, 'The common acid lemon fruit is a cheap fruit with extraordinary potentialities as a therapeutic agent and

so deserves greater attention from both the patient and the physician'.

REFERENCES

1. Bendersky, G. and Lupas, J. A., *Journal Amer. med. Ass.*, 173, 255, (1960).
2. Kishor C. Mehta, *Health*, Madras, Vol. XXIX, No. 11, Nov. 1951, 246.
3. Muzafar Hussain IVAN., *Kitabul Mufaredath.* 3rd, Edn., pp. 456-57, Shaik Ali & Sons, Publishers, Kashmiri Bazzar, Lahore (Pakistan). (Urdu).
4. Unichem *Medical Notes*, p. 21, No. 3, (1961).
5. Nadkarni, A. K., *Indian Materia Medica*, p. 347, 3rd Edn.
6. Shankar, *et al.*, *Home Scale Preparation of Fruits & Vegetables*, pp. 6-7 (1962).
7. Mathur, R. C., *Systematic Botany*, p. 224, 5th Edn. (1965).
8. Majeed, S. A., *Tibbey-Kareemy*, Urdu MSS.
9. *British Pharmaceutical Codex.*, p. 703, (1911).

68. GRAPE-FRUIT

Grape Fruit: *Citrum Parodisi:* (B.N.)

Food Value per 100 g. approximately

Carbohydrate	5.5 g.	Magnesium	10.4 mg.
Protein	0.7 g.	Chlorine	1.3 mg.
Fat	0.5 g.	Copper	0.06 mg.
Calcium	17.1 mg.	Vitamin B_1	40 mcg.
Phosphorus	15.6 mg.	Vitamin C	63 mg.
Iron	0.26 mg.	Oxalic acid	3.4 mg.
Potassium	234 mg.	Digesting Time	1½ Hrs.
Sodium	1.4 mg.	**CALORIES**	24

Acid Base Balance. /100 g.c.c. N/10 Alkali 64.

Constitution: Cold 1°—Wet 2°.

Grape-fruit is a very delicious fruit like our pomelo originated in West Indies. It is mostly used in making squashes wines and cordials. Its juice contains plenty of vitamin C and potassium, hence it can be used as a medicinal beverage in scanty urination due to liver, heart and kidney disorders and in vitamin C deficiencies.

69. POMELO

Pomelo: *Citrus decumana:* (B.N.); *Madhukarkati* or *Madhuramlaphala:* (Sans.); *Chakotra* or *Shaddock:* (Hindi, Urdu, Dak., Pers., Puj.); *Sakotra-hannu:* (Kan.); *Bombolinos:* (Tam.); *Edapandu:* (Tel.); *Kumle-naranga:* (Mal.); *Botar or naranga-limboo:* (Beng.); *Latapilimba:* (Ori.); *Chakvan:* (Sind.).

Family: Rutaceae.

Zodiac: Virgo.

Food Value per 100 g. approximately

Carbohydrate	10 g.	Vitamin A	230 I.U.
Protein	0.7 g.	Vitamin B_1	30 mg.
Fat	0.4 g.	Niacin	0.4 mg.
Calcium	30 mg.	Vitamin C	25 mg.
Phosphorus	30 mg.	Digesting Time	2 Hrs.
Iron	0.4 mg.	**CALORIES**	**40**

Constitution: Cold and Wet 2°.

Physiopharmacology and Therapeutics

Pomelo is cultivated all over India for its valuable commercial and medicinal value. It is habitant of Batavia, Malaysia and Java. There are two varieties of Citron: the pink and the creamy white. *Devanahalli* the birth place of *Tippu Sultan* in Bangalore District is very famous for delicious pomelos.

Both the varieties are rich in *reducing* and *non-reducing sugars* between 1.77 to 3.22 per cent and 4.5 to 5.44 per cent respectively. It also contains 1.15 per cent *Citric acid.*

Ripe fruit is sweetish-sour and cooling. Sugar-candy counteracts its cooling effects in the body. Eating a ripe fruit with salt and pepper increases hunger, pours out more saliva on the food, secretes more bile, quenches thirst, tones up heart and liver and cures biliousness. A glassful of fresh juice mixed

with *sugar-candy* once or twice daily is given along with suitable treatment to hasten the recovery from liver disorders like: jaundice, hepatitis, cirrhosis, liver abscess etc. A table spoonful of juice mixed with equal quantity of *honey* sucked in the morning is a very effective medicine for morning sickness, giddiness, urticaria, pyrosis, hiccough, dyspepsia, bitterness in the mouth, indigestion etc. Eating unripe fruit causes throat irritation and cough.

Peel

Peel of the fruit is used in making tinctures and perfumery. Its marmalade is a bitter tonic used in the treatment of bilious disorders and chronic dyspepsia. Fresh peel is rubbed over face to cure pimples, black-heads and dryness of the face. It increases the complexion and prevents early appearance of wrinkles.

Seeds

Seeds are bitter and one or two are used to kill intestinal parasites by giving them in one ounce of *pomegranate* bark juice; followed by an ounce of castor oil.

Leaves

Leaves and flowers are used in making tinctures for blending perfumes. A handful of tender leaves boiled in a glassful of water for half an hour and an ounce of it is given three to four times a day with honey in cholera, whooping cough, epilepsy etc. (A. K. Nadkarni).

70. ORANGE

Orange: *Citrus-reticulata:* (B.N.); *Naranga:* (Sans.); *Sangtra:* (Hindi, Urdu, Panj.); *Kitelay-hannu:* (Kan.); *Kichili-pazam:* (Tam.); *Naranga:* (Mal.); *Kamala:* (Beng.).

Family: Rutaceae.

Zodiac: Aquarious.

Food Value per 100 g. approximately

Carbohydrate	6.4 g.	Vitamin A	350 I.U.g.
Protein	0.9 g.	Vitamin B_1	120 mcg.
Fat	0.3 g.	Vitamin B_2	60 mcg.
Calcium	50 mg.	Vitamin B_6	0.3 mg.
Phosphorus	24 mg.	Folic acid	5 mg.
Iron	1 mg.	Niacin	0.3 mg.
Potassium	197 mg.	Pantothenic acid	0.25 mg.
Sodium	2.9 mg.	Biotin	1 mg.
Sulphur	9.8 mg.	Vitamin C	68 mg.
Magnesium	13 mg.	Oxalic acid	8.7 mg.
Chlorine	3.2 mg.	Digesting Time	1½ Hrs.
Copper	0.07 mg.	**CALORIES**	**30**

Acid Base Balance/100 g.c.c. N/10 Alkali 61.

Constitution: Cold and Wet 3°.

Physiopharmacology and Therapeutics

Orange is an universal fruit eaten all over the world for pleasure and health. There are many varieties of oranges such as: *Loose-skin orange* (Citrus-reticulata or mandarin); *Tight-skin orange* (Citrus-sinesis) and *sour-orange* (Citrus-aurantinum).

In India, loose-skin orange is very popular and it is abundantly grown in Assam, Coorg etc., where there is heavy rainfall. In western countries, the tight skin orange is very popular.

Orange juice contains vitamin C, iron, potassium etc., with 3-5 per cent of reducing and non-reducing sugars. The sour taste is due to the presence of citric acid which varies in different types of oranges.

Among all the fruit juices, orange juice is suitable for all ages and can be safely given in all kinds of diseases. Particularly in fevers like: typhoid, tuberculosis, measles etc., orange-juice is the most ideal liquid food to give energy, to increase urinary output and to increase body resistance against infections and to hasten recovery. Though orange is a cheap fruit in our country, but still, majority of the people consider it to be a fruit for the sick and are not much interested in eating daily. It is proved beyond any doubt that regular use of oranges prevents one from frequent attacks of common cold, influenza, and bleeding tendencies, keeps healthy, strong and helps one to live long.

In the body orange juice acts as a diuretic, heart-tonic, controls the secretion of bile, gives a cooling effect and reduces the blood acidity.

In heart diseases, I have been using orange juice sweetened with *honey* from past several years with very gratifying results. Some practitioners hesitate to give orange juice in acute cardiac emergencies like: coronary ischaemia, infraction etc., thinking that vitamin C may increase blood coagubility. There is absolutely no relationship of vitamin C in blood coagubility during cardiac emergencies as confirmed by Russian cardiologists. (For detail read vitamin C section in this book). In such cardiac conditions when only liquid-food is advisable, giving orange juice with honey is a very safe energy giving liquid food. Diabetic heart patients must use honey and orange juice under the care of a physician.

A glassful of orange juice mixed with a pinch of *salt*, a tablespoonful of *honey* is usually given with very good result in tuberculosis, asthma, common cold, bronchitis, and other conditions of cough associated with difficult expectoration. It eases expectoration due to its saline action in the lungs and protects from the secondary infections. Juice taken with a little *pepper* and *salt* acts as a medicine for indigestion due to fatty foods, nausea and vomiting due to excessive bile. It is a medicine for bleeding piles, excessive thirst due to non-vegetarian food and fevers.

Juice mixed with a glass of *tender coconut water* is a very valuable natural diuretic in all conditions of scanty urination, dropsy, nephritis, cystitis, pyelitis, gonorrhoeal and non-specific urethritis, painful micturation due to high acidity of the urine etc.

Orange juice in Sports and hard labour

Punjabi Wrestlers usually take a handful of roasted walnuts, or drink a glassful of fresh orange-juice, just half an hour before the wrestling match. They also eat unleavened bread prepared from the flour of germinating wheat along with honey daily. They believe that after drinking orange juice with honey and eating the bread helps them to develop resistance against getting early exhaustion and tiredness, and every wrestler in Punjab knows this secret from past several decades.

Knowing that orange juice and wheat germ is rich in vitamin C and E, I tried *Redoxon-Roche* 1g. (vitamin C) and *Ephenyl-Roche* 50 mg. (vitamin E) with a glassful of orange juice sweetened with honey in various sportsmen half an hour before commencing the sports. It is noted that persons who were given this recipe felt greater strength and they did not suffer from much tiredness and body pains that is usually common after the second day. Encouraged by this result, I have been using this medicine for more than eight years now with very gratifying results.

Administration of vitamin C, E and honey prevents the rupture of blood capillaries, detoxicates and excretes the pain causing acids due to diuretic action of orange-juice. Vitamin E plays a major role in increasing oxygen intake and honey supplies quick energy to heart and other muscles along with Oxygen. SYED *et al.*, recommends the use of vitamin C 500mg. immediately after any manual work and its repetition daily for two more days. It is useful in preventing the tiredness and mylagia thus caused.

Drinking orange juice regularly is a natural shield against all the diseases caused by vitamin C deficiency. Giving a teaspoonful of fresh orange juice once or twice daily after the first week of the child's birth, helps the baby to grow smoothly and prevents from the gastro-intestinal disorders. Supplementing orange juice during the entire period of pregnancy not only eases labour but also prevents the mother and baby from post-natal infections.

Crowned with all these health giving qualities ORANGE is praised as *a boon to humanity*. (Dr. Albert Broad Bent).

Oranges can be kept fresh by packing them in polythelene perforated bags having 64, $\frac{1}{4}''$ holes per 5 lb. at 70°F[4,6,7,9]. Orange segments can also be canned[12-20].

Peel

Orange-peel is rich in certain volatile oils like: *Terpine, iso-hesperidine, turpentine, dextro-rotary limonene, aurantimarin* and other glucosides like *hesperidium* etc. The peculiar smell of the orange is attributable to these oils. Due to the pleasing smell of the orange, the peel is used in the extraction of orange oil which is chiefly used as a flavouring agent and as a fixer in perfumes.

Peel rubbed over the face is a cosmetic to improve the complexion. Using it regularly before going to bed, cures pimples

and black heads. Peel is also rubbed over chronic skin diseases like: psoriasis, dry eczema, senile-itching, scabies etc.

Decoction of the peel 3 teaspoonfuls mixed with a glassful of lemonade; taken in empty stomach acts as a bitter-tonic in chronic dyspepsias and indigestion. It cures morning-sickness, hysteria, common cold, anaemias, chronic constipation and scanty urination.

Infusion of fresh orange-peel and fresh tender leaves or flowers mixed with roasted orange pulp is applied as a very effective poultice in painful blood-boils, rheumatism, foul-smelling ulcers and diabetic carbuncles. *Petitgrain-oil* is obtained from leaves and twigs. (R. C. Mathur).

Flowers

Infusion of fresh orange flowers is massaged over the scalp to lengthen hair and to cure dandruff. Smelling orange blossoms increases the mental power, creates a happy feeling, banishes worries, induces sleep and excites the sexual centres in the brain. Eating fresh orange flowers with sugar or honey is a very effective tonic for the heart and the nerves. It increases the stamina for food and helps digestion. Massaging flower-juice over the breasts, reduces the extra fat and makes them firm.

How to make orange-squash[10]

Select fresh and sound oranges and cut them into halves after washing them in cold running water. Extract juice with cone extractor, and strain it through a muslin cloth. Put the juice in a glass jar and add a teaspoonful of fresh lime-juice per every six ounces of orange juice. Then add clean sugar equal to the weight of the juice and stir it well until all the sugar is dissolved. Add a few drops of orange essence (Bush) and a little orange colour (Bush) and strain the mixture through the cloth. Add *potassium metabisulphite* at the rate of 715 mg./kg. of the finished product. Pour the squash in sterilized bottles and cork them air tight.

When tried this squash personally, it is found to be immensely helpful during the off season and quite handy during sickness as a substitute of fresh orange juice. It can be taken

after diluting with the water and can be safely given to infants and children during all seasons of the year without any harm.

How to prepare orange-marmalade[10]

Cut the orange peel into fine shreds after the oranges are washed in cold water. Boil the oranges in sufficient water for about fifteen minutes. Change the water two or three times and keep aside in a stainless steel vessel.

Cut the segments and boil them in enough water for half an hour with occasional stirring and crush them by means of a wooden ladle till the extract becomes thick. Strain the hot pulp through a coarse muslin cloth. Take another extract from the pulp which is left in the cloth, by adding quarter of the quantity of water. Mix all the extracts and keep the mixture overnight in a vessel for sedimentation. Decant the upper clear fluid next morning and throw the pulp.

For every cup of clear fluid-extract, add half a cup of clean sugar. Heat the mixture till the formation of the steam and then add the cooked orange shreds. Stir the mixture well and continue to heat for ten minutes. Add little orange colour by dissolving it in a teaspoonful of water and few drops of orange essence if you like. Pour the mixture into clean jars and seal them air-tight by screw caps. Preserve them in cool dark place.

REFERENCES

1. Sreenivasan, A., *Reviews in Food Technology*, pp. 76-78, Vol. 3, (1961).
2. Hruschka, H. W., *et al.*, *Ibid.*, 7, (1), 9, (1953).
3. Winston, J. R., *et al.*, *Pre-Pack-Age*, 3 (5), 29, (1950).
4. Rygg, G. L., *Citrus Leaves*, p. 32, (9), 12, (1951).
5. Hruschka, H. W., *et al.*, *Mod. Packag.*, p. 27 (6), 135, (1954).
6. Smoot, J. J., *et al.*, *Ibid.*, 3 (9). 81, (1960).
7. Mahaboob Ali Khan Bakshi, *Aksir-ul-Imraz*. Urdu (MSS.) 1929. Mysore.
8. Ali Akbar Hussain, *Burg-e-Narang* Pers. (MSS) 1895, Bidar (Hyderabad).
9. Anon. *Pre-Pack-Age*. 6 (10), 21 (1956).
10. Shankar, J. V. *et al.*, *Home Scale Preparations of Fruits and Vegetables*, 3. pp. 7-8. 4th Edn. (1962).
11. Syed, *et al.*, *B.M.J.* 304, July 30, (1966).
12. Kariappa, C. B., *et al.*, 'Studies on the Canning of Coorg Mandarin Orange Segments', *J. Food Science and Technology*. pp. 101 to 102. Vol. III, No. 3. October C.F.T.R.I., Mysore, (1966).

13. Lal, C. and Jain, N. L., *Indian J. Hort.*, 8, 2, (1951).
14. Sidappa, G. S. and Bhatia, B. S., *Food Science*, 7, 112, (1958).
15. Pruthi, J. S. *et al.*, *First International Congress of Food Science and Technology*, London, (1962).
16. Iwasaki, Y. and Sugmoto, T., *Chem. Abstr.*, 30, 3109, (1936).
17. Canning of Orange Segments, Translation No. 4445, INSDOC., Council of Scientific and Industrial Research, New Delhi (India).
18. Food Industries Manual, Leonard Hill Ltd., London, (1949).
19. Yamamoto, N., *Chem. Abstr.*, 52. 13140 e (1958).
20. Venkatesam, A. V., Rehman, A. and Srihari, B. R., *Food Science*, 12, 275, (1963).

71. BITTER-ORANGE

Bitter-orange: *Citrus-bigaradia:* (B.N.); *Karna:* (Hindi, Dak., Urdu); *Yerlekai:* (Kan.).

Family: Rutaceae.

Zodiac: Virgo.

Food Value per 100 g. approximately

Carbohydrate	10 g.	Sodium	1 mg.
Protein	1.5 g.	Vitamin A	Trace.
Fat	0.1 g.	Vitamin B_1	18 mcg.
Calcium	20 mg.	Vitamin B_2	5 mcg.
Phosphorus	10 mg.	Vitamin C	50 mg.
Iron	1 mg.	Digesting Time	1½ Hrs.
Potassium	60 mg.	**CALORIES**	**30**

Constitution: Hot and Dry 3°.

Physiopharmacology and Therapeutics

Bitter-orange is largely cultivated for its medicinal pickles. In Western countries, it is grown for its peel and oil. About 473,767 tons of *Sour* and *bitter-oranges* are yearly produced in India.

Juice of bitter-orange is sweetish-sour and it is mostly used as a medicine to cure biliousness. Pickle of whole fruit is used as a bitter-tonic and appetizer. Its regular use with meals is said to prevent liver diseases and indigestion. In folk medicine,

the fruit is cut into two halves and stuffed with *cumin seeds*. The cut surface is exposed to dew overnight and in the morning in empty stomach the juice is sucked for relief of jaundice, bitterness in the mouth, nausea and vomiting, indigestion, giddiness, burning in the anus etc.

Peel

Aurantii Cortex Recens. B.P. is bitter in taste and is rich in volatile oil and other bitter chemical named *aurantimarin*. It is also rich in *hesperidin* which is mostly present in the white inner lining, *isohesperidin*, hesperic acid, a bitter resin and *aurantimaric* acid. (B.P.C., pp. 160-161, 1911).

Peel is used as a bitter-tonic and as a bile-rectifier. Good quality marmalade can be made from fresh peel.

Orange-Oil

Oleum-Aurantii, B.P., is a yellowish-brown oil having orange smell and bitter in taste. It is extracted from the fresh peel. Orange-oil is rich in *terpene d-limoene, citral, citronellal, decyl aldehyde*, the methyl ester of *anthranilic acid* and *steroptine* with traces of *linalool* and *terpinol*. (B.P.C., p. 676, 1911). It is used as a flavouring agent and in perfumery. ½ to 3 minims of oil is used internally.

Orange-Flowers

Gul-e-Naranj (Urdu). *Aviceena*, recommends smelling of flowers as a smelling medicine to cure palpitation of the heart due to nervousness. The distilled essence of the flowers (Orange-flower water or *Arqe-Bahr* is used as an aromatic carminative. It can be preserved in zinc bottles for more than seven years, but it spoils in glass bottles. Very good quality floral oil can be made from orange flowers by steeping fresh blossoms in til or sesame oil. Then the bottle is immersed in sufficiently hot water for half an hour. This process is repeated for seven to ten times and then the oil is strained. It is the best natural perfumed hair oil for luxurious growth of the hair and it induces refreshing sleep if massaged before going to bed. (Note: Change flowers every time you put fresh flowers in the oil).

72. SWEET-ORANGE

Sweet-orange: *Citrus-sinensis:* (B.N.); *Madhukarkatika:* (Sans.); *Musambi:* (Hindi, Urdu, Dak.); *Musambi-hannu:* (Kan.); *Satgudi:* (Tam.); *Satgudisinin:* (Tel.); *Elemichha-narkam* (Mal.). *Mithanimboo:* (Guj., Beng., Mar.).

Family: Rutaceae.

Zodiac: Taurus.

Constitution: Cold and Wet 1°.

Sweet-orange contains more or less the same food value of orange except the colour. It is pale-yellow in colour. It is a native of China and a very valuable commercial fruit. About 278,213 tons of fruits are yearly produced in India.

It has got the same nutritive and medicinal value as orange, except taste and flavour. This fruit is not so popular in making squash and juice as orange is.

Fresh musambi juice added with a pinch of pepper and salt to a glassful of juice is given to quench thirst and as an expectorant in bronchitis, asthma and emphysema.

A glassful of juice with sugar or glucose is a cooling drink during summer. It is also given in scanty urination, urethritis and gonorrhoea, along with suitable treatment.

Neroli oil is obtained from flowers and *petitgrain oil* from leaves and young shoots (Prof. Mathur).

73. GIANT-LEMON OR CITRON

Giant-Lemon or Citron: *Citrus-medica:* or *bimbti* (B.N.); *Mahalunga:* (Sans.); *Turunj:* (Hindi, Dak.); *Bajura:* (Urdu); *Utraj:* (Arabic); *Madeephalmu:* (Tel.); *Colongo-nimboo;* (Beng.); *Madala-narkam:* (Mal.).

Family: Rutaceae.

Zodiac: Pisces.

Food Value per 100g. approximately

Carbohydrate	11 g.	Vitamin A	Trace
Protein	1.1 g.	Vitamin B_1	20 mcg.
Fat	0.9 g.	Vitamin B_2	4 mcg.
Calcium	70 mg.	Vitamin K	1 mg.
Phosphorus	10 mg.	Vitamin C	40 mg.
Iron	2.3 mg.	Digesting Time	1½ Hrs.
		CALORIES	57

Constitution: *Peel:* Hot and Dry 1°. *Pulp:* Cold and Wet 2°. *Seeds:* Hot 3° and Dry 2°.

Physiopharmacology and Therapeutics

Citron or Turunj is cultivated all over India for its valuable volatile oil. Peel-oil is rich in *Citrene* 0.78 per cent, *Citrol* 7.8 per cent, *Cymene* and *Citronellal.*

Juice of citron is sour, cooling and astringent. Fresh juice mixed with honey and a little rock-salt is used to cure biliousness, nausea and vomiting, dyspepsia, etc. It acts as a digestive tonic, reduces flatulance and cures intra-abdominal pressure and palpitation of the heart. Given as a lemonade with sugar, it quenches thirst and increases hunger. Its regular use prevents the formation of urinary stones and diabetes. Peel conserve is used in dysentery, fevers and piles.

Seeds

Paste of the seeds is applied as a cure for scorpion sting. Seeds with salt and honey are given internally to cure menstrual irregularities. A seed rubbed with fresh citron juice and few drops are instilled in the eyes of a snake bitten victim. Paste of the seed with paste of fresh peel with rose-water is applied in eyes to increase eyesight.

74. LOQUAT

Loquat: *Eriobotrya-Japanica:* (B.N.); *Lokat:* (Hindi, Dak., Urdu); *Lakotta-lokotta:* (Ta'm.); *Lakotte-hannu:* (Kan.); *Lakhote:* (Beng.).

Family: Rosaceae.

Zodiac: Aquarious.

Constitution: Cold 2° and Wet 2°.

Loquat is grown all over India, particularly it is very popular in Bengal. It is a native of China and Japan. Its deep yellow colour with sweetish-sour taste makes it an ideal fruit for the preparation of jam, syrup and jelly.

Loquat syrup made as the usual method is very delicious to taste and cooling. It quenches the thirst due to summer heat. In loss of memory, bleeding piles, urticaria, septicaemia, blood boils and carbuncles, cirrhosis of the liver, haemoptysis, feeling of dryness and heat in the system etc., Loquat syrup given twice a day with cold water is very useful.

Free use of loquat is contra-indicated in all the phelegmatic diseases like; asthma, bronchitis, emphysema etc. It is advised not to drink water after eating this fruit, because it causes indigestion.

Loquat jam, jelly, and syrup can be made similarly as explained in other fruits.

75. MANGO

Mango: *Mangifera indica:* (B.N.); *Amva Ambra:* (Sans.); *Aam* or *Amba:* (Hindi, Urdu, Dak., Pers., Guj.); *Mavina hannu:* (Kan.); *Umbaj:* (Arab.); *Mampazham:* (Tam., Mal.); *Mamdi:* (Tel.).

Family: Anacardiaceae.

Zodiac: Pisces.

Food value per 100 g. approximately

(*Alfonso without seed*)

	Green	*Ripe*		*Green*	*Ripe*
Carbohydrate	9 g.	12 g.	Vitamin A	150 I.U.	4,800 to 22,550 I.U.
Protein	0.7 g.	0.6 g.	Vitamin B_1	...	42-155 mcg.
Fat	0.1 g.	0.1 g.	Vitamin B_2	30 mcg.	50 mcg.
Calcium	10 mg.	17 mg.	Niacin	...	0.3 mg.
Phosphorus	20 mg.	20 mg.	Vitamin C	250 mg.	150 mg.
Iron	0.40 mg.	0.8 mg.	Oxalic acid	30 mg.	...
Potassium	...	250 mg.	Digesting Time	3 hrs.	2 hrs.
Sodium	...	7 mg.	Calories	30	50

Constitution: Hot and wet (*Green*).
Cold and dry 1° (*Ripe*).

Physiopharmacology and Therapeutics

Mango is one of the oldest fruits that is cultivated in India from ancient time, perhaps even before 4,000 to 6,000 years. In Vedas, the only ancient scripture available in the world, mango is praised as a heavenly fruit. In Indian mythology, it is believed that when Lord Shiva and Parvathi came from Himalayas, they missed this heavenly fruit on this part of the earth. Parvathi being very fond of mango, requested her Divine husband to create mango tree by His Divine power (Srushti). In response to His beloved wife, Lord fulfilled her desire and the mango tree appeared in India. With this background mango is considered as a habitant of India and a sacred fruit[2]. Dr. Mukherjee, head of the Indian Horticulture Division confirmed that the first mango grew in the dense forests of Indo-Burmese border. Alexander and his army was the first European nation that saw mango in India in 327 B.C. Hieuen T'sang was probably the first person who took mangoes from India. Ibn-e-Batuta took mangoes to Iran 700 years later. Then Portugese spread mango in Africa and South America via Goa[64].

At present there are about 500 varieties of mango, but, only about 35 varieties are cultivated in India. Even among them only some are very popular like, *Alfonso, Langra, Malgoba, Neelam, Raspuri, Shapasand, Totapuri*, etc. Due to cheapness of the fruit, taste and the pleasure that gives while eating it has earned the title, *The King of Fruits.*

Green Mango

Green or unripe mango contains a large portion of starch which gradually changes into glucose, fructose, sucrose, maltose etc., as the fruit begins to ripen and disappears totally when the fruit is fully ripe.

Green mango is a rich source of pectin which is detected in the tender fruit before the formation of the seed. It is seen that the pectin concentration gradually goes down after the formation of the stone[20].

Unripe mango is sour in taste due to the presence of certain acids like: *oxalic, citric, malic* and *succinic acids*. The concentration of these acids varies in different kinds of mangoes, but usually the total concentration ranges between 2.2 to 12.2 ml. of $N.N_a$ OH per 100 g. of the pulp. It is found that the marked gradient of increasing acidity exists from the skin towards the seed[22].

Green mango is a very good and cheap source of Vitamin C and a fair source of Vitamin B_1 and B_2 along with sufficient quantity of Niacin. These vitamins vary in concentration in various varieties, during stage of maturity, environmental conditions etc. The smaller fruit is richer in Vitamin C than the other bigger varieties, particularly, *Langra* mango contains the highest concentration of Vitamin C[28, 29, 30, 43, 44, 46]. It is estimated that eating an unripe *langra mango* will supply as much Vitamin C as one gets by eating *any one* of the following foods:

Apples	35	(5½ kg.).
Bananas	18	(2½ kg.).
Oranges	3½	(450 g.).
Limes	9½	(900 g.).
Pineapple	1	(1 kg.).
		etc.

Tannins are also present in the green mango, mostly in the skin and in the pulp in the small amounts being 0.16 to 0.105 per cent. respectively[47].

Medicinal Uses of Green Mango

In India green mango is used as a medicine for various gastro-intestinal, bilious and blood disorders.

(*a*) Gastro-intestinal Disorders

Eating one or two small tender mangoes in which the seed is not fully formed along with salt and honey is found to be a very effective medicine for summer diarrhoea, dysentery, piles, morning-sickness, chronic dyspepsia, indigestion, constipation etc,[42, 43].

(*b*) Bilious Disorders

The acids contained in the green mango increase the secretion of bile and act as intestinal antiseptic. Therefore, eating green mango daily with honey and pepper cures biliousness, food putrification, *urticaria* liverishness, jaundice, etc. It tones up the liver and keeps it healthy. In off season, sun-dried slices of green mango (Amchur) can be used as a substitute for fresh mango[41].

(*c*) Blood Disorders

The curative value of green mango in blood disorders is attributable to its Vitamin C content. It increases the elasticity of the blood vessels, helps the formation of new blood cells, aids the absorption of food-iron, prevents bleeding tendencies and cures Scurvy. Eating an unripe mango daily during the season, prevents one from infections, increases body resistance against tuberculosis, cholera, dysentery, insanity, anaemias, etc. It tones up the heart, nerves and cures palpitation of the heart, nervous tension, insomnia and weakness of the memory.

Eating a fresh green mango baked in hot ash daily once or twice is a sure preventive remedy for sun-stroke. Also protecting head and neck during summer; acts as a double insurance against sun-stroke. Eating raw mango with salt quenches thirst and prevents the excessive loss of sodium chloride and iron during summer due to excessive sweating. It cures the undue tiredness and irritability in summer and helps one to tolerate the excessive heat.[11, 39, 41, 42].

Pounded peeled tender fruit is applied over the eyes to cure burning hot sensation in them due to sun glare, heat in the body, conjunctivitis etc. It is a boon to the tired eyes and to those who work in welding job.

Cooked tender mango with tender leaves of *Tamarind* is given as a food-medicine to cure jaundice, biliousness, piles, burning in the rectum, to reduce the heat in the body during summer etc. It is common folk-medicinal food in South India.

Eating unripe mango in excess causes throat irritation, indigestion, dysentery like stools, abdominal colic etc. Therefore, not more than one or two green mangoes should be consumed daily and *cold water* should never be drunk immediately after eating the green fruit because it coagulates the sap and makes it more irritant.

Sap

Sap or the milky juice which runs on breaking the stalk of the tender fruit is irritant and astringent. Eating green mango with undrained sap is the cause of mouth, throat and gastro-intestinal irritation. It should be fully squeezed out or the skin be peeled before using raw mango. Sap is used externally to cure chronic eczema, scabies, psoriasis, ring worm and other chronic skin diseases. Its application on the healthy skin forms a bleb and leaves a brownish dark mark.

Peel

The green peel is rich in *tannins* and *Vitamin C* along with sap. Therefore, chewing a piece of the peel daily once is found to be effective in curing the bad breath, bleeding from the gums, etc. *Fried peel* one handful is used to cure excessive bleeding during menstruation. *Paste of the peel* one teaspoonful mixed with a glassful of *butter-milk* is given thrice daily as a treatment for dysentery, diarrhoea, cholera, piles, prolapse of the rectum etc.[9, 39, 42].

CULINARY PREPARATIONS OF GREEN MANGO

Mango pickle[55]

Green mango is extensively used for preparing pickles, chutney etc. There are various methods in vague from ancient times and each method varies in different parts of India. However, the following method of mango pickling is found to be tastier and lasts longer than the other commercial and domestic brands of mango pickles[55].

Recipe

Mango slices	2 kg. (About 6 pickle-mangoes)
Red chilli powder	1 teacupful.
Fenugreek powder	½ ,,
Mustard seed powder	½ ,,
Turmeric powder	1 tablespoonful.
Pure til oil	1 kg.

Preparation method

Before you buy the mangoes, get all the above mentioned ingredients. Clean them and roast them gently on a frying pan (Do not fry turmeric powder). Then pound coarsely and seive each ingredient separately.

Select good quality fully developed pickle mangoes (*Amlet* or *Achar ka aam* (Hindi); Uppinmavin kai (Kan.). Wash them in cold water and keep them immersed in cold water for about an hour.

Cut the fruit with a stainless steel knife into slices of desired shape and size and put them in water in which 2 tablespoonfuls of common salt is dissolved per gallon. This immersion prevents the mango slices from turning into blackish colour.

After all the mangoes with the peel are cut, drain away the water and wrap the cut pieces in a clean turkish towel and shake the bundle rigorously to remove the remaining water from the cut slices. Add a handful of common salt to these pieces and tie them in a thin muslin cloth and hang for about half an hour to drain as much water from them.

Heat the oil until it begins to fume and see by putting some mustard seeds whether they take well and crack. This is the required heat to roast the following ingredients: Put a handful of coarsely pounded *peeled garlic* and fry it gently. When it begins to turn golden add a handful of fresh *curry leaves* and roast them for about two minutes. Then add *cloves* 15, whole *cardamom* 15, *cumin seeds* 2 teaspoons, *whole pepper* 1 tablespoon, *piper longum* (dum ki kali mirchi: Hindi) 2 teaspoons *cinnamon* 6 pieces 3 inches long and red chillies 12. Fry all the ingredients for a minute or two and take the vessel from the fire. Add the other powdered ingredients one after another in the hot oil and mix them well with a wooden ladle. Then add the mango slices and mix the contents well. Taste and add some salt and chilli powder if it needs.

Transfer the whole mass into a clean sun-dried porcelain jar and be sure that the oil is two inches above the pickle. Cover the lid and set aside for four to five days. See if the oil level has gone down if so, add some more steaming hot til oil to keep the required level. Lid tightly and allow the pickle to mature for a month and then use it. Do not open the lid frequently. Take the required quantity of the pickle sufficient to last for a week and

use it from this stuff. Make sure that even this pickle is kept in a clean dry glass jar with a screw cap.

Mango Chutney[55]

Peel mangoes instead of cutting them into slices and the mangoes should be little yellow in colour. Grate the peeled fruit on a stainless steel grater. Add salt and tie the pulp in clean muslin cloth so as to drain the unwanted water. Follow the same method and use the same ingredients as described in the preparation of mango pickle. Also preserve it similarly to get the best results.

Preparation of *mango pickle* according to C.F.T.R.I. method:[18]

Recipe

Mango slices	1 kg.	Turmeric powder	30 g.
Common salt (powdered)	250 g.	Red chilli powder	30 g.
Fenugreek (carsely ground)	125 g.	Black pepper	30 g.
Nigella (kalunji) „	30 g.	Fennel or aniseed (saunf)	30 g.

Sarsoon oil (moist free) sufficient to cover the mass.

Method of preparation

Mix the mango slices with requisite quantity of powdered common salt. Transfer the entire mass to a glass or glazed jar and shake well; leave it in the sun for 4-5 days until the fruit slices sweat and the green surface of the thin skin turns pale yellow in colour. Mix all the ingredients with solid slices and smear with a little oil free from moisture.

Transfer the pickle into a clean dry glass or glazed jar and press the mass thoroughly so that no air pocket is left inside. Add oil sufficient to cover the pickle. Add oil if necessary examining it after 3 or 4 days. Store the product for 2-3 weeks before use.

Mango Chutney (Sweet)[13]

Recipe

Mango (grated)	1 kg.
Sugar	1 kg.
Salt	50 g.
Spices (cardamom, cinnamon etc.)	30 g.
Red chillies	15 g.
Ginger	15 g.
Onions (chopped)	60 g.
Garlic (chopped)	15 g.
Vinegar (good quality)	180 g.

Method of preparation

Select unripe, firm, and fully developed fruits having yellow inner pulp and wash them in cold water. Peel off the green skin with a stainless steel knife. Grate the peeled fruit into fine slices.

For preparing mango chutney in off-season use slices of peeled mangoes stored in 6 per cent salt solution in closed containers for 5-6 months.

Warm the slices in a little quantity of water to render them soft. Add sugar and salt to them in the proportion given in the recipe. Allow the mixture to sweat so that the sugar and the salt dissolve in the juice exuding from the fruit.

After the sugar and salt dissolve, keep the mixture on the stove. Tie the spices (given in the recipe) in a muslin bag. Holding the bag dipped in the mixture, continue heating, with occasional stirring, till a product of the desired consistency is got. Remove the spice bag after squeezing it well into the mixture. Then add vinegar and heat for 10 more minutes.

Cool the product slightly and pour it into clean, sterilized, wide mouthed bottles. Allow it to cool in the air and close air-tight. The product can also be poured into clean glazed jars and covered.

Why mango-pickle gets spoiled ?

Mango pickle usually gets spoiled due to contamination coming from the fruit and spices. *Aspergillus niger*, a black mould is usually the cause of the spoilage of the pickle. This can be prevented by adding sufficient quantity of *mustard 1 per cent salt*, *pure vinegar* and *moisture free hot oil.*[21, 48, 49, 51] Handling with contaminated hands also spoils the pickle. It is therefore, a common practice that a wise house wife never handles the pickle during menstruation, during night and when her hands are not clean. This is known from centuries and the secret of preservation of various pickles is our ancient heritage.

Uses of Mango pickle

Mango pickle increases hunger, digests food and prevents food putrification in the stomach.

Ripe-Mango

The growth period of the mango is about 90 days. During this period the fruit matures fully and on developing well, it takes a shining oily green colour. The pulp becomes pale yellow emitting a pleasing aroma. When the fruit begins to fall of its own, then it becomes the right time to pick[23, 48].

After the mangoes are carefully picked from the tree, they are kept for maturing which is usually done by arranging the fruits on the floor over the *paddy hay* and covering them with more hay and the room is closed for five days. Usually the ripening of the mangoes takes about four to five days and in eight days the fruits over ripe. *Ethylene* and *acetylene* have also been used in the ripening of mangoes. By this process there may be good colour but the taste may not be so delicious as hay ripened mangoes. Ripening the fruits with the use of *calcium carbide* has also become common in India which is found to have no bad effect on the health, but, this process may be not superior to the old hay method[21].

The pleasing aroma of the ripe mango is attributable to certain volatile aromatic oils and chemical flavouring components which are not fully known[21].

The orange yellow colour of the mango is due to carotenoids such as: *Neo β caroteine μ ; β carotene* and *∝ carotene.* In *Badami, Langra* and *Raspuri* mangoes carotene, content varies between 1.18 to 8.75 mg.[27]. Eating any one of these mangoes will approximately supply as much Vitamin A as one gets by eating *any one* of the following foods:

Eggs (hen's)	26
Butter	2.5 kg.
Milk	25 cups
Shark liver oil	11 teaspoons.
Mutton	4 kg.
	etc.

Ripe *Badami, Fazli, Langra, Raspuri* etc., contain vitamin B_1, B_2 and C. *Bengal, Fazli* and *Langra* mangoes contain Vitamin B_1 45, 50 and 55 mg. per 100 g. respectively. The concentration of Niacin in these varieties varies between 0.24 to 0.90 mg. per 100 g.[15, 31, 32]. Eating any one of these mangoes supplies as much vitamin B_1 as one gets by eating *any one* of these foods:

Rice	350 g.
Wheat	50 g.
Bengal gram	50 g.
Green gram	30 g.
Amrud (Guava)	7
Apples	2
Banana	1
Orange	1½
	etc.

The concentration of Vitamin C varies between 50 to 130.8 mg. per 100 g. Langra and Badami contain the highest and the other varieties do not contain more than 50 mg. per 100 g. It is noted that Vitamin C distribution decreases in concentration with the increase in distance from the peel towards the seed. It also becomes less when the mango is rotting[28, 29, 30].

Pulp of the ripe *Badami*, *Raspuri* etc., contains proteins and amino acids like: *asperatic* and *glutamic acids*, *alanine*, *glycine*, *serine*, *y-amino-butyric acid* with small amounts of *leucine* and *methionine*. The other proteins of high quality ranging between 1.57 to 5.42 per cent are also found in the ripe mangoes of the above said variety[47].

The ash content of *Malgoba*, *Neelam* and *Raspuri*, varies between 0.26 to 1.16 per cent. The chief components of the ash are: calcium, iron, magnesium, manganese, silicon etc. Iron is freely detected in the concentration of 0.08 mg. per 100 g.[5, 46].

Mangoes contain sufficient quantity of cellulose in the form of *fibers*. The country type and *Malgoba* contain more *fibers* than the other varieties. However, its concentration varies between 0.30 to 0.02 per cent.

How to prevent the spoilage of mangoes

Like other fruits, mangoes begin to rot due to bacterial and fungi activity after they are fully ripe. The bacterial activity depends on the concentration of fruit sugars on which they thrive well and cause fermentation[35]. In the mangoes the decay usually starts at the top around the place where the stalk was attached and gradually spreads over the whole fruit in the form of black patches. This is attributable to the activity

of the bacteria known as *Aspergillus niger* associated with other organisms like; *Glocosporium mangifera* that produces fermentation and acid in the mangoes. Other common fungi that cause mango rot are; *Aspergillus Nidulans, Collectotrichum capsici* and *Acrthe-penniseti*[36].

Recent investigations have proved that mango rot can be prevented or delayed by delaying the ripening process by using various chemical methods like; *post harvest treatment with 6 per cent aucous wax emulsion containing 1 per cent orthophynyl phenate and growth regulators like: maleic hydrazide and 2, 4-D etc.*[36]. Mango rot can also be prevented by dipping the semi ripe mangoes in pure malt vinegar having 4 per cent common salt. Packing mangoes that are dipped in vinegar in polyethylene bags having 4-8 perforations helps the mangoes to keep fresh for a week.[58] Wrapping sound mangoes in oily tissue paper and storing them in cold or gas storage reduces mango decay while transporting them. Waxing fresh unripe mangoes also prevents the mango spoilage while transport. It also helps in the retention of natural appearance of the fruits and prolongs their storage life by 25 per cent at room temperature[37]. In ancient time mangoes were used to be preserved by immersing them in honey which is an expensive method.

Medicinal Uses of Ripe Mango

Eating a ripe mango after washing it with water supplies energy, increases appetite, digests food, quenches thirst and cures constipation. It is believed that eating mangoes in excess causes dysentery and diarrhoea. It is not true. Mangoes by themselves do not have any gastro-intestinal irritants, but, the cause of such episodes is due to bacterial infection which takes place while eating mangoes by holding in dirty hands and eating rotten mangoes infested with maggots. However, eating mangoes in excess causes indigestion which can be prevented by eating them with a pinch of ajwan (*carum coptis*) and eating a piece of ripe mango peel after eating the pulp. Drinking cow's milk sweetend with honey also prevents the bad effects of excessive use of mangoes. Eating *country mangoes* which have more fiber causes colic, diarrhoea and hyperactivity of the intestines. But their moderate use is found to be effective for high-blood-pressure and constipation.

Mango in the treatment of Night blindness

Our eyes manufacture a kind of chemical called *Rhodopsin* that is present in the rods of the retina. This substance changes into chemical energy to form good sight in dim light and helps one to see in such condition. If there is Vitamin A deficiency, formation of Rhodopsin fails and one does not see properly in dim light. This is very common in children who are poor and are suffering from gastro-intestinal disorders. In such conditions, giving mangoes liberally during all the season not only cures night blindness but also prevents them from other eye diseases which ultimately cause total blindness.

Eating mangoes liberally also prevents one from developing refractive errors, dryness of the eyes, softening of the cornea (keratomalacia), excessive lacrimation while going in cold air, itching and burning in the eyes.

Mangoes in the prevention of Infections

According to *Frandson*, the cause of all the bacterial invasion is due to poor epithelium. In such condition the underlaying cells of mucous membrane proliferate but do not differentiate well, and due to this; horny cells are produced. In the absence of cilia stagnation the secretion occurs on the mucous membranes. Bacteria proliferate and infection occurs as the circulatory antibodies cannot reach the invading bacteria. When there is a thickened and dry epithelium, the invasion of the pathogenic organisms becomes easier. Particularly this is manifested in the mucous membrane of respiratory tract and alimentry canal producing chronic bronchitis, asthma, tuberculosis, laryngitis, tonsillitis, enteritis diarrhoea, dysentery etc.

Eating mangoes daily during the entire season, helps the formation of healthy epithelium and prevents one from frequent attacks of the common infections including colds, rhinitis, sinisitis etc. This is attributable to the high concentration of Vitamin A in mangoes.

Drinking a glassful of mango juice mixed with honey and milk every day is one of the cheapest and most effective general tonic in all ages to increase, appetite, body weight, memory, etc. Its regular use cures mental irritability, weakness of hearing, loss of

smell, insomnia, neuritis, lack of optimal control of the motor nerves etc. It cures anaemia by absorbing more food-iron and tones up the heart, liver and gastro-intestinal tract. A teaspoonful of the juice given thrice is a boon to babies and children.

Drinking plain mango juice mixed with a tablespoonful of fresh *unripe mango* juice, a teaspoonful of fresh *coriander leaf-juice* two to three times daily during pregnancy prevents one from foetal abnormalities. It increases the resistance of the foetus against infections, helps the proper development, eases child-birth and prevents the post-partum complications. It increases the secretion of breast milk and delays the appearance of menstruation. This benefit of mango can be utilized to control frequent conception and plan one's family.[59]

Eating mangoes with almonds, dates and honey increases sexual virility, motility of the sperms, cures premature ejaculation and imparts a feeling of well being after conjugal union. It lowers mild type of hypertension.

Drinking a glassful of mango juice mixed with half the quantity of fresh *carrot juice* once or twice daily for a couple of months, dissolves the gravel in the bladder or in the kidneys. It prevents the formation of urinary calculi, increases urinary out put, washes away the waste substances from the body, reduces the acidity of the system and prevents one from getting frequent urinary bacterial infection. It is given with very gratifying results during the treatment of nephritis, cystitis, urethritis, hyperacidity of the urine and imparts a cooling sensation in the organism. It makes one look more healthy, beautiful by forming a healthy skin and prevents one from getting ugly looking pimples.

Eating mangoes regularly prevents all the other deficiency diseases caused by Vitamin A, B-complex and C that are already explained in their respective chapters in the previous pages. Suffice to say that mango is a boon to humanity and its regular use prevents one from early aging and premature death. Mango is so popular in India that its annual production has risen up to 6,987,720 tons.

Note: A diabetic who is under regular treatment can take a mango once or thrice a week without fear. Lean persons with mild type of diabeties can take one small mango daily, where as fat ones can only take one mango once in four days.[57, 60]

Seed

Mango contains about 6 to 19 per cent of the seed. It is a stone like hard having fibers over it and is covered with the mango pulp. Inside this horny covering there is kernel covered with a thin membrane. Kernel is soft and creamy white in colour. It is rich in *gallic acid*, therefore, its taste is bitter and astringent.

Due to its astringent effect, paste of the fresh seed, half teaspoonful mixed with butter-milk is given once or twice daily as a medicine in diarrhoea, dysentery, piles etc.

A teaspoonful of the paste of the decorticated kernel of mango is applied inside the vagina to cure lucorrhoea, senile vaginitis, and relaxed walls due to multiple pregnancies. Its use half an hour before conjugal union gives a virgin feeling and acts as a safe contraceptive. This has been tried many times with gratifying results.[61]

A teaspoonful of the fresh kernel or its dry powder 20-30 grs., is given once daily to eradicate round worms. The same is also used as a styptic medicine to control bleeding from lungs, nose, teeth, rectum caused by tuberculosis, epistaxis, gingivitis and piles. Powder of the kernel 1 to 2 grs., mixed with honey is given in children to cure prolapse of the rectum, dysentery, diarrhoea and constant itching in the anus. Juice of the kernel is sniffed to stop nasal bleeding.

Fried kernel of the mango seed 10 grs., mixed with honey is given once before going to bed for one or two months, reduces tropical eosinopilia and cures the respiratory distress. Mixing half a teaspoonful of *turmeric powder* along with this medicine and taking *Hetrezen-Lederle* 50 mg. one tablet two to three times under the supervision of a physician is a specific treatment for such conditions. Fried kernel ½ teaspoon taken with *water* once daily for a month increases sex stamina and cures spermatorrhoea.

An effective *hair darkner* can be prepared from the kernel of the mango seed by the following method:

Fresh kernel	160 g.
Fresh Marigold flower petals	160 g.
Pure til oil	300 g.

Boil all the ingredients over a slow fire until all the petals get soft and begin to dissolve in the oil. Pour mass into an iron vessel

and cover its mouth securely. Bury the pot in the earth for a month and use it afterwards. Apply this oil to the hair regularly to darken and make them look lovely.

Another method of preparing the *hair darkner* is also described below:

Fresh kernel	55 g.
Fresh Amala	23 g.
Haleelaiye-zard or halda (chebulle myrobalan)	23 g.
Beleric myrobalan (balda) or Tare-kai in (Kan.)	11.5 g.
Iron fillings	11.5 g.

Mix all these substances by rubbing in an iron pan and grind them well with an iron pestle in the same iron pan. Leave the whole mass in the pan for a night and then put the mass in a jar. Apply regularly over the hair to darken them permanently. It is particularly effective for the greyness of the young persons.[12]

Leaves

Like the mango fruit, the leaves of mango are also considered to be very sacred in India. Festoons of fresh leaves are tied on the top of the front doors of the Hindu homes as an indication of goodwill and welcome. It is believed that tieing mango leaves on the doors prevents the access of the evil spirits and infections[40, 41, 42].

Mango leaves contain both gallic and tannic acid and like seed, they are astringent. Paste or the decoction of a handful of tender leaves is given thrice daily to cure diarrhoea, dysentery and loss of voice. Fresh juice of the tender leaves one tablespoonful is given thrice daily to cure diabetes in its early stage[39]. It is usually given along with a tablespoon of *bittergourd juice* once daily in the morning for a couple of months to get the desired effect in diabetes.

Chewing tender mango leaves stops bleeding from the gums, cures stomatitis, relaxed throat, cough and toothache. Fumes of the leaves are inhaled by burning them to stop hicough. The midrib of calcined leaf is used to remove warts on the eye-lids. Ash of the leaves is mixed with coconut oil and is used as a cooling and bland dressing in burns and scalds.[9]

The nodules that are commonly found on the fresh leaves are collected from 6 or 7 leaves and mixed with 4 pepper corns is given every 4 hours with tender coconut water in cholera with gratifying results[56]. Milky juice of the leaf stalk is applied tc heal cracked heels.[62]

Flowers

Flowers of the mango are styptic and are cold and dry in 2°. Juice of the fresh flowers 1-2 teaspoons is given with curds in dysentery and diarrhoea.[11] According to *Pandit Jaganath* a wonderful miraculous power can be acquired by rubbing the hands with the fresh mango flowers and let the juice dry in the palms. This process is repeated for four more days regularly at the same time. He confirms that touching the spot stung by bees or scorpion with these hands can cure the pain immediately. He says, that this miraculous power remains in the hands for a year only and the same process should be repeated every year[38].

Dry flowers of the mango one tablespoonful mixed with equal quantity of honey is given thrice daily as a specific medicine for spermatorrhoea[42].

Paste of the fresh flowers one tablespoon mixed with curds or tender coconut water is given an a cure for gonorrhoea, cystitis, catarrh of the bladder, scanty urination with burning micturation due to hyperacidity, albuminorrhoea etc[9]. Gargling infusion of the fresh flowers once daily cures cough due to relaxed throat and it cures stomatitis[56]. Fumigation of dry flowers drives the mosquitoes.[62]

Bark

Mango bark is also rich in tannins, hence it is astringent. Juice of the bark can be used as a douche in lucorrhoea, and as a gargle with some salt in relaxed throat, sorethroat, stomatitis etc. Bark juice one to two teaspoonfuls mixed with a glass of butter-milk is given thrice daily as a medicine in haemoptysis, spermatorrhoea, premature ejaculation, gonorrhoea etc. Ash of the bark can also be used as a dressing by mixing it with coconut oil in simple burns. Application of the bark or juice of any part of

the tree over the cut wounds stops bleeding and heals the wound. Juice of the bark 1½ ounces mixed in a cupful of lime water is given as an effective medicine for gonorrhoea. Bark boiled in water along with mulberry leaves is gargled during the treatment of diphtheria[42].

Gum

Rakat bole: (Hindi); *Rakat valla:* (Kan.) is a mixture of gum exudated from the old trees and mud deposited by white-ants on the trunks. This substance is found in the hallow trunks of old mango trees. It is fragile and dark brown in colour. It has got slight astringent taste. It is usually mixed with *lime juice, aloes* and *turmeric powder* and heated to make a liniment like substance. It is applied over sprains, dislocations, concussions etc.[56]. Fresh gum in applied to cure cracked skin.[62]

Mango Squash[13]

Health giving mango squash can be prepared at home as follows:

Take pulp from fully ripe fresh *Badami mangoes* after washing them well in cold water and rub them in between the palms in order to thin down the pulp.

Remove the stem portion and squeeze as much pulp as possible with rubber gloved hands.

Mango pulp	1 kg.
Water	1 kg.
Sugar	1 kg.
Citric acid	30 g.
Orange yellow colour	2 grs.

Put sugar in the water and boil for about five minutes and strain the syrup through a fine sterilized cloth in a clean stainless steel vessel. Allow it to cool completely. Then mix the pulp, colour and citric acid and churn the ingredients with a hand egg beater. Strain the mixture through clean muslin cloth. Dissolve potassium metabisulphite (preservative) 715 mg. per kg. of the prepared stuff. Pour the squash in clean and preboiled bottles and store them in cool dry place.

Mango Preserve[13]

Cut mangoes with yellow pulp that are firm and slightly ripe into slices after removing the peel with a stainless steel knife. Keep the slices in water having a tablespoon of common salt per gallon to prevent the slices from turning black.

Wrap the slices in a muslin cloth and immerse them in boiling water for 5-10 minutes in order to soften them.

Spread the warm slices on a cloth and puncture them with a bamboo stick or a fork.

Take sugar equal the weight of mango slices and make a thick syrup by boiling with water add citric acid 1-2 g. per kg. sugar, before boiling the water. Add slices to the syrup when it gives 3-4 threads on examining between two fingers.

Cool the ingredients and preserve in clean, dry and sterilized wide mouth jars.

Mango Leather: (Aam-papad)[13]

Prepare pulp as you did while preparing Mango Squash and strain it through a mosquito net.

Spread the pulp in thin layers on copper or brass trays that are properly tinned and greased with butter to avoid sticking of the pulp. Cover the trays with a fine cloth and keep them in the sun. Put another layer of the pulp after the first layer dries completely and then repeat this process three or four times.

Expose the product to *sulphur fumes* by burning a small quantity of *sulphur* at the bottom of a closed box. This process helps to retain the natural appearance of the mangoes. Cut the slices and wrap them in butter paper and preserve them in glass jars.

Other mango products like: *Mango-cereal flakes, Vermicelli* and *flour, Strained baby food, Unfermented mango beverages, Mango concentrate, Canning of mangoes* and *pulp* etc., can be prepared at home. For detail information write to Director, C.F.T.R.I., Mysore, India.

REFERENCES

1. Candole, A. De., *Original of Cultivated Plants* Kegan Pan, London (1904).
2. Zia-mujahid, *Phaloon-ka-badsha*, Daliy Salar, p. 5, 2-9-1967, Bangalore.
3. Popenoe, W., *Manuel of Tropical and Sub-tropical Fruits*, Macmillan and Co., New York (1939).
4. Hill, A. F., *Economic Botany*, McGraw Hill, New York (1952).
5. Singh, L. B., *The Mango Botany, Cultivation and Utilization*, Leonard Hill Books Ltd., London (1960).
6. Cheema, *et al.*, *Commercial Fruits of India*, Macmillan, London (1954).
7. Watt, G., *Dictionary of the Economic Products of India*, Vol. 1, p. 153, (1891).
8. Winten, *et al.*, *Structure and Composition of Foods*, Wiley, New York (1935).
9. Dastur, J. F., *Medicinal Plants of India and Pakistan*, pp. 106-107, (1966).
10. Dastur, J. F., *Useful Plants of India and Pakistan*, pp. 143-44, 3rd Ed.
11. Muzafar Hussain, A., *Qhuas-ul-advia*, (Urdu) p. 97, Lahore (Pak.) (1965).
12. Shiva Kumar, S., *Arogiya darpana* (Kan.), pp. 177-78, Mrutyunjaya Clinic, Bangalore (1965).
13. Shankar, *et al.*, *Home Scale Preparations of Fruits and Vegetables*, pp. 10-13, C.F.T.R.I., Mysore City (1962).
14. Mukharjee, S. K., *Indian, J. Genet*, p. 2, 49 (1949).
15. Sthal, A. L., Florida, *Agic. Sta. Bull.*, 238 (1935).
16. Soule, M. J. Jr and Harding, P. L., *Proc. Florida State Hort, Sco.*, p. 69, 282 (1956).
17. Siddappa, G. S. and Bhatia, B. S., *Ind. J. Hort.*, p. 11, 9. (1954).
18. Srivastava, H. C., *J. Sci. Ind. Res.*, p. 12 B, 363 (1953).
19. Lal, G. and Murthy, *et al.*, *Food Science*, p. 9, 121 (1961).
20. Roy, R. S. and Singh, D. P., *Indian Food Packer*, p. 6, 13 (1952).
21. Jain, B. N., *Chemistry and Technology of Mango*, Rev. in Food Technology, pp. 131-162, Vol. 3. C.F.T.R.I., Mysore (1961).
22. Wardlaw, C. W., and Leonard, R. E., *Imp. Coll. Trop. Agri. Trinadad Low temp. Res. Sta. Mem.*, p. 3, 47 (1936).
23. Leyley, V. K., *et al.*, *Ind. J. Agi. Sci.*, p. 13, 291 (143).
24. Mukherjee, P. K., *Hort. Adv.* p. 3, 95 (1959).
25. Srivastava, H. C., Personal communication (1961).
26. Chowdry, M. D., *J. Sci. and Agric.* p. 1, 173 (1950).
27. Bose, A. N., and Das, K., *J. Sci. and Ind. Res.*, p. 17A, 203 (1958).
28. Gribel, C., *Z., Untersuch Lebensm*, p. 55, 89, (1928).
29. Ramasarma, G. B. and Benerjee, B. N., *Agric. Live-stock India*, p. 8, 253 (1938).
30. Spencer, J. L. *et al.*, *Plant Physiology*, p. 31, 79 (1956).
31. Intergan, C. I. *et al.*, *Philippine, J. Sci.*, p. 83, 187 (1954).
32. Quinones, M. B., *Food Res.*, p. 9, 415, (1944).
33. Govindrajan, V. S. and Srinivasa, M., *Current Sci. India*, p. 19, 234 (1950).
34. Khan, A. W. and Chugatai, M. I. D., *Pak. J. Sci. Res.*, p. 8, 73 (1956).

35. Banerjee, B. N. and Karmarkar, D. V., *Agri. Live-stock*, p. 4, 36, India (1934).
36. Basu, N. M. *et al.*, *J. Ind. Chem. Soc.* p. 24, 325 (1947).
37. Subramanyam, *et al.*, *Food Sci.* C.F.T.R.I., Mysore.
38. Jaggannath Vaidu, *Ajuba-Jawahirath*, (Urdu), p. 93. The Texilla Ayurvedic Pharmacy, Chadosi, U.P. (1966).
39. Hazrath Qhaja Bande Nawaz Chusti. (Famous saint of Gulbarga, A.P.), *Amm-ki-dawa.* (Dak. Mss.) p. 110, (1400 A.D.).
40. Majeed Abdul, *Nusqajath*, (Urdu) Sira, (1926).
41. Hakeem Mahboob Ali Khan Bakshi, Amm-say-bimarioon-ka-illaj, (Urdu Mss.) Mandi Mohalla, Mysore (1959).
42. Hakeem Rasool Sahib, *Jiryan-ka-illaj*, (Urdu Mss.), 289, Mandi Mohalla, Mysore (1930).
43. Mastard, M. J. and Leynon, S. J., Florida, *Agri. Expt. Sta. Bull.*, 406 (1945).
44. Ramasarma, G. B. and Banerjee, B. N. *Ind. Inst. Sci.*, 23A, 1, (1940).
45. Siddappa, *et al.*, *Ind. J. Hort.*, p. 11, 104 (1954).
46. Wahab, A. and Khan, A., *J. Pak. J. Sc. Res.*, 6, 124 (1954).
47. Jaffe, W. G., G. Czysinciw, W., Cauderno, 4, (1954).
48. Jain, N. L., C.F.T.R.I., Mysore.
49. Rao, B. A. S. *et al.*, C.F.T.R.I., Mysore.
50. Prasad, H. H. and Joshi, N. Y., *Agri. J. Indi.* p. 24, 402 (1929).
51. Anand, J. C. and Johar, D. S. *J. Sci. Ind. Res.*, p. 17c. 203 (1958).
52. Singh, R. N., *Ind. Hort.* pp. 5-9. No. 4 (1967).
53. Dhillon, B. S., *Controlling Fruit Drop in Citrus and Mango. Ind. Hort.* No. 4, 1967.
54. Sharma, G. D. and Kapur, N. S., *Indian Food Packer*, pp. 34-36, Vol. XXI, No. 2. (1967).
55. Rasheeda and Suriya Begum, Mysore (1968).
56. Haji, Ghousepeer, G. M., *Pansari*, K.T. Road, Mandi Mohalla, Mysore (1968).
57. Antia, F. P., *Clinical Dietetics and Nutrition*, p. 402, 1st Edn. (1966).
58. Aman, *Personal investigation to Prolong Mango Life*, F. No. 118 (1966-67), *Indo-American Hospital, Mysore.*
59. Aman, *Clinical observations of mango-carotene on ovulatory phase after Child Birth*, F. No. 228, (1965-67).
60. Aman, *Clinical observation of mangoes in Diabeties*, F. No. 412, (1964-67).
61. Aman, *Clinical observation of mango kernel on the motility of Sperms and its Spermicidal Action*, F. No. 120, (1962-67).
62. Nadkarni, K. M., *Indian Materia Medica*, Vol. 1, pages 764 to 69: 1547. 3rd Edn. (1954).
63. *Book of the Mango*, Bul. No. 103, Dept. Bombay Agri., (1920).
64. Ahuja, S. S., 'Mango: King of Fruits' weekly Magazine, Deccan Herald, p. 6. June 6 (1968).

76. WATER-MELON

Melon (Water-melon): *Citrullus-vulagaris:* (B.N.); *Chayaphala:* (Sans.); *Tarbuz:* (Hindi, Urdu); *Kalangda:* (Dak.); *Kalangde-hannu:* (Kan.); *Batieq-hindi:* (Arab); *Darbusinipiteha:* (Tam.); *Tarvooja:* (Ori.); *Tarmuj-jol:* (Beng.); *Tahanni-matha:* (Mal.); *Tadbuch:* (Guj.); *Hindana:* (Panj.).

Family: Cucurbitaceae.

Zodiac: Leo.

Food Value per 100 g. approximately

Carbohydrate	4 g.	Magnesium	20 mg.
Protein	0.1 g.	Chlorine	43.5 mg.
Fat	0.2 g.	Copper	0.04 mg.
Calcium	10 mg.	Vitamin B_1	20 mg.
Phosphorus	10 mg.	Niacin	0.2 mg.
Iron	0.2 mg.	Vitamin C	1 mg.
Potassium	319 mg.	Digesting Time	2½ Hrs.
Sodium	13.5 mg.	**CALORIES**	17

Acid Base Balance/100 g.c.c. N/10 Alkali 75

Constitution: Cold and Wet 3°.

Physiopharmacology and Therapeutics

Water-melon is a huge summer-fruit which is grown on the sandy bed of rivers. Each fruit weighs between 25-40 lb. approximately. The outer covering is dark and light green with horizontal stripes and the pulp is spongy-pink and red in which hundreds of black or chocolate coloured seeds are embedded. Water-melon is a very common fruit in the State of Mysore and it is harvested during summer months between February and May.

Water-melon contains the highest concentration of water amongst all fruits. It is also rich in potassium salts and has a base forming property. It is therefore one of the safest and best

diuretics which can be used with very gratifying results in the treatment of diminished urination, kidney and bladder-stones, strangury, excessive discharge of phosphates in the urine metabolic acidosis such as ketosis encountered in diabetes and starvation[1].

A glassful of fresh water-melon juice mixed with a table-spoonful of honey is given with excellent effects in the treatment of cardio-vascular and renal disorders associated with sodium and water retention. Particularly when given with SEERPENA-*Himco*. 1 to 2 tablets t.d.s., it acts as a safe anti-hypertensive-diuretic in high blood pressure. In mild type of kidney diseases having low urinary output leading to uraemia, water-melon juice is an effective medicine. Water-melon should not be given in kidney failure associated with severe uraemia, but in mild cases one to two ounces four hourly can be given under the supervision of a physician.

Eating water-melon regularly during summer months quenches thirst, prevents the mineral loss due to excessive perspiration, forms a cooling and wet effect in the body and prevents the bad effects of heat radiations. In all kinds of fevers, its juice with glucose or honey can be safely given to supply nutrition and water. A glassful of juice mixed with a fresh lime-juice is given in dehydration in gastro-entritis, cholera, diarrhoea, dysentery, colitis, nausea and vomiting, chronic bronchitis, etc.

In habitual constipation due to sedentry habits, eating water-melon daily, not only lubricates the intestinal mucosa but also helps the natural movements of the bowels by supplying moisture in the intestines.

A glassful of juice mixed with equal quantity of butter-milk and a pinch of common salt is a medicine for jaundice, biliousness, sick headache, dryness of mouth due to diabetes, burning sensation while passing urine, gonorrhoea, cystitis, etc.[2]

A ripe fruit is cut into two halves and the pulp is scoped out to make it bowel like and is then put on the shaved head of the insane person. Change the water-melon cap after three hours and replace the other one. Repeat this process three to four times a day for four days using fresh melon everyday. The same method can also be used in the treatment of hysteria, insomnia, and other mental derangements. (Hakeem Ajmal Khan. (late) Delhi.)

Eating the white portion just under the peel along with the spongy red pulp and chewing the seeds after eating the fruit, counter acts the bad effects and excessive cooling in the body. Eating water-melon with rice-meal is bad for health. It causes indigestion and diarrhoea[2].

Water-melon as a beauty aid

Select a fresh ripe water-melon and make a hole in the usual way as one checks the fruit to see whether it is pink or white. Push about three handfuls of raw-rice, a handful of dry peas, a pinch of camphor and lime juice 2 teaspoons through the hole inside the fruit. Replace the cut portion on the hole and keep the fruit in cool place away from light for a week. Then, cut the fruit and take all the grains and peas and dry them in the shade. Powder the dry ingredients and keep in a clean jar with a lid. Apply a teaspoonful powder mixed with whole milk on the face before going to bed. Should you feel uneasy, wash it after half an hour and then go to bed. Regular use of this medicine bleaches the skin and makes you look more beautiful.

Seeds

Water-melon seeds are used in medicine from ancient times as a base in many Unani and Ayurvedic tonic preparations. Seeds contain a glucoside by name **Cucurbotrine.** Milky juice of the seeds obtained by grinding them and straining through a cloth is used in high blood pressure, scanty urination, burning micturation, haemoptysis in tuberculosis, loss of weight due to malnutrition and tuberculosis, gonorrhoea etc., with very good results. Adding few almonds and a teaspoonful of poppy-seeds to a tablespoonful of water-melon seeds and ground to get the milk is more effective in the above said diseases than the seeds alone. Sugar, sugar-candy or honey can be added to taste. Regular use of the seeds-milk protects the arterial lumen, reduces the blood cholesterol and helps one to live longer with a strong and healthy heart. Seeds are cool and wet in 2°.

77. MUSKMELON

Muskmelon: *Cucumis-melo:* (B.N.); *Kharguza:* (Hindi, Urdu, Dak.); *Kharbuz-hannu:* (Kan.); *Bateeq:* (Arab); *Kharoiza:* (Pers.); *Gadroo:* (Sind.); *Kharmuch:* (Beng.).

Family: Cucurbitaceae.

Zodiac: Aries.

Like water-melon, muskmelon also is a summer-fruit, but its action in the body is different. It is hot and wet in 2nd degree, whereas, water-melon is cool and wet in 3rd degree.

Fruit is diuretic, nutrient, laxative and antilithic. It is therefore, used in scanty urination due to sodium retention, constipation, stones and gravel in kidney and bladder. It is rich in vitamin A having 2400 I.U./100 g. Hence, its regular use prevents from vitamin A deficiency diseases. Eating the fruit in the morning before breakfast and in moon-light causes indigestion and vomiting. Usually, it is eaten with sugar which is not healthy. It should be eaten with honey or salt and pepper. Eating the fruit after the childbirth, increases the breast milk. Ripe fruit with greenish-yellow pulp variety is a heart tonic. It increases the muscular tone of the heart and increases longevity. Pulp of the ripe fruit is beneficial in eczema. It is eaten with jaggery to cure similar skin diseases.

Peel

Peel is rich in potash salts and its decoction with tender coconut water is given as a very effective diuretic and it is used to break the gravel in the bladder. Its paste with water is applied over the face to remove freckles wrinkles. Adding pieces of dry muskmelon peel while cooking meat, makes it delicious and softens the meat-fibres[5].

Seeds

Seeds are also diuretic, aphrodisiac, nutritive and fattening. Like, water-melon seed-milk, it is used to dissolve excessive uric

acid and gravel in the bladder. The milk with honey and dates, increases the secretion of semen and thickens it, increases the sexual desire and retentivity.

Paste of the seeds is applied over the face to whiten it. It is also applied over boils to help early pus formation and gives a cooling effect.

Constitution of the seeds is hot 1° and wet 2°.

REFERENCES

1. Hurkat, P. C., Rajasthan *Med. J.*, 6, 171, (1966).
2. Hamid Hussain, *Aquas-e-Phal*, (Urdu mans.), 1890, Bijapur, A.P.
3. Majeed, S. A., *Tarbuz aur Kharbuz sey Ilaj*, (Urdu mans.), (1926), Mysore.
4. Capsule, Bombay, p. 22, May, Vol. VI, No. 2, (1967).
5. Sarvar Taj, *Daccan may Hukama*, Urdu mans., (1965), Dept. of P.G. Studies in Hindi, Manasagangotri, Mysore.

78. PALMYRA

Palmyra or Fan-Palm Fruit: *Borasus flabellifer:* (B.N.); *Tad-ka-phal:* (Hindi, Urdu); *Munjal:* (Dak.); *Tati-ningu:* (Tam. Tel.); *Elampannam-kai:* (Mal.); *Tar:* (Arab); *Tala:* (Ori.); *Sindhi:* (Mar.); *Talshash:* (Ben.).

Family: Palmae.

Zodiac: Pisces.

Food Value per 100 g. approximately

Carbohydrate	4 g.	Potassium	200 mg.
Protein	0.7 g.	Sodium	20 mg.
Fat	0.3 g.	Vitamin A	Trace
Calcium	10 mg.	Digesting Time	2 Hrs.
Phosphorus	20 mg.	CALORIES	28
Iron	0.4 mg.		

Constitution: Wet and Cool 3°.

Physiopharmacology and Therapeutics

Fan-palm tree grows wildly as well as cultivated in the dry climate of South India in the Province of Kerala and Madras. It also grows in Ceylon, Bihar, Bengal, etc.

Jelly like kernel of the fruit is eaten with sugar during summer as a cooling medicine. Taken as it is, increases urinary output, flushes the urates through kidneys, reduces uric acid in the blood and prevents the formation of calculi. It fattens the body, tones up the spleen and liver if taken with honey.

Kernel of the tender fruit is useful in the treatment of palpitation of the heart and reduces heat in the body. Kernel quenches thirst in fevers and diabetes.

Fresh unfermented juice drawn from the trunk of the tree by making incision near its top is collected in earthen pot. It is a cheap source of yeast and B-complex vitamins. It is a very effective natural diuretic and cures burning micturation. Persons who drink this, are found to have immunity against tuberculosis. Jaggery or *palm-gur* made from the fresh juice is used to induce abortion and expel the placenta. Fermented juice is used as toddy for pleasure of intoxication, which is caused due to alcohol formed by self generation. Poultice made by mixing the fermented juice with rice-flour is applied over foul smelling carbuncles, blood boils, whitlow, cellulitis and other inflammations (K. M. Nadkarni). Drinking unfermented juice early in the morning expels the intestinal worms and prevents the reinfestation. Toddy taken with honey increases the sex stamina and makes the sperms motile.

Roots

The roots and the bark is rich in tannins. The infusion of the either is gargled in tooth ache and bleeding of the gums. The ash of the bark or the roots is a good dentifrice to cure and prevent pyorrhoea. Boiled roots are commonly used as a cooling food-medicine in Madras State.

79. PAPAYA

Papaya: *Carica-papaya:* (B.N.); *Papita or papaya:* (Hindi, Urdu); *Parangi-hannu:* (Kan.); *Shajar-ul-bateeq:* (Arab); *Arand-kharguza:* (Pers.); *Papali-pazam:* (Tam.); *Papaya-pazam:* (Mal.); *Papai:* (Mar. Dak); *Amruthabda:* (Ori.); *Kat-gadra:* (Sindhi); *Papaie:* (Guj.); *Peka-pape:* (Beng.).

Family: Caricaecae.

Zodiac: Aquarious.

Food Value per 100 g. approximately

Carbohydrate	10 g.	Chlorine	0.01 mg.
Protein	0.6 g.	Vitamin A	2,500 I.U.
Fat	0.1 g.	Vitamin B_1	40 mcg.
Calcium	180 mg.	Vitamin B_2	250 mcg.
Phosphorus	11.1 mg.	Niacin	0.2 mg.
Iron	2.1 mg.	Vitamin C	43 mg.
Potassium	250 mg.	Digesting Time	1½ Hrs.
Sodium	5 mg.	**CALORIES**	**43**
Sulphur	0.03 mg.		

Constitution: Cold and Wet 2°.

Physiopharmacology and Therapeutics

Papaya is a native of America. About 329,420 tons of papaya are yearly grown all over India. Apart from its food value, every part of the papaya tree is used as a medicine.

The green unripe fruit is rich in *papaine*, which is a very powerful *proteolitic* digestive enzyme. *Papaine* is the chief chemical constituent of the milky juice of the fruit. The raw fruit is used as a vegetable in the culinary preparations. It has a very contractile effect on the gravid uterus, therefore, it should not be used during the first trimester of it pregnancy. Peeled fruit eaten with common salt, cumin seeds and lime juice is a safe medicine for the treatment of constipation, roundworms, dyspepsia, indigestion of carbohydrates and lack of breast milk. Cooking a few slices of fresh raw-fruit with meat, makes it soft and digestable. The raw fruit is found to have a lethal effect on the roundworms. It is therefore used with sugar to expel the worms. Slices of peeled raw fruit with cumin-seeds and pepper is given once daily to cure enlargement of the spleen due to malaria.

A tablespoonful of the fresh milk is collected in a glass tumbler by incising the raw fruit on the tree. Add double the quantity of soda-bicarb, powdered ajwan seeds, fresh ginger

juice and grind the mixture finely. Dry it in shade and powder it again and preserve it in a well stoppered bottle.

A pinch of this powder taken immediately after food not only digests all the proteins and carbohydrates but also reduces the hyperacidity caused by indigestion. It can be given as a medicine for dyspepsia, heartburn, lack of appetite, itching in the anus due to pinworms, periodical palpitation due to intra abdominal pressure, etc. I have been using this preparation in such conditions with excellent results.

Few drops of fresh juice mixed with honey is given once daily to increase breast milk. Milky juice mixed with glycerine or honey is applied over inflamed tonsils, diphtheria, etc. It dissolves the membrane and prevents the spread of the infection. It should be borne in mind that diphtheria or other acute throat infections are very dangerous and they require quick acting life saving treatment with D.A.T. (Diphtheria Anti Toxin) in various concentration depending on the severity of the condition and other antibiotics to combat the infections.

Few drops of milky sap is applied as a cure over the pimples freckles, blemishes ringworm eczema, psoriasis, scorpion sting etc. Pluging the cervix with a cotton-swab dipped in the sap causes abortion in early months.

Ripe Fruit

Ripe fruit is delicious, nutritive, digestant, laxative and aromatic. It is the cheapest source of vitamin A, riboflavin and digestive enzyme papain. A few slices eaten immediately after food helps easy digestion and supplies the required amount of vitamins, minerals and checks the infection of intestinal parasites like round and pinworms. Eating the fruit regularly is effective in the prevention of the formation of urinary stones. It is believed that papaya is bad for health because it causes heat in the body. It is not true; it gives a cooling effect in the body.

Eating papaya with boiled egg-yolk is an excellent food-medicine to cure stomatitis, cirrhosis of the liver, corneal ulcers, weakness of the memory, lack of breast milk and general weakness. Addition of onion-juice and honey to the above recipe is a wonderful sex-tonic for nervous and weak persons.

Ripe papaya with honey is a medicine for urinary disorders having scanty urination, and it acts as a best tonic for heart, liver, brain, nerves and blood. It prevents the deficiencies of Vitamin A, B-complex and supplies abundant of potassium. It cures bleeding piles and constipation.

Ripe papaya mixed with milk and honey is an excellent tonic for growing children, during pregnancy and lactation, during treatment of tuberculosis and for all diseases of the eyes, gastric cancer, gastric ulcer, gastric acidity, etc. It is an energy giving food after the second week of coronary thrombosis. It can be taken by diabetics who are regularly taking insulin. For menstrual irregularities, particularly for the cessation of menstruation due to exposure to the cold or due to fright in young unmarried girls, papaya acts as a boon.

Seeds

Papaya seeds are rich in a substance known as *Carcin*. It is a very effective medicine for roundworms. A tablespoonful juice obtained by grinding the black seeds with ten drops of fresh lime juice is given once or twice daily for a month as a medicine for cirrhosis of the liver caused by malnutrition. It is a medicine for piles, dyspepsia, malaria, etc. A teaspoonful of the seed-juice is given after childbirth to contract the uterus and stop bleeding.

Leaves

Papaya leaves are rich in *Carpine* and other alkaloids combined with a glucoside *Carposide Carpine* is isolated by continuous crystallising from spirit in the form of colourless lusterous needle shaped crystals. Its chemical formula: C_{14} H_{25} O_2 N was formulated by MERC AND VAN RIGIN. The melting point of carpine is 112°C and it has a similar effect like digitalis on heart. As a substitute of digitalis it was once used on 0.5 to 0.85 mg. by intramuscular injection in disorders of cardiac irregularities and amoebic dysentery. (Col. Chopra. Indigenous Drugs of India).

Paste of the fresh leaves mixed with a grain of opium with a pinch of turmeric powder is applied over guinea-worm to eradicate it fully. Fomenting breast with hot papaya leaves increases breast milk.

Infusion of the fresh leaves is gargled to cure tonsillitis, ulcerative-stomatitis, gingivitis etc. Washing with it cleans and whitens the skin. Applying the lotion of the leaves stops bleeding and shrinks the haemorrhoids. A cupful of the infusion is given at night as a safe anthelmintic purgative. Wrapping meat in the leaves softens the fibres and makes it cook easily.

Root

Paste of the papaya-root is a very powerful abortifacient if given with bamboo-leaves decoction. However, it is risky to use it after third month of pregnancy.

80. PASSION FRUITS

Passion Fruit: *Passiflora-edulis* or *Foetida:* (B.N.); *Mukkopeera* (Sans); *Passion-phal:* (Urdu, Dak, Hindi); *Kordapacham-pazam:* (Mal.).

Family: Passifloraceae.

Zodiac: Taurus.

Food Value per 100 g. approximately

Carbohydrate	6.2 g.	Chlorine	36.6 mg.
Protein	1 g.	Copper	0.12 mg.
Fat	0.1 g.	Vitamin A	180 I.U.
Calcium	15.6 mg.	Vitamin B_1	0.3 mg.
Phosphorus	60 mg.	Vitamin B_2	0.17 mcg.
Iron	2 mg.	Niacin	1.7 mg.
Potassium	348 mg.	Vitamin C	50 mg.
Sodium	28.4 mg.	Digesting Time	2 Hrs.
Sulphur	18.7 mg.	**CALORIES**	**39**
Magnesium	38.6 mg.		

Acid Base Balance/100 g.c.c. N/10 Alkali 85

Constitution: Cold 2° and Dry 1°.

Physiopharmacology and Therapeutics

Passion fruit is not so popular in India, but still it is very useful as a nutritive fruit rich in vitamin C and vitamin A. Eating

this fruit not only nourishes the body but also prevents infections like: tuberculosis, typhoid, measles, small-pox etc., it cures scurvy and other diseases caused by vitamin C deficiency. It helps the children to grow healthy and strong.

81. PEACH

Peach: *Prunus-persica:* (B.N.); *Arhu:* (Hindi, Urdu); *Beyri:* (Dak.); *Peech:* (Guj. Beng. Mar.); *Marsebu:* (Kan.); *Pochadpaxam:* (Mal.); *Piccu:* (Ori.).

Family: Rosaceae.

Zodiac: Taurus.

Food Value per 100 g. approximately

Carbohydrate	9.1 g.	Copper	0.05 mg.
Protein	1.2 g.	Vitamin A	780 I.U.
Fat	0.3 g.	Vitamin B_1	20 mcg.
Calcium	4.8 mg.	Vitamin B_2	0.5 mg.
Phosphorus	25 mg.	Vitamin B_6	0.2 mg.
Iron	6.75 mg.	Niacin	1 mg.
Potassium	259 mg.	Pantothenic acid	0.15 mg.
Sodium	2.7 mg.	Vitamin C	8 mg.
Sulphur	5.7 mg.	Digesting Time	2½ Hrs.
Magnesium	8 mg.	**CALORIES**	**44**
Chlorine	1. mg.		

Acid Base Balance/100 g.c.c. N/10 Alkali 61

Constitution: Hot 1° and Wet 3°.

Physiopharmacology and Therapeutics

Peach is a valuable fruit which is abundantly cultivated in Ooty and other cold places. It is a native of China. Its spongy crisp pulp is rich in water and potash. It is therefore used as a thirst quenching diuretic fruit in fevers and other conditions associated with scanty urination. Eating the fruit with its peel before going to bed daily, cures habitual constipation and dissolves gravel in the bladder. It is a stomachic, demulcent, antiscorbutic and its regular use prevents round-worm infestation.

82. PEAR

Pear: *Pyrus-communis:* (B.N.); *Amrithaphala:* (Sans.); *Pear-nashpathi:* (Hindi, Urdu, Dak.); *Kumessra:* (Arabic); *Bokara:* (Pers.); *Vel-berrica:* (Tam.); *Desi-nashpathi:* (Guj. Ori. Mar.).

Family: Rosaceae.

Zodaic: Gemini.

Food Value per 100 g. approximately

Carbohydrate	13 g.	Vitamin A	70 I.U.
Protein	0.2 g.	Vitamin B_1	80 mcg.
Fat	0.1 g.	Vitamin B_2	0.3 mcg.
Calcium	10 mg.	Vitamin B_6	0.2 mg.
Phosphorus	20 mg.	Folic acid	2 mg.
Iron	0.6 mg.	Niacin	0.2 mg.
Potassium	129 mg.	Pantothenic acid	0.5 mg.
Sodium	2 mg.	Biotin	0.1 mg.
Sulphur	5.6 mg.	Vitamin C	3 mg.
Magnesium	9.3 mg.	Digesting Time	2½ Hrs.
Chlorine	1 mg.	**CALORIES**	**50**
Copper	0.20 mg.		

Acid Base Balance/100 g.c.c. N/10 Alkali 34

Constitution: Cold and Wet 2°.

Physiopharmacology and Therapeutics

Pear is cultivated in Kashmir, Ooty and other hilly regions. About 7,360 tons of fruits are yearly grown in India. It is rich in pectin, malic and citric acid. The presence of these substances makes it an ideal medicinal fruit in the treatment of dysentery, diarrhoea, enlargement of the liver and spleen and prevents the formation of renal and biliary stones.

Fermented juice of Pear is similar to cider and it is known as *Perry*. This beverage is used to cure rheumatism, gout, nephritis and burning micturation etc. A kind of oil is extracted from the kernel of the seeds which is used for making soaps etc.

83. PEAR-AVACADO

Pear-Avacado: *Persica-Americana:* (B.N.); *Butter-fruit:* (Engl.); *Makhanphal:* (Hindi, Urdu, Dak.); *Benney-hannu:* (Kan.); *Kullu-nashpathi:* (Beng.).

Family: Rosaceae.

Zodiac: Aquarious.

Chemical composition of this fruit is not available at the moment, however, it contains 3 to 4 per cent of fat, and 2-4 per cent of carbohydrate and minerals. The yellowish creamy pulp resembles like butter and is eaten with sugar for pleasure and taste. It is contraindicated in jaundice and diarrhoea.

84. PINEAPPLE

A. Cosmosms

Pineapple: *Ananasa-sativa:* (B.N.); *Ananas:* (Hindi, Urdu, Dak., Pers.); *Ananas-hannu:* (Kan.); *Anasa-pandu:* (Tel.); *Kayatha-chaccka:* (Mal.); *Supari-pansu:* (Ori.); *Anarash:* (Beng.).

Family: Bromioliaceae.

Zodiac: Gemini.

Food Value per 100 g. approximately

Carbohydrate	12 g.	Copper	0.08 mg.
Protein	0.6 g.	Vitamin A	60 I.U.
Fat	0.1 g.	Vitamin B_1	0.02 mg.
Calcium	12 mg.	Vitamin B_2	120 mcg.
Phosphorus	10 mg.	Folic acid	4 mg.
Iron	0.42 mg.	Pantothenic acid	0.17 mg.
Potassium	247 mg.	Vitamin C	50 mg.
Sodium	1.6 mg.	Oxalic acid	5.8 mg.
Sulphur	2.6 mg.	Digesting Time	2½ Hrs.
Magnesium	16.9 mg.	**CALORIES**	**50**
Chlorine	28.5 mg.		

Acid Base Balance/100 g.c.c. N/10 Alkali 70

Constitution: Cold and Wet 2°.

Physiopharmacology and Therapeutics

Pineapple is a very popular fruit available all over the world. It is a native of Brazil but also cultivated in tropical countries and its slices are canned in syrup. Many other preparations like; *squashes, cordials* and *syrups* are made from this fruit. There are about 80 to 90 varieties of pineapple, but *Kew, Jaldhoop, Queen* are popular. In India it is grown from 1548 A.D. and about 75,650 tons of pineapple are yearly grown now.

Unripe fruit is abortifacient, gastro-intestinal irritant and its fresh juice acts as styptic when applied over the freshly cut wounds. Eating unripe fruit causes diarrhoea and splits the tongue. It is bad for stomach and causes indigestion.

Juice of the fresh ripe pineapple is cooling and nutritive. It contains a very powerful digestive enzyme known as *Bromelin.* It is therefore used with much benefit in indigestion and hyper-irritability of the stomach. The fruit is rich in fibres and therefore, acts as a medicine for constipation. Besides vitamin C, pineapple is rich in carotene having the major constituents of carotenoid mixture *vialaxanthins* (*50 per cent*) *luteoxanthins* (*13 per cent*) *β-Carotene* (*9 per cent*) and *neoxanthine* (*8 per cent*). Less abundant carotenes are: *Zeta carotene, hydroxy alpha carotene crypoxanthins, lutein, auroxanthins* and *neochromes*[4]. It is rich in natural potassium, hence, it is given with good results in diseases of kidneys having scanty urination with burning micturation. Drinking a glassful of pineapple juice sweetened with sugar or glucose is a very pleasant cool drink during summer. It quenches thirst and counteracts the bad effects of sun's radiation. Eating pineapple regularly reduces the bad effects of excessive smoking It is proved that smoking reduces the vitamin C level in the bloo and eating pineapple supplies the required vitamin C. Perso suffering from the internal heat of the body can be greatly help by eating pineapple daily, because of its cooling effects. glassful of fresh pineapple juice mixed with a pinch of pep and salt is given daily once, to cure morning sickness, biliousness, common cold, piles, scurvy, anaemias etc. Fresh juice is gargled in diphtheria, tonsillitis etc. It is observed that children who were given pineapple regularly did not suffer from throat infections as

freely as they used to get before pineapple treatment. Usmani recommends the application of fresh pineapple juice to cure elephantiasis, eczema, leprosy and scabies. I tried this recipe in elephantiasis, but I did not find any remarkable effect and also there was hardly any change in leprosy. But in scabies and eczema, daily application of fresh juice showed a remarkable medicinal effect in mitigating the troublesome itching.

Fresh pineapple juice can be used with very gratifying results during the treatment of jaundice, hepatitis, gonorrhoea, nephritis, cystitis, coronary infraction, angina pectoris, palpitation of the heart, etc. Supplementing *Cystone-Himco.* 1-2 tablets, t.d.s., along with a glassful of pineapple juice is the specific treatment of urinary calculi in early stages of enlarged prostate where surgery is contraindicated; the patient is old and refuses to undergo the ideal prostectomy.

Ensilation of pineapple tops prepared with urea and Molases forms a very valuable fodder[5].

How to prepare pineapple juice[3]

After washing the ripe fruit, peel off the skin with a sharp stainless knife. Cut the pulp into fine bits and extract the juice by pressing through a coarse cloth. Add sugar equal to the extracted juice and mix well. After the sugar is dissolved, strain the mixture again through the cloth. Heat the mixture in a stainless vessel until steam is formed and pour the hot juice in sterilized bottles. Add a little lemon colour (Bush) and pineapple essence (Bush) at the rate of 5-15 drops per bottle of 24 ounces. Also dissolve 15 grs. of potassium-metabisulphite in a teaspoon of hot water and add to the bottled juice before sealing. Shake well and preserve in cool dark place. This juice can be used in off season as a reliable substitute for pineapple juice having all its qualities.

Pineapple jam[3]

Cut the pulp into fine shreds after peeling the fruit. Crush them thoroughly and make it a mash. Add equal the quantity of the mass and allow the mixture to stand for half an hour. Heat the ingredients over slow fire and fill it in open mouth jars. Cap them air tight and enjoy the taste when you desire.

REFERENCES

1. Bhattacharjee, S. C., *The Pineapple in India, Farm. Bull. No. 24, Ind. Con. Agri. Res.*, New Delhi, (1957).
2. Aiyappa, K. M. and Nanjappa, P. P., And now, *Why not Pineapple?* Lal-Baugh J. Vol. XII, No. 2.
3. Shankar, J. V. *et al., Home Scale Preparations of Fruits and Vegetables*, pp. 20-21, 10.1., 10.3; C.F.T.R.I. (1962).
4. Morgan, R. C., *J. Food Science*, 31, 2, 213 (1966).
5. Satapathy, N. *et al., Comparative Laboratory Study of Ensilation of Pineapple Tops and Leaves*, 'Food Packer', pp. 5 to 9. Nov.-December (1967).
6. George, P. V., *Pineapple promises a fair Foreign Exchange, Indian Horticulture*, pp. 83-86, No. 4, Sep. (1967).

85. PLUMS

Plums: *Prunus-domestica* or *americana:* (B.N.); *Alucha:* (Hindi, Urdu); *Aplogada-pazam:* (Tam.); *Aplo-gada pandu:* (Tel.); *Daraksh-churana thiram:* (Mal.).

Family: Rosaceae.

Zodiac: Capricorn.

Food Value per 100 g. approximately

Carbohydrate	8 g.	Chlorine	1 mg.
Protein	0.7 g.	Copper	0.10 mg.
Fat	0.4 g.	Vitamin A	280 I.U.
Calcium	20 mg.	Vitamin B_1	120 mcg.
Phosphorus	20 mg.	Vitamin B_2	36 mcg.
Iron	0.5 mg.	Niacin	0.3 mg.
Potassium	188 mg.	Vitamin C	5 mg.
Sodium	1.7 mg.	Digesting Time	2¼ Hrs.
Magnesium	7.2 mg.	**CALORIES**	40

Acid Base Balance/100 g.c.c. N/10 Alkali 48.

Constitution: Cold and Wet 2°.

Physiopharmacology and Therapeutics

Plums, cherries, apricots etc., belong to the same family and they are a good source of Vitamin A, B-complex and other minerals which are required for good health and longevity. These fruits are mostly grown in cold climate and are extensively used in

making fruit-salads, and canned them in syrup. There is very little medicinal value except some diuretic effects is noted in these fruits. About 11,240 tons of plums are yearly grown in India.

86. POMEGRANATE

Pomegranate: *Punica-granatum:* (B.N.); *Dadimaphalam:* (San.); *Anar:* (Hindi, Urdu, Dak.); *Ruman:* (Arab.); *Dalimbre-hannu:* (Kan.); *Dalimma-pandu:* (Tel.); *Dadam:* (Guj.); *Mathlam-pazam:* (Mal.); *Dalimba:* (Ori. Mar.).

Family: Puniaceae.

Zodiac: Taurus.

Food Value per 100 g. approximately

Carbohydrate	15 g.	Sodium	4 mg.
Protein	1.6 g.	Vitamin A	200 I.U.
Fat	0.1 g.	Vitamin B_2	100 mcg.
Calcium	10 mg.	Oxalic acid	100 mg.
Phosphorus	70 mg.	Digesting Time	1½ Hrs.
Iron	0.3 mg.	**CALORIES**	**65**
Potassium	171 mg.		

Constitution: Cold and Wet 1°.

Physiopharmacology and Therapeutics

Pomegranate is a very delicious semi-seedy fruit grown all over India, but, the good quality fruits are imported from Afghanistan, Kabul and Persia. There are about fourteen varieties of this fruit but, the sweet ruby-pink and the sour varieties are popular among them. It is a heavenly fruit praised by HOLY QURAN.

The juice of the fresh sweet fruit contains *glucose, fructose tannins* and *oxalic acid.* It acts on the liver, heart, kidneys and tones up their functions. It acts as diuretic in fevers and quenches thirst in summer. It supplies the required minerals and helps the liver to preserve vitamin A from the food that we take. It increases the body resistance against infections, particularly tuberculosis. Its juice is given with very good results to quicken

the recovery from tuberculosis, jaundice, hepatitis, cirrhosis of the liver, palpitation of the heart, coronary insufficiency, cardiac ischaemia, hypertension, insanity, mental tension, hysteria, morning sickness, nausea and vomiting due to excessive secretion of bile, stomatitis etc. Fresh juice is instilled in the eyes to brighten them and cure conjunctivitis, belepheritis and eye-pain due to strain.

Sour Pomegranate

The sour fruit is the most useful one in the medicine, than the sweet fruit. A tablespoonful of the juice given thrice daily acts as an antiscorbutic, antilithic anthelmintic and nutritive.

A tablespoonful of the juice mixed with equal quantity of honey is given with very gratifying effect in bilious vomiting and nausea, hiccup, burning in the chest due to excessive secretion of bile, jaundice, hepatitis, flatulent colic, rancid eructations due to indigestion of the food, morning sickness with severe weakness in primiparas, burning micturation, scanty urination due to hypertension, nephritis, toxaemia of pregnancy, cyclical vomiting in children due to acidosis, enlargement of the spleen, burning and itching in the anus and palms, headache due to tension and nervousness etc. Regular use of the fresh sour-pomegranate juice prevents the development of refractive errors and preserves eye-sight. It also prevents the infestation of roundworms and other intestinal parasites. Syrup pomegranate is a very delicious cool drink in summer.

Pomegranate can be kept fresh by treating them with 7 per cent *wax emulsion* and wrapping them with *diphenyl impregnated paper* having 40 mg. per sq. inch[6].

Seeds

The seeds of sour and sweet pomegranates are used in medicine. A teaspoonful of the seeds are ground into a fine paste and is given along with a cupful of horse-gram soup to dissolve gravel in kidneys and bladder. Swallowing the pips while eating the fruit is said to have a bad effect in the intestines and the impact seeds may cause appendicitis. The paste of the seeds with water is given to cure diarrhoea, dysentery and indigestion. The seeds are cool and dry in 2nd degree.

Rind: or Granati Fructi Cortex. B.P.C.

The rind of the fruit is astringent and it contains about 28 *per cent of tannic acid* identical to *gallotannic acid.* Decoction of the dry powder 15-30 grs., made by boiling it in a glassful of water is given to stop diarrhoea, dysentery and bleeding from rectum, lungs, or from nose. The same decoction mixed with a cupful of fenugreek infusion sweetened with honey is given as a medicine in bacillary dysentery, prolapse of the rectum, burning in the anus due to excessive acidity in the lumen, leucorrhoea, etc. Powder of the dry rind mixed with pepper, common salt in half the quantity of the rind powder is applied as a very good dentifrice. Its regular application strengthens the gums, stops bleeding, prevents pyorrhoea, cleans the teeth and preserves them for a long time. Decoction of the fresh rind with a pinch of salt is gargled in relaxed throat, tonsillitis, pharyngitis, toothache, sore tongue due to stomatitis etc. Decoction of the fresh rind mixed with a pinch of turmeric powder is used as a very effective douche in excessive white discharge per vagina, prolapse of the rectum in children etc.

Flowers

The buds of the pomegranate (*Gulnar*) are very rich in a crimson red colour and tannic acid. Dry powder or the decoction is used as a medicine to cure diarrhoea, haemoptysis in tuberculosis, leucorrhoea, spermatorrhoea, enlarged prostate due to oldage, sterility, menorrhagia and threatened abortion etc., due to progestrone deficiency. A pinch of the dry powder of the buds is *snuffed* to stop acute bleeding from the nose and is applied over the profusely bleeding cut minor wounds etc. A pinch of the powder inserted in the vagina before half an hour of conjugal union; gives a virgin pleasure due to contraction of the vaginal walls and acts as a contraceptive medicine. It is a medicine for senile vaginitis and burning in the passage due to excoriating uterine discharges.

Leaves

The leaves of the pomegranate also contain considerable quantity of tannins and the decoction of the leaves can be used in all

the indications described in the rind and the buds. The paste of the fresh leaves is applied over the eye-lids in conjunctivitis. It is applied over the body to stop the bad smell due to excessive perspiration, itching of the skin, scabies, eczema, ringworm etc. Massaging the paste of the tender leaves over the sagged breast, helps them to retain their firmness[3]. The noticeable effect is only possible when there is firm underskin fat and the person is not too old.

Bark

The bark of the stem or the roots is a powerful astringent and it contains a very effective alkaloid *Pelliterine-tannas*. This substance is a poison to tapeworm. Dr R. N. Chopra, recommends the following treatment to eradicate the tapeworm:

Boil 2 ounces of fresh pomegranate bark in 24 ounces of water until 12 ounces of decoction remains. Give 4 ounces of this infusion every hour in the morning and after the last dose give a brisk purgative of mag-sulph or castor oil 1-1½ ounce. This treatment is effective against all intestinal worms. Giving a dose of *CAMOQUIN-P-D. & CO.*, 2 tablets along with the first dose of the decoction is also very effective treatment to expel the tapeworm.

Juice of the fresh bark is instilled in the nose to cure congestive headache, bleeding from the nose, ozaena, etc. A tablespoonful of the fresh bark juice mixed with sugar or honey to taste acts as a medicine in diarrhoea. The alkaloid *Iso-pellatrine* acts on the mucous surface of the inflamed internal organs of the abdominal viscera and reduces the excessive secretions which cause diarrhoea. It also reduces the bronchial secretions and when given with honey reduces the expectoration and cures cough in bronchitis and asthma[2].

REFERENCES

1. J. F. Dastur, *Medical Plants of India and Pakistan*, p. 139, 2nd Edn., (1962).
2. Hakeem Gulam Dastagir, *Kanz-ul-Mujarabats* (Urdu mans.), 1888.
3. Hakeem Syed Sulatan, *Anar-ḵay-Qhuas* (Pers. mans.), 1910.
4. British Pharmaceutical Codex (1911), p. 1137.
5. Hakeem Muzafar Hussain Aiwan, *Qhuas-ul-Advia*, Urdu, 3rd Edn pp. 94-97.
6. Mathur, P. B., *et al.*, *Ann. Conven. Assoc. Food Technologists*, C.F.T.R.I Mysore, 56, (1965).

87. RASPBERRY

Raspberry: *Rubus-idaeus:* (B.N.); *Rasbhury:* (Urdu, Dak).

Family: Rosaceae.

Zodiac: Libra.

Food Value per 100 g. approximately

Carbohydrate	5.6 g.	Magnesium	21 mg.
Protein	0.9 mg.	Chlorine	22.3 mg.
Fat	0.9 g.	Copper	0.21 mg.
Calcium	40.7 mg.	Vitamin A	200 I.U.
Phosphorus	30 mg.	Vitamin C	100 mg.
Iron	1.2 mg.	Digesting Time	2½ Hrs.
Potassium	224 mg.	**CALORIES**	27
Sodium	2.5 mg.		

Acid Base Balance/100 g.c.c. N/10 Alkali 61.

Constitution: Cold and Wet 2°.

Physiopharmacology and Therapeutics

Raspberry is not a popular fruit in India and it grows only in hilly regions of Shimla, Darjelling and Ooty. Juicy crimson raspberries are a very cheap and useful source of Vitamin C and A, potassium and iron.

Raspberry syrup is a very delicious cool drink and can be given as a medicinal and nutritive drink in fevers, colds, rheumatism, scurvy and in other diseases where Vitamin C and A is indicated. It is said that eating fresh raspberries develops immunity against tuberculosis, heart failure, cancer and stomach ulcers. Perhaps these qualities may be attributable to the presence of high concentration of Vitamin C in raspberries.

88. STRAWBERRY

Strawberry: *Farigaria-vesca:* (B.N.).

Family: Rosaceae.

Zodiac: Pisces.

Food Value for 100 g. approximately

Carbohydrate	6.2 g.	Vitamin A	200 I.U.
Protein	0.7 g.	Vitamin B_1	30 mcg.
Fat	0.2 g.	Vitamin B_2	0.03 mg.
Calcium	25 mg.	Vitamin B_6	0.04 mg.
Phosphorus	30 mg.	Folic acid	5 mg.
Iron	0.71 mg.	Niacin	0.4 mg.
Potassium	161 mg.	Pantothenic acid	0.10 mg.
Sodium	1.5 mg.	Biotin	1.1 mg.
Sulphur	13.4 mg.	Vitamin C	60 mg.
Magnesium	12 mg.	Digesting Time	2½ Hrs.
Chlorine	17 mg.	**CALORIES**	**29**
Copper	0.13 mg.		

Acid Base Balance/100 g.c.c. N/10 Alkali 35.

Constitution: Cold and Wet 3°.

Physiopharmacology and Therapeutics

Like raspberry, strawberry is also not so popular in this country. It is rich in Vitamin C and its concentration varies according to the soil in which it grows and the deepness of its colour. The deeper the colour, lesser is the content of Vitamin C in it.

Regular use of this fruit prevents scurvy, anaemia, tuberculosis, and other infections, common during winter.

89. TOMATO OR LOVE APPLE

Tomato: *Lycopersicum-esculentum:* (B.N.); *Tamatar:* (Hindi, Urdu); *Bhetra-pandu:* (Dak.); *Chapprada* or *Tomato-hannu:* (Kan.); *Semay vanga pandu:* (Tel.); *Takkali-pazam:* (Tam. Mal.); *Vilayathi-baigan:* (Ori.); *Tomato:* (Sin., Guj., Mar).

Family: Solanaceae.

Zodiac: Pisces.

Food Value per 100 g. approximately

Carbohydrate	4 g.	Copper	0.10 mg.
Protein	1 g.	Vitamin A	14,160 I.U.
Fat	0.1 g.	Vitamin B_1	120 mcg.
Calcium	13 mg.	Vitamin B_2	60 mcg.
Phosphorus	25 mg.	Folic acid	1 mg.
Iron	0.1 mg.	Niacin	0.4 mg.
Potassium	360 mg.	Vitamin K	0.1 mg.
Sodium	3 mg.	Vitamin C	32 mg.
Sulphur	0.05 mg.	Oxalic acid	5.3 mg.
Magnesium	11 mg.	Digesting Time	2 Hrs.
Chlorine	51 mg.	**CALORIES**	21

Acid Base Balance/100 g.c.c. N/10 Alkali 56.

Constitution: Moderate and dry.

Physiopharmacology and Therapeutics

Of all the fruits and vegetables, tomato is one of the most commonly used fruits all over the world both as a fruit and vegetable. There are several varieties such as: *Golden Queen* (*yellow*); *Golden perfection* (*yellow*); *Best of all* (*Red*), *perfection* (*Red*), *Mar Globe*, *Trophy*, *Tangerine*, *Ponderosa*, *Monarch*, *Mikado*, *Ten Ton*, *Prize Taker*, *Blooms dale*, *Epicure*, *Ox heart* etc.

Raw Tomato

Tomato is rich in *citric*, *malic* and *oxalic acid*. It contains nore starch and no colouring matter. It is therefore cooked

before it is used. Unripe tomato begins to change into a beautiful orange-red colour as it begins to ripen and contains no starch. The presence of colouring matter: *lycospericum* makes it digestible even if it is eaten uncooked. The acids act as an antiseptic in the intestines and prevents the formation of gas.

Ripe Tomato

A fully ripe tomato is a boon to poor as a health giving food. Eating it daily supplies as much vitamin A as one gets by eating any one of the following foods:

Eggs	12
Cod liver oil	7 teaspoons
Sheep's liver	25 g.
Butter	50 teaspoons
Milk (Cow's)	15 cups
	etc.

Eating a tomato early in the morning is found to be a very effective medicine to prevent the formation of urinary calculi by supplying sufficient quantity of acids and Vitamin A and C. It is proved that deficiency of Vitamin A and C and the recurrent urinary tract infections are some of the most exciting factors in the formation of calculi. Tomato keeps the pH value of urine 5.5 or less which hampers the chances of infections by increasing the acidity of the urine.

Taking one or two ripe tomatoes early morning without breakfast for a couple of months not only helps the safe reduction of weight but also supplies the necessary food factors to safeguard the health. Tomato is also an ideal fruit-vegetable for a diabetic.

A glassful of fresh tomato juice mixed with a pinch of salt and pepper taken early in the morning is the safest medicine to cure morning sickness, biliousness, hepatic sluggishness, torpidity of the liver, jaundice, indigestion, waterbrash, excessive formation of gas in the intestines, constipation, diarrhoea due to indigestion, burning in the entire gastro-intestinal tract, constant burning feeling in the chest due to hiatus hernia, etc. Dr C. S. CARR, of America says, 'For torpid liver, eat tomatoes which contain vegetable calomel and then sip water freely between meals: due to high sulphur contents in it, it cures torpidity of the liver, rheumatism, skin diseases, tuberculosis and asthma'.

'Some people fight shy of tomatoes, holding the erroneous view that they contain oxalic acid in great quantities and should not be eaten by those with liver and kidney trouble. On the contrary, tomatoes are rich in salts of potassium and various vitamins and are excellent for faulty metabolism and cardio-vascular diseases'[1].

A glassful of fresh tomato juice mixed with honey, a pinch of cardamom seeds powder, taken after swallowing three peeled cloves of garlic every night before going to bed is the most powerful tonic during the treatment of tuberculosis and other lung infections. It increases the body resistance and prevents the formation of drug resistance and the relapse which is so common in tubercular patients. In asthmatics, it reduces the congestion in the bronchioles and checks the hyper-secretion of mucous and mitigates the spasms. Supplementing tomato juice with a teaspoonful of turmeric powder once daily is found to reduce *tropical eosinophilia* and free the pangs of breathlessness in asthmatics. Try this recipes by examining the total blood count and test the blood after a couple of months treatment and see how wonderfully it brings the eosinophilia count to normal. In very resistant and chronic cases it fails to act rarely. In such cases, supplementing *Hetrezan 50 mg.* (*Lederle*) once or twice daily with *tomato-turmeric-juice* continued as directed by a physician for a month or two is the specific treatment for tropical-eosinophilia. Taking fresh tomato juice with honey every morning purifies the blood and cures chronic diseases of the skin.

Fresh tomato juice with sugar or glucose is a very pleasant cool-drink in summer, fevers, general debility after physical or mental work, before and after taking part in sports, mental irritability due to nervousness, sleeplessness, constipation etc. Its Vitamin C increases the mental alertness during night automobile driving and keeps one fresh throughout the journey. The same can be given as a regular tonic to growing children, pregnant and lactating mothers, hard-studying students, practicing lawyers, engineers, doctors and patients who are recovering from acute febrile diseases.

Eating a tomato immediately after any non-vegetarian meal, not only helps easy digestion but also prevents the extra formation of acids. It reduces the thirsty feelings which are usually common after such meals. However, excess of eating of tomatoes or

cooking them with starchy foods like rice, potatoes etc., is bad for stomach (Usmani).

Externally, tomato can be used as a cosmatic. Pack your face liberally with the pulp of tomato and leave it there for an hour and then wash it with warm water. Repeat this every day and see how beautifully the complexion blooms and how the ugly looking pimples vanish, one after another in a short time. Poultice of a baked tomato is applied to hasten the pus formation in the boils and when applied over the ulcers, helps quick granulation and heals them soon.

Leaves

The juice of the whole plant including leaves mixed with equal quantity of til-oil is heated until all the watery part is evaporated and the oil is preserved in a bottle. A little oil massaged over painful joints, sprains, etc., and fomenting with dry heat gives a miraculous relief. It is noted that all solanaceae plants exert an analgesic effect when used externally.

The leaves can be cooked and used as a vegetable in rheumatism, gout, etc. Roasted flowers are useful to cure indigestion and flatulence.

How to prepare Tomato Juice at home and preserve it

Put ripe tomatoes in a stainless steel vessel and crush them with a wooden ladle thoroughly. Cook the crushed tomatoes for about 5 minutes and mash them while cooking. When the mass is sufficiently soft, remove it from the fire and strain it through a mosquito net and set aside the extracted juice.

Then add common salt 10 g., sugar 5 g., per kg. of the juice and mix the ingredients well. Pour the finished product into hot bottles which have been boiled in water for about half an hour. Seal them with crown corks and cool them later.

Tomato Ketchup

Recipe

Tomato-juice or the pulp	30 kg.	Mace (Javathri not ground)	2.5 g.
Chopped onions	375 g.	Cinnamon	17.5 g.
Chopped garlic	25 g.	Red chillies powder	12.5 g.
Cloves (whole)	25 g.	Sugar	1-1.5 kg.
Spices [Coarsely powdered cardamom, black pepper, Jeera (Cumen cymenium)]	12 g.	Malt vinegar	1.5 lit.

Method of preparation

Add ⅓ of the sugar to the pulp in the above given recipe. Tie the spices in a muslin cloth and immerse it in the pulp. Then heat the pulp till it thickens and is reduced to about ⅓ of its original volume. Remove the bag of spices and squeeze it well to extract the aroma and flavour. Add vinegar, salt and the remaining sugar and heat it to thicken it further for a few minutes.

Take a cupful of the finished product and add 350 mg. of sodium benzoate per kg. and mix it thoroughly. Adding the powder of Ascorbic acid in the form of Celin-Glaxo or Redoxon-Roche 50 mg., after pouring the ketchup in the bottles and corking air tight prevents the formation of a black mould and keeps it fresh. Tomato ketchup is a very good appetizer when used along with fish, eggs, cutlets and other snacks and regular meals. The beautiful crimson colour can be increased by dipping tomatoes in hot water having 45°C for 5 to 10 minutes and kept for a day before used for preparing ketchup or other preparations.

How to grow good tomatoes at home garden

Since tomato is an all season crop, it can be harvested all round the year.

Before you sow the good quality seeds purchased from a reliable nursery; the ground should be properly prepared and manured with compost or cowdung. Water the earth slightly for two or three days before the sowing of the seeds. Sow the seeds in a nursery bed mixing them with some *Gamexine*. I.C.I. powder and sprinkle water every day. After the seedlings are one month old; sow them in the prepared ground 50 cms. apart adding once again some gamexine powder to the ground. Earthing and stacking should be done when the plants are 25 cms. high. Tender side shoots should be removed. Putting dilute potassium permanganate solution weekly once to the roots of the plants brings out amazingly big tomatoes.

Pests and Diseases of Tomato

Borer of tomato or (*Heliothis obsolata*) is a green striped medium sized caterpiller which eats all parts of the plant and bores into the fruit by thrusting its head into the fruit and leaving the body outside.

Control of the pest

Dust D.D.T. 50 per cent concentration or sprinkle 0.2 to 0.5 per cent *FOLLIDOL* lotion. It can be prepared by following the rigid directions by dissolving *Follidol 2 to 5 c.c. in 1 litre of water to spray. (Follidol is a deadly poison, therefore, great care must be taken).* Bordeaux mixture is the safest insecticide which can be purchased by nearest Horticulture Office.

Diseases

Tomato Bacterial Canker: In this common disease the seedlings are stunned or killed. Stems, leaves and fruits are spotted and begin in decay. The prevention is to use disease free seeds. *Early Blight:* is another disease which can be identified when the tomato leaves begin to get brown having marks with concentric rings which slowly enlarge and destroy the leaves. There is no treatment of Early Blight, therefore, destroy the plant to save other healthy plants.

Septoria

Is another disease which appears as numerous small roundish brown lesions. Leaves turn yellow and fall off. Treatment same as Early Blight.

REFERENCES

1. Olga Shvetsova, *Vegetables* Soviet Woman, No. 9, p. 37, (1967).
2. Shankar, J. V. *et al., Home Scale Preparations of Fruits and Vegetables,* pp. 9-10, (1962).
3. Elsie Nalini, Viswanath, M. L., *The Need and Guidance for Expansion of Vegetable Cultivation,* Lal Bagh, Bangalore, (1964).
4. Majeed, S. A., *Quhas-e-Tarkari* (Urdu MSS.)
5. Hakeem Azad, *Tamtar-kay-Tibby Qhuas* (Urdu MSS.), (1935).
6. Hakeem Mhamood Baig, *Tamatar-sey-Gharelu-Illaj,* (Urdu MSS), (1929).
7. Usmani, Nutritive Value.
8. Capsule, Himco-Bombay, *The Prevention of Urinary Calculi,* No. 4, Vol. VI, July 1967.
9. Singh, N. S., *et al., Indian Food Packer,* p. 16, Vol. XXI, No. 6, (1967).

90. TODDY PALM-FRUIT

Toddy or Fish tail palm-fruit: *Caryota Urens:* (B.N.); *Kapilah:* (Sans.); *Sendola:* (Hindi, Dak.); *Echal-hannu:* (Kan.); *Indu:* (Tel.); *Periadhu:* (Tam.); *Sendi-ka-phal:* (Urdu. Mar.); *Kharik:* (Guj.).

Family: Palmae.

Zodiac: Cancer.

Constitution: Hot 1° and Dry 2°.

Physiopharmacology and Therapeutics

Toddy palm is abandantly grown wildly in the hot climate of South India. Raw fruit is rich in tannis and is used as a fodder to the cattle and sheep. Ripe fruit is more or less contains the same chemicals of date, but the pulp is very much less when compared to it.

From the sap of the tree toddy is prepared. After fermentation, the sap which is sweet becomes sourish-sweet and contains yeast B-complex vitamins and potassium. It is therefore used as a tonic beverage having slight alcohol in the treatment of urinary diseases with scanty urination. It is drunk in the same way as beer for health and pleasure. It is found that drinking toddy increases the *Nuclic acid* in the system and builts a barrier against tuberculosis germs. The scavenger community, who uses plenty of toddy, rarely suffer from tuberculosis and malnutrition in spite of poverty. Unfermented sap contains sugars and acts as an anabolic medicine to increase weight and gives strength by creating more hunger and digesting more food. Toddy mixed with rice-flour is applied as a poultice to hasten pus formation and early drainage of boils and abscesses.

The leaves are boiled in water and the steam is inhaled to cure cold and chest pains due to influenza. Decoction of the leaves is gargled to stop itching in the throat, tooth-ache etc.

Tender pith of the stem of the top is nutritive and cooling.

91. WOOD-APPLE

Wood-apple: *Ferona-elphantum:* (B.N.); *Gopakarna:* (Sans.); *Kayth:* (Hindi, Urdu); *Kaveet:* (Dak. Mar.); *Belada-hannu:* (Kan.); *Vilam-pazam:* (Tam.); *Velga-pandu:* (Tel.); *Kitha:* (Ori.); *Kathbael:* (Beng.); *Kothu:* (Guj.); *Vilam-pazham:* (Mal.).

Family: Rutaceae.

Zodiac: Capricorn.

Food Value per 100 g. approximately

Carbohydrate	16 g.	Iron	0.1 mg.
Protein	7 g.	Vitamin B_2	168 mcg.
Fat	0.7 g.	Vitamin C	100 mg.
Calcium	128 mg.	Digesting Time	3 Hrs.
Phosphorus	108 mg.	**CALORIES**	88

Constitution: Cold and Dry 2°.

Physiopharmacology and Therapeutics

Wood-apple tree grows wildly all over India. The fruit is round and its peel is hard like wood therefore, its name is wood-apple.

Pulp of raw fruit is rich in *oxalic, malic* and *citric acid* combined with concentrated *tannic acid.* It is therefore used in preparation of chutneys and pickles. Mashed seedless pulp is given to cure dysentery, diarrhoea and piles. Eating too much of pulp damages the teeth enamel and causes sorethroat.

Ripe fruit emits a very aromatic smell and its pulp mixed with jaggery or sugar and water is a very popular and cheap cool-drink during summer. It quenches thirst and cures biliousness, stops bad breath, bleeding from gums, supplies sufficient Vitamin C and increases body resistance against infections. Pulp of the fruit mixed with cardamom, honey and cumin seeds is given as a medicine to cure indigestion, diarrhoea, piles, cirrhosis of the liver in children due to malnutrition etc. Its regular use early in the morning acts as a medicine to tone up the sagging breasts due to poor development of mamary glands, prevents one from

cancer of breast and uterus and cures sterility due to deficiency of progestrone hormones. Ripe pulp is rubbed to alleviate pain caused by venomous stings.

Leaves

Powder of the leaves dried in shade with equal quantity of sugar-candy; one teaspoonful thrice daily with cold water is given to cure spermatorrhoea, pre-mature ejaculation and functional impotency with very gratifying results. An ounce of fresh leaf juice mixed with cumin taken twice daily cures urticaria.

Sap

The sap of the fresh bark 3 ounces, two corns of pepper, few drops of pure cow's ghee and a desertspoonful of honey given twice daily immediately after childbirth prevents the post-partum complications. (Hakeem Muzafar Hussain). The twig is used as a tooth brush to strengthen gums and stop bleeding.

Gum secreted in the trunk is used with honey to cure dysentery and diarrhoea. Gum 20 grs. dissolved in sugared cow's milk is given thrice daily as a valuable medicine for spermatorrhoea, pre-mature ejaculation, scanty urination, high acidity of urine etc.

92. ZIZYPHUS

Zizyphus: *Jujuba:* (B.N.); *Badari:* (Sans.); *Chinese date:* (Eng.); *Bair:* (Hindi, Urdu, Dak.); *Bore-hannu:* (Kan.); *Elanta-pazam:* (Tam.); *Regu-pandu:* (Tal.); *Bara-koli:* (Ori.); *Bor:* (Mar. Guj.); *Kul:* (Beng.); *Elanda-pazam:* (Mal.); *Phal-e-Kombaq:* (Arab.); *Kanar:* (Pers.).

Family: Rhamnaceae.

Zodiac: Taurus.

Food Value per 100 g. approximately

Carbohydrate	12 g.	Iron	0.7 mg.
Protein	0.7 g.	Vitamin A	70 I.U.
Fat	0.4 g.	Vitamin C	5 mg.
Calcium	30 mg.	Digesting Time	3 Hrs.
Phosphorus	30 mg.	**CALORIES**	**75**

Constitution: Cold and Dry 1°.

Physiopharmacology and Therapeutics

The fruit has been cultivated in China for centuries. In India it is also available as a wild fruit and is very common in dry regions. There are two kinds of this fruit the wild one Jharbheri is smaller and round but, the cultivated fruit is oval and fleshy and bigger in size. It is sweeter in taste when compared to the smaller kind.

Both the varieties of the fruit contain *zizyphic* acid, tannins, sugar and other minerals. They are equally effective in the treatment of diarrhoea, dysentery, gout, rheumatism, etc. Regular use of the fruit prevents the formation of gravel in the bladder, diabetes, constipation, leucorrhoea and cures spermatorrhoea.

A teaspoonful of the powder of the dry fruit is given to stop excessive menstruation. A handful of the dry fruits boiled in a pint of water until it remains half and then sugar or honey is added to taste. This mixture is used once daily as the last thing in the night to cure mental retardness and stubbornness in children with very good results. It increases the function of the brain by releasing more *glutamic acid* in the blood. Author recommends it as a very effective but very cheap nerve-tonic to sharpen memory and tone up the nerves.

A teaspoonful of the fresh juice taken with a pinch of pepper once daily is a remedy to prevent frequent attacks of colds and influenza. Ash of the burnt fruit is mixed with lime juice and applied over pimples as a cure. Adding seed paste to it increases its curative value.

Leaves

Externally the fresh leaf juice is applied to cure excessive perspiration under armpits hands and soles. It stops the bad smell caused by growth of bacteria due to excessive perspiration. Application of the paste of the leaves over the scalp and hair not only cleans but also it prevents the scalp diseases. It lengthens the hair and darkens them. Fresh leaves baked by putting them over the clothed mouth of a vessel in which water is boiling and covering the leaves with another plate to prevent the free escape

of the steam. Then the boiled leaves are pounded with some castor oil and the warm poultice is applied over the piles. This process is repeated twice daily for a week to get a marked relief.

Infusion of the fresh and tender leaves with salt is gargled in sorethroat, relaxed uvula, stomatitis, bleeding from gums with smarting pain and cracked tongue due to excessive eating of sour fruits. It can also be used as a lotion to wash the wounds and other foul smelling ulcers.

It is a compulsory custom in muslim community to bathe the dead body with water in which fresh zizyphus and pomegranate leaves are boiled. It is believed that it prevents the body from early disintegration.

Seeds

The kernel of the seeds mixed with honey is given as a cough medicine. Its paste is applied over painful boils and styes. Paste of the seeds with half a teaspoon of lime juice is applied as a poultice to hasten suppuration in blood boils and as a cure for scorpion sting.

Bark

The infusion of the inner covering of the bark is used as a purgative in constipation, rheumatism and gout. Its paste with water is applied to cure animal bites and venomous stings of bees, scorpions, wasps etc.

REFERENCES

1. Syed Ahamed, *Ber kay adviath* (Urdu MSS.).
2. Shiva Kumar, *Arogiya Darpana*, Kannada publication.
3. Syed Sultan, *Bichu-kate-ka-illaj*, (Urdu MSS.).
4. Mathur, R. C., *Systematic Botany*, p. 214, 5th Edn., (1965).
5. Dastur, J. F., *Medicinal Plants of India and Pakistan*, pp. 180, 249, 2nd Edn., (1962).
6. Muzafar Hussain Aivan, *Kitab-ul-Mufaradath*, pp. 145-146, 4th Edn., (1965), Lahore.

MISCELLANEOUS FRUITS

93. LITCHI

Litchi: *Litchie Chiensis:* (B.N.); *Chin-fruit:* (English); *Lechu or Leechi:* (Urdu, Hindi).

Family: Sapindaceae.

Zodiac: Taurus.

Constitution: Wet and Cold 2°.

Lichi or Litchi resembles to Loquat in size and shape having sourish sweet taste. It is a native of China and in India about 91,860 tons of fruits are yearly produced. Its juice is cooling, nutritive and a good source of minerals. It is therefore given in fevers to increase perspiration and urinary output. It tones up the heart and quenches thirst during summer and convalescence from acute febrile diseases. Its juice taken with a teaspoonful of rose-water and sugar, gives a cooling effect to the body.

Leaves

The juice of the leaves is applied as a cure for animal bite.

Seed

The paste of the seed is applied over the enlarged scrotum with some good results. It helps the reabsorption of the fluid in hydrocele. It is astringent and can be internally used for diarrhoea.

94. MANGOSTEEN

Mangosteen: *Gracina mangostana:* (B.N.); *Mangoostan:* (Hindi, Urdu, Beng.).

Family: Guttiferae.

Zodiac: Gemini.

Mangosteen is a fruit which resembles to a small apple. It comes to India from Singapore and Streetsettlement. Its pulp is purple and sweet. It is very delicious and melts in the mouth like butter. It is a good source of sucrose. Fruit is boiled in water and the infusion is given with sugar in dysentery, diarrhoea and gonorrhoea.

95. MULBERRY

Mulberry: *Morus nigra or alba:* (B.N.); *Toola:* (Sans.); *Shahtoot:* (Hindi, Urdu, Pers.); *Kamle-hulla-hannu:* (Kan.); *Toot:* (Arab.).

Family: Moraceae.

There are two kinds of mulberry: the white and the purple. The purple variety is common and used as a medicinal fruit to quench thirst and prevent colds. Fruit is rich in vitamin A and C.

Decoction of the leaves is used as a specific in sorethroat, diphtheria, laryngitis, pharyngitis etc. It is usually gargled thrice daily until the pain subsides. Other specific treatment should be given simultaneously to be on a safer ground, because, all acute throat infections, particularly diphtheria, septic tonsillitis etc., are very dangerous when they are neglected. The leaves are used to breed silk worms.

96. LANGSAT

Langsat: *Nephelium-langona:* (B.N.).

Family: Guttifereae.

Zodiac: Libra.

Langsat is rich in Vitamin B-complex, Vitamin C and iron. It is cooling and nutritive, but has no remarkable medicinal value.

97. FOX-BERRY

Fox-Berry: *Vaccinium vitis:* (B.N.); *Kola-phal:* (Urdu); *Samer-e-shugal:* (Pers.).

Family: Ericaceae.

Zodiac: Cancer.

Fox-berry is a very delicious fruit and its beautiful blue pulp is very popular in the preparations of jams, jellies and squashes.

98. KAMRAKH

Kamrakh: *Averrhoa-carambola:* (B.N.); *Kamrak:* (Urdu, Pers.); *Tamrak:* (Guj.); *Karmar:* (Mar.); *Kamrang:* (Beng.); *Chandra-pulli:* (Mal.).

Family: Gerimiaceae.

It is sour fruit commonly used to prepare pickles. It is yellowish-green in colour and has ridges over it. It contains oxalic and malic acid with some Vitamin C. It is used to cure biliousness catarrhal jaundice, diarrhoea, indigestion, etc. Raw fruit is bad for teeth and throat.

99. BELAMBOO

Belamboo: Like kamrakh, this fruit is also used for pickles and contains oxalic acid. It belongs to the same family of kamrakh but, does not contain any ridge and is smaller in size. (See vegetables).

100. SAPOTA

Sapota: *Achras-sapota:* (B.N.); *Chiku:* (Hindi, Urdu); *Naseberry:* (English).

Chemical composition

Moisture	73.2 per cent	Fat	1 g.
Protein	0.6 g.	Ash	0.5 g.
Carbohydrate	22.79	Fibre	2 per cent
Calcium	49 mg.		

(Diljit Singh)

Sapota is a very popular fruit in South India and it is cultivated in black soil for its valuable commercial value all over costal regions. There are varicus varieties in Sapota, but *Cricket Ball*, *Bangalore Jovana losa* etc., are popular. It contains plenty of sucrose, phosphorus, iron and potassium. Its regular use with

honey increases sex stamina and prevents premature ejaculation in nervous persons. Its jam or jelly can be made in a usual way is delicious and nutritive.

101. PHALSA

Phalsa: *Grewia asciatica:* (B.N.).

Phalsa fruit is an important commercial fruit for its valuable juice. It can grow well in all the soils and resists pests and viruses. Due to its 55 to 65 per cent juice, 2.8 per cent citric acid and traces of vitamin C, it forms an excellent drink in hot weather. (Diljit Singh. Indian Horticulture, p. 54, No. 4, July-Sep. 1967).

102. PRUNS

Pruns: *Ijas:* (Arab.); *Alue-Bokara:* (Pers.).

Pruns are grown at high mountains, mostly in Kashmir. Pruns are cold and wet in 2^{c}. They are used as commercial fruit.

In Unani and Ayurvedic medicines pruns are extensively used as a laxative, cooling and expectorant. In spite the fruits are sour and astringent, they are recommended for smoker's cough, bronchitis, biliousness, common cold, scanty urination etc. Water in which pruns are soaked is given to quench thirst in inflamatory fevers, diabetes, etc. Few fruits soaked in water and in the same water some tamarind pulp is mixed; sugar or honey is added and is given as a medicine for biliousness, constipation, urticaria etc.

Leaves

Decoction of the leaves is used as a medicinal gargle to cure colds and sore throat.

103. QUINCE

Quince: *Safarjal:* (Arab. Pers.); *Samar Qhand* or *Samarphal:* (Urdu, Hindi). *Beri:* (Dak.).

Quince is a common fruit during summer. There are two varieties namely; the sweet and the sour. It is cold 1° and dry in 2°. Fruit is used to cure bilious vomiting, weakness of the heart, liver, brain etc. It is astringent, cooling and an effective diuretic. It increases breast milk and quenches thirst.

Quince-Seeds: *Behi-dana:* (Urdu, Hindi).

Seeds resemble to apple-seeds, and have similar taste but contain mucilage. Seeds are very popular in Unani and Ayurvedic medicine. They are used as cooling medicine to cure stomatitis, sore throat, etc.

Seeds are soaked overnight in a cup of water and the mucilage is strained through cloth. Mixed with sugar or honey is given regularly two to three times during all types of fevers, such as: typhoid, pneumonia, tuberculosis, small-pox, measles, scarlet fever etc. It is also used to quench thirst, and cure stomatitis, sore throat, burning and soreness of the tongue and throat, burning in the stomach, dryness of the mouth, dysentery, diarrhoea, gastric ulcer, dry cough, pharyngitis, spermatorrhoea, etc. It is a specific medicine for chronic rhinitis and colds. In such conditions it should be used regularly three to four times daily for a month.

PART III

LEAFY AND NON-LEAFY VEGETABLES

LEAFY AND NON-LEAFY VEGETABLES

The term vegetables is that which signifies the food articles belonging to plant kingdom. These plant-foods are divided into two groups namely: *Leafy and Non-leafy vegetables.*

Leafy vegetables are chiefly the green leaves of certain species of plants which have no poisonous alkaloids and do not cause any gastro-intestinal disturbance when they are consumed as food.

Non-leafy vegetables are those parts of the plants like; *fruits, stems, flowers* and *roots* which are cooked and some of them are eaten raw as food without any harm.

These vegetables consist the major portion of our daily food next to grains, cereals and pulses. They are the chief source of good quality-food components like: VITAMINS, MINERALS, PROTEINS, FATS, CARBOHYDRATES, FIBRES AND HORMONES. Vegetables improve the digestion, stimulate the appetite, intensify the activity of salivary glands, pancreas, and liver and encourage the secretion of gastric juices. This ensures the normal chemical processing of food assisting assimilation of meat, fish, bread, fats and various cereals when taken with vegetables.

Carbohydrates in Vegetables

Carbohydrates in leafy-vegetables differ from non-leafy vegetables. The former are highly soluble than the later which are rich in starches.

Carbohydrates in the leaves are activated by the process of photosynthesis and are stored in the form of starchy grains. After the sun sets, the tanslocation draws off the soluble carbohydrates and their level of concentration falls. Then the starch is hydrolysed back to sugar.

Carbohydrates in some of the plants are purely sucrose and glucose in highly soluble form, hence, they can be safely taken where starches are forbidden. Vegetable-carbohydrates are superior to *grains, cereals, pulses* and *nuts*. They do not require much insulin to get metabolised in the body without any harm to the system even in diabetics. However, the non-leafy vegetables should be consumed carefully in diabetes etc.

Raw vegetables contain *tatoronic acid* which prevents the conversion of carbohydrates into fat, therefore, it is very important point to remember for those who are over weight.

Proteins in Vegetables

It is commonly believed that animal proteins are superior to vegetable-proteins, but, recent investigations in dietetics proved that the vegetable-proteins are equally good when compared to animal proteins. Block and Mitchel, after years of extensive research have isolated the following amino-acids in vegetables; they are: *Arginine 7; Histidine 2.1; Lysine 4.5; Trytophane 1.9; Cystine 2.0; Methionine 3.2* and *Threonine 3.2.* All these vegetable-proteins help the animal body to make animal-proteins in their own bodies and are stored in various tissues. Banana leaf, Sugar-cane leaves, cabbage, and other green leave can be used as the useful and cheap source of leaf protein[2].

Fats in Vegetables

Vegetable fats which are found in the form of oils and are th chief source of unsaturated fats which are superior to animal-fats The animal-fats are saturated ones which tend to cause high elevation of blood cholesterol. Such fats cause the narrowing of the blood vessels and favour the chances of heart failure, high blood pressure and other vascular diseases like cerebral haemorrhage, thrombosis etc. The moderate consumption of vegetable-fats is harmless, but, excessive use of the hydrogenated oils is certainly harmful to health.

Minerals in Vegetables

The highly soluble minerals like Calcium, Phosphorus, Iron, Magnesium, Copper, Arsenic, Potassium, and other trace minerals are rich in all parts of the vegetables. These minerals maintain the Acid-Base Balance of the Hydrogen concentration of the body tissues and help the complete absorption of vitamins, proteins, fats and carbohydrates of the food. They help the body to eliminate excess of liquid and salt. The diuretic action of vegetable like: Potatoes, beans, spinach, water melons radishes, turnip, brinjals, etc., is of specially important in cases of oedema, kidney and heart conditions. *Copper* and *permanganate* are

ılso found in legumes and leafy-vegetables which are indispen-ıable for blood formation.

Vitamins in Vegetables

All the life giving vitamins so far known are originated from 'egetables. They are abundantly found in highly soluble form n various parts of the plants. For example, Vitamin A is found n the form of *Carotens* and *Chlorophyll* in the dark green leaves ınd the redish pink colour of the plants. Vitamin B_1 is found in :he form of Thiamin, in the pale yellow stem of the plants, leaves ınd pulp of the non-leafy vegetables. Vitamin C, is largely ound in the tender tips of the leaves, in the form of Ascorbic acid. Vitamin D, is made and stored in the leaves which are exposed to he sun rays and supply your daily needs to form the healthy ones. Foilc acid and Vitamin P are also isolated from fresh egetables, mostly from lettuce, red-chillies parsley, spinach, omatoes, agathi leaves, cabbage etc. These leaves are found to revent megaloblastic anaemias of pregnancy due to the follates n them.

Fibres in Vegetables

Fibres in vegetables act as the mechanical intestinal expanders, draw more water and proteins in them and help the easy expulsion of the waste in the form of stool. They are activated by the nzymatic action of certain bowel-organisms and liberate carbon ıioxide. Persons who eat plenty of green vegetables therefore, complain of excess of wind in the intestines, which however, ;an be prevented by adding spices like; ginger, asafoetida etc., when they are cooked. Persons having some gastro-intestinal disturbances should use the green vegetables with care to prevent the bad effects of excessive formation of the gas. The fibres prevent habitual constipation and keep the entire intestinal tract free from harmful germs.

Fibres in the form of cellulose help the elimination of *cholesterol*. Especially valuable in this are *beet root*, *cabbage*, *carrots*, *cucumbers*, *green peas* and *beans*. They are useful in cases of arteriosclerosis, high blood pressure, constipation etc. But when there is inflammation in the intestines, vegetables having less cellulose content such as: *marrow*, *tomatoes*, *lettuce*, *potatoes* and *vegetable juices* should be given.

Hormones in Vegetables

There are certain hormones like *oestrogen* in the vegetables. These hormones act on the female organism to help the secretion of breast milk during breast feeding. Men are however not affected by them. Women who are having any cancerous tendency should be careful to use all the green leafy vegetables in large quantity, because, *these hormones help the quick development of cancer cells in the organism.*

Pectin in Vegetables

Pectin found in vegetables such as: *brinjals, radishes, pumpkin,* and *beet root,* absorb water, devour certain bacteria and toxins and eliminate them from the body. *Garlic, onions, radishes, mint* etc., have *pectin* and also *anti-microbic* qualities.

Nitrogen in Vegetables

Nitrogen supply from the plants is very essential to the human body next to animal-proteins. The vegetables supply it in the form of nitrates and maintain the nitrogen balance in kidneys. Vegetables act as anabolics and prevent the nitrogen waste in the body during high fevers and wasting diseases.

The magic Chlorophyll in Vegetables

The predominant colour in nature is GREEN. The leaves of gigantic trees, the leaves of plants, the leaves of creepers the leaves of flowering plants, the leaves of vegetables and the leaves of grass and even ivy are tainted with this magic colour which is attributable to a wonderful chemical known as *Chlorophyll.*

What is Chlorophyll

Chlorophyll is a chemical substance of green colour that is made up of at least six different kinds of Chlorophyll— *a, b, c* and *d* are found in *photosynthetic plants* and the other two are found only photosynthetic bacteria[3]. Chlorophyll *a* and *b* are mostly present in the green land plants that we see every day. They are made up of five different kinds of atoms:

Chlorophyll *a*: C_{55} H_{72} O_5 N_4 Mg.
Chlorophyll *b*: C_{55} H_{70} O_6 N_4 Mg.

How this wonderful substances are synthesized in the plants s not fully known. But, it is found that chlorophylls are formed nside the *Chloroplast* and they are organised in layered disk-haped structures called *Grana*. Each layer or *Lamela* is covered vith still smaller layers of protein, fatty substances, chlorophyll nd other pigments[3].

What is the function of Chlorophyll

Chlorophyll in the leaves traps the light energy and converts he atmospheric carbon dioxide into carbon and oxygen and vater by the process of *Photosynthesis*. Carbon is used for the evelopment of plant and Oxygen is released in the atmosphere. hlorophyll is a green blood in the plants, whereas haemoglobin red in the animal blood. The function of both the complex roteins is to carry oxygen but in different process. Animals ke Oxygen and give up Carbon dioxide, and plants take Carbon ioxide and give Oxygen. Therefore, if there were no chlorophyll the plants, life on the earth world have become impossible.

Twenty five years ago, John Harvey Kelloyg conducted xtensive researches with Chlorophyll. He discovered that hlorophyll is effective in promoting the healing of the wounds which has resisted all other methods of treatment. The healing rocess of mouth ulcers, pyorrhoea, bad breath, and other diseases of mouth that are indicated in various leaves of various plants this book are attributable to Chlorophyll. It is believed that lack of Chlorophyll may play a far more important role in the roduction of diseases than is now known[12, 13].

Chlorophyll exerts a mild bacteriostatic action presumably as a result of changes in oxidation-reduction mechanisms of bac-terial respiration. The compound stimulates the growth of fibroblasts in tissue culture and it appears to accelerate the healing of experimental wounds in animals[14].

Chlorophyll was found consistently to be effective deodorant when used on foul-smelling wounds and tended to give wounds a healthy granulating appearance. (Moss *et al.*, 1949). Thus the compound seems to be of value in wound healing. *Cloro-midon* and *Sulfa-Cloromidon-Pharmed*[16] ointments are some of the very effective topical, anti-bacterial, healing and deodorising pre-parations that are recommended as first aid medicines.

SOME GOLDEN TIPS ABOUT EATING VEGETABLES

1. Buy the best and fresh tender vegetables and cook them as early as possible.
2. Wash all vegetables in fresh running tap water or in dilut Hydrochloric acid solution. This removes all th harmful insecticides and germs from the surface o vegetables.
3. Never peel vegetables or cut them into small pieces o. let them stand in water for a long time. This drain out the useful water soluble vitamins, minerals and othe food factors from vegetables.
4. Boil water before you put the fresh vegetables and coo them in the little quantity of water for only about te minutes in a vessel having a tight lid. The leafy greer require still less time. Over cooking reduces Vitamin C present in them.
5. Do not add baking soda to retain the natural colour c vegetables. It is harmful to health.
6. Never reheat the stale, left-over vegetables, they are n good for health and cause intestinal diseases.
7. Do not eat only one kind of vegetable at a time, have a combination of three or four at a time and change them every day.
8. Remember, eating plenty of fresh vegetables is the sure insurance against disease and premature oldage.

How to keep your Vegetables Fresh

Vegetables can be kept fresh in a refrigerator, but they can alsc be kept fresh in cellophane bags having *tiny holes* punched in them. The bags should be tied with a string after vegetables are put.

REFERENCES AND BIBLIOGRAPHY

1. Olga Shvetsova *Vegetables* Soviet Woman, No. 9, p. 37, (1967).
2. Nelson, A., Medical Botany, p. 306.
3. Biological Science, pp. 290-92. *Indian Ed.* (1964).
4. Glaston, A. W., *The Life of the Green Plants*, Prentice-Hall, N.J. (1961).
5. Gabriel, M. L., *et al.*, *Great Experiments in Biology*, Prentice-Hall, (1955).

6. Bonner, J., *et al.*, *Principles of Plant Physiology*, Freeman Sans Francisco; (1952).
7. Machlis, L., *et al.*, *Plants in Action*, Freeman Sans Francisco, (1956).
8. Arnon, D., *The Role of Light in Photosynthesis*, Scientific American. Vol. 203, pp. 104-09. Nov. (1960).
9. Bassham, J. A., *The Path of Carbon in Photosynthesis*, Scientific American, Vol. 206, pp. 88-100. June (1962).
10. Rabinowitch, E., *Photosynthesis*, Scientific American, Vol. 189, pp. 80-84, Nov. (1953).
11. Wald, G., *Life and Light*, Scientific American, Vol. 201, pp. 92-100, Oct. (1959).
12. Good Health, June (1952).
13. The Magic Chlorophyll, *The Health*, Vol. XXX, pp. 229-30, No. 10, Oct. (1952).
14. Smith and Living Stone, 1943, 1945, Smith and Sano (1944).
15. Goodman and Gillman, *The Pharmacological Basic of Therapeutics*, 7th printing (2nd Edn.), p. 121, (1963).
16. Pharmed Private Ltd., 25-31, Rope Walk Lane, Bombay 1.

104. AGATHI

Agathi: *Sesbenia-grandiflora:* (B.N.); *Agastaya:* (Sans.); *Basna:* (Hindi); *Agsi-ki-bhaji:* (Dak.); *Agse-soppu:* (Kan.); *Avisi:* (Tel.); *Akkathi:* (Tam. Mal.); *Agathio:* (Guj.); *Agasthi-sag:* (Ori.); *Bang feel:* (Beng.).

Family: Leguminoceae.

Zodiac: Cancer.

Food Value per 100 g. approximately

Carbohydrate	12 g.	Iron	3.8 mg.
Protein	8 g.	Vitamin A	8995 I.U.
Fat	1.4 g.	Potassium	200 mg.
Calcium	1120 mg.	Digesting Time	1½ Hrs.
Phosphorus	105 mg.	**CALORIES**	**90**

Constitution: Hot and dry 1°.

Physiopharmacology and Therapeutics

The agathi tree is mostly cultivated as a back yard tree in South India. Its leaves, fruits and flowers are used as vegetable.

Every part of the tree is used in the treatment of various kinds of diseases with very good results.

Agathi leaves are not commonly used as a green vegetable, and if any one knows how much valuable this green is having enormous treasure of calcium, Vitamin A and iron, then only its nutritive value is appreciated. If you compare the contents of Agathi leaves in respect of calcium, that each handful of leaves will supply as much calcium as one gets by drinking 10 cups of pure fresh milk —or by eating 20 eggs or 500 g. of mutton or meat.

Vitamin A content of the leaves in the form of carotene is enough for the daily requirement of the body. To get this quantity of Vitamin A from other foods one must eat at least 5 kg. of mutton or drink 20 cups of pure milk or eat two egg-yolks.

Iron and phosphorus are also abundantly found in this green vegetable.

With all these considerations, fresh juice or decoction or curds of Agathi leaves prepared by heating the juice in a pan and after it splits the pure watery juice is strained. This process is technically known as 'Murooq' in Arabic.

A tablespoonful of fresh leaf juice thrice daily is used with gratifying results during treatment of tuberculosis, asthma, chronic coughs, emphysema, chronic bronchitis, rickets, Kwashiorkar's disease, night blindness, xerosis, and during acute febrile infections like typhoid, pneumonia, etc.

Mixing the fresh juice with wheat flour in place of water before it is baked or eating the leaves as cooked vegetable will prevent all the deficiency diseases caused by lack of calcium, iron and Vitamin A.

Fresh juice of the agathi leaves is medicinally very much effective when taken a cupful every night to cure scanty urination, chronic rhinitis, sinisitis etc. Leaf juice mixed with ghee and honey is applied over penis, increases the hardness while conjugal union.

Charaka recommends the use of fresh Agathi leaf juice mixed with a couple of garlic cloves and a teaspoonful of honey per each cupful of the juice; taken every night before going to bed; as a medicine for tuberculosis in early stages, asthma, emphysema, bad

smelling expectoration, excessive night sweating, general weakness of the body and feeling of tiredness after slight manual work etc. Taking the same medicine immediately after any type of meal helps easy digestion and prevents the formation of extra gas in the intestines.

Dhanavanthra, used Agathi leaves as a cure for jaundice and eye diseases. He recommended the regular use of the fresh leaves with honey to increase sex vigour and longevity.

Fresh juice of agathi leaves is instilled in the nose to cure chronic rhinitis, colds, nasal polypy, sinisitis, ozaena, loss of smell and itching of the nose. Its regular use increases copious nasal discharge and relieves the congestion. In chronic conditions, the juice must be put once before going to bed and should be regularly used for at least a month (Bhavaprakash of ancient India). Few drops of the fresh juice of leaves are put in the nose during the epileptic fits in children and its regular use not only cuts the duration of attacks but also cures the disease in its early stage. In adults who have more frequent attacks of fits, the juice mixed with two pepper corns and a little common salt and made into a thin paste and is applied in the eyes carefully, and few drops are put in the nose to stop the convulsions (Haritasamhita). The ancient physicians used agathi-leaves as anticonvulsant and Pandit Chandrabhan Singh used the juice with pepper and salt supplemented with few drops of fresh urine of a black cow, as nasal drops in the treatment of epilepsy. *Bhagavatha* used the paste of the leaves roasted in cow's ghee and after clarifying with goat's fresh milk to cure dimness of the vision, night blindness, dry scaly skin, and impotency. If one analysis the chemical composition of the goat's milk and Agathi leaves and compares the therapeutic value of Vitamin A, phosphorus etc., in the treatment of night blindness and sex-vigour he will bite his finger in appreciation of the knowledge of our ancient masters. Fresh juice with a teaspoonful of honey and two or four drops of fresh onion juice is used, in most resistant types of chronic coughs in children with very gratifying results. In whooping cough, it should be used daily thrice along with almond oil half a teaspoonful. The curative effect is remarkable after a fortnight's regular use of this medicine. Dr K. M. Nadkarni, advises the application of the juice over the fontenals of the babies suffering from common cold as an effective remedy.

Fruits and Flowers

Agathi fruits and flowers are used as vegetable. They are nutritive, cooling, diuretic and laxative. Ripe fruits are cooked and used as medicine in sinus and tumourous growth (Brihannirghantukara). Fresh flowers fried in ghee are given thrice daily to cure leucorrhoea. Fresh flower juice 2 teaspoons mixed with equal quantity of honey is given thrice daily as an expectorant in bronchitis. Flower juice is put in eyes to cure conjunctivitis and dryness of the eyes.

Ghee prepared from buffalo's butter that is prepared from the milk in which agathi flowers are boiled is used externally with gratifying results in contact dermatitis, skin eruptions etc. (A. C. Bisharad). Nadkarni's, Indian Materia Medica, pp. 52-54 (1954).

Root

Root is given with honey to cure common cold and catarrh

105. ALTERNANTHERA SESSILIS

Alternanthera Sessilis: *Honagone-ki-bhaji:* (Hindi, Dak.); *Honagone soppu:* (Kan.); *Ponnangannikkirai:* (Tam.); *Ponagantikeera:* (Tel.).

Family: Amrantaceae.

Zodiac: Pisces.

Alternanthera Sessilis is a very cheap and common green vegetable very popular in folk-medicine. Its soup is found to be very effective in preventing colds and cough. Fresh juice a tablespoonful mixed with a *clove of garlic* is given daily once or twice as a medicine to cure intermittent fevers, asthma, chronic cough, chest pain with general weakness, etc. Its soup increases breast milk and tones up the liver.

Fresh juice of the whole plant is mixed with equal quantity of pure *coconut* or *til oil*, and heated on gentle fire to evaporate

the water; when the oil is cool preserve in a clean bottle. This is a very cooling medicated hair oil. It induces sleep, imparts a feeling of refreshness in the brain and eyes and helps the luxurious growth of hair.

Fresh juice of the leaves a tablespoonful, mixed with equal quantity of fresh juice of the *Woodapple leaves* and a teaspoonful of fresh juice of the *Coriander leaves*, taken every night for 2 months with milk is a very effective medicine for spermatorrhoea. Fresh leaves are applied over eyes to cure conjunctivitis, styes, belepheritis and strain in the eyes due to constant strain. Fresh leaf juice 2 tablespoon mixed with equal quantity of *radish leaf juice* given 2 to 3 times daily for a month cures bleeding piles.

A cotton cloth is soaked in the fresh leaf juice and dried in shade. After a week, the cloth is made into a vick and dipped in *Castor oil* and is lighted. The soot is collected over a new earthen plate. The dry soot is mixed with castor oil and kept in a clean small open mouth bottle. It is used to make one's eyes look beautiful and to prevent eye diseases. It imparts a feeling of cool sensation in the eyes, prevents from excessive lacrimation, eye strain, early appearance of cataract, refractive errors etc. (Miss Mumtaz of Heserkete, Bangalore).

Root

Fresh root juice 1 cupful is given every hour in snake bite.

106. AMARANTH

Amaranth or **China Spinach:** *Amaranthus-Paniculatus* or *Caudatus:* (B.N.); *Maredu:* (Sans.); *Chaulai:* (Hindi); *Dant:* (Urdu, Dak); *Boqla-e-maniya:* (Arab); *Taje Khurus* (Pers.); *Rajgirahsoppu:* (Kan.); *Mulaikerai:* (Tam.); *Thota-koora:* (Tel.); *Elamcheru cheera:* (Mal.); *Khanda Saga:* (Ori.); *Banopata-nate:* (Beng.); *Tandaljo:* (Guj.).

Family: Amrantaceae.

Zodiac: Taurus.

Food Value per 100 g. approximately

Protein	4.9 g.	Vitamin B_1	36 mcg.
Fat	0.4 g.	Vitamin B_2	2.5 mcg.
Carbohydrate	6 g.	Niacin	11.1 mg.
Calcium	397 mg.	Vitamin C	150 mg.
Phosphorus	83 mg.	Sodium	230 mg.
Iron	25.5 mg.	Magnesium	247 mg.
Vitamin A	2,485-10,970 I.U.	Potassium	341 mg.
		CALORIES	**50**

Constitution: Cold 1° and Wet 2°.

Physiopharmacology and Therapeutics

Dantu is a very cheap and popular green-leafy-vegetable grown all over India. There are number of varieties in this family. Such as: *Amaranthus-olerecia, A. Spinosus etc.*

Half a cup of fresh leaf juice supplies as much food value as one gets by eating any one of the following foods: *2 cups of pure milk, 520 apples, 5 eggs, 250 g. of fresh liver, 3 oranges, 25 g. of mutton etc.*

It is therefore a boon to the poor people who cannot afford to eat such costly foods.

I recommend fresh-leaf-juice one cupful two or three times a day as a best vitamin and mineral tonic during the treatment of malnutrition, anaemias, cirrhosis of the liver, jaundice, hepatitis etc.

Eating this wonderful green vegetable prevents the deficiency of Vitamin A, Vitamin B_1, Vitamin B_2, Vitamin C, Calcium, iron, and potassium. It protects one from getting defective eye sight, cancer, respiratory infections, poor growth, functional sterility, recurrent attacks of colds, etc.

Eating cooked Amaranthus along with *honey* and *wheat bread* helps the healing of gastric-ulcers, cures the most obstinate constipation, spermatorrhoea, pre-mature ejaculation, leucorrhoea and torpidity of the liver.

Drinking fresh juice along with *honey* is a remedy for chronic bronchitis, asthma, tuberculosis emphysema. (In infections such as tuberculosis, lung abscess etc., supplementing the indicated treatment is advised).

Giving amaranthus fresh leaf juice one cup every day with *honey* and a pinch of *Cardamom powder* during the entire period of pregnancy, helps the normal growth of the baby, prevents the extra use of calcium, and iron from the body reserves, relaxes the uterine ligaments and eases child birth without much pain. Later, it shortens the laying-in-period and checks from the post-natal complications. It acts as a tonic and increases the breast milk.

A teaspoon of the fresh juice mixed with few drops of *honey* given once every day after a fortnight of the birth, helps the baby to grow healthy and strong. It prevents the constipation and eases the teething process as the baby grows.

Growing children can safely be given as a cheap natural protein tonic having all the benefits of a costly tonic. It contains all the essential *amino-acids* in the following concentration: *(g/100 g. protein): Arginine 14.8, Histidine 2.9, Isoleucine 6.9, Leucine 8.0, Lysine 8.2, Cystine 2.2, Methionine 2.5, Phenylalanine 4.8, Threonine 4.4* (Limiting amino acids), *Tryptophan 0.9*, and *Valine 6.1*.

In anaemias a cupful of fresh-leaf-juice supplies double the required daily iron in the most highly assimilable form. It does not cause any metalic taste in the mouth or any gastric-irritation as one finds in taking metalic iron. In tropics, iron deficiency is the major cause of malnutrition infections and high mortality. Its regular use prevents one from getting pre-mature oldage, by preventing the disturbance of calcium and iron metabolism which usually occurs in oldage. According to *Dr Van-Sylke*, Calcium molecules begin to get deposited in the bone tissues as one becomes old. This haphazard calcium distribution is influenced by the improper molecular movements of iron in the tissues.

If this molecular disturbance of calcium and iron is prevented by regular supply of food-calcium and iron and the health is maintained from the early age. The process of aging can certainly be prevented. *Dr V. Sylke* proved and altered the process of quick aging by administering *iron-dextran* to the old people. [For details see aging and Calcium in CRAB (flesh-foods)].

For getting the high concentration of iron from green-leafy vegetables, it is advised to pluck the leaves after the sunset and eat

by cooking them delicately. Because, after the process of photosynthesis is stopped, the ready made plant iron is used during the night for the growth of the plant, and the iron content falls to low concentration in the morning.

A cupful of fresh-leaf-juice mixed with a teaspoonful of *lime juice* taken every night is a natural tonic for all bleeding tendencies, such as bleeding from gums, from nose, from lungs, piles, excessive menstruation etc. The same given every night during oedema caused by kidney, liver and heart disorders increases the urinary out put, eliminates excessive salt, reduces blood cholesterol and lowers the high blood pressure. It tones up the heart and nerves and exerts a tonic effect during sickness.

Application of the fresh-leaf-juice helps the growth of the hair, keeps them silky soft, retains their black colour and prevents from the premature greyness.

The juice applied over the face with a pinch of *turmeric-powder* bleaches the skin, prevents it from dryness and wrinkles, cures pimples and makes one look flower fresh. If milk and lime juice is added to the juice and delicately massaged over the face and neck for half-an-hour and washed with luke warm water every night before going to bed; it acts as a best and effective skin-tonic to increase and retain the beauty.

For itching of the skin due to dryness, scabies, eczema etc., the fresh leaf-juice mixed with a pinch of sulphur is applied half an hour before taking the bath with very good results.

Seeds

The seeds of amaranth pounded with *sugar* or *jaggery* are used to cure leucorrhoea and excessive bleeding during menstruation. Dose ½ to 1 teaspoon at a time once or twice a day to be used for a month.

107. AMARANTHUS SPINOSUS

Amaranthus Spinosus: *Katemat:* (Hindi); *Mullu-dantu:* (Kan.).

The plant grows wildly during rainy season and it is available all over India and Pakistan. It contains thorns and can be used as a vegetable.

Native physicians use the leaves of this plant along with *wheat bread* without adding any spices and its decoction is given instead of water to cure the bad effects after the use of wrongly prepared Calcined metals. (*Kushta-e-Qham*) (or *Kacha bhasma*—Hindi) (Hakeem Muzafar Hussain).

The paste of the leaves mixed with a pinch of *common salt* and *turmeric* is applied as a poultice on blood boils with very good results. I have tested many times and found to be very effective in ripening and opening the boils.

Fresh juice of the whole plant including the roots is given as a specific medicine for dropsy caused by liver disorders. It not only rectifies the liver but also removes excess of water causing profuse urination.

A teaspoonful of the dry seeds soaked in water is given every day for a week to cure painful menstruation and excessive bleeding in young girls (Hakeem Syed Sultan).

108. AMARANTHUS VIRIDUS

Amaranthus Viridus: *Tanduliya:* (Sans.); *Chudi ki bhaji* or *Choti: Chauli ki sag:* (Hindi); *Kire soppu* or *Gorjai soppu:* (Kan.); *Kuppaikkirai:* (Tam.); *Chilakathotakura:* (Tel.).

Like *dantu,* (*A. gangeticus*) and cook's Comb: (*A. Polygamus*) *A. Viridus* is also a very popular green commonly used as medicinal herb. It is mostly used to cure liver disorders like; jaundice, hepatitis, dropsy, stomatitis etc. It is used in dry hacking cough, burning in the urinary tract due to high acidity etc. Its regular use as a vegetable, protects the liver, purifies blood and increases body resistance against infections.

Native physicians use the fresh leaf juice to purify aconite and other poisonous herbs.

REFERENCES

1. Mathur, R. C., *Systematic Botany*, p. 330, 5th Edn.
2. Dastur, J. F. *Medicinal Plants of India and Pakistan*, p. 18, 2nd Edn.
3. Muzafar Hussain Aivan, *Kitabul Mufaredoth*, p. 222, (Urdu), 3rd Edn.
4. Syed Sultan, *Jadi-butiyan kay Qhuas* (Urdu Mss.) (1920).
5. Swaminathan, M., and Bhagwan, R. K., *Our Food*, p. 158, (1966).

109. AMARANTHUS POLYGAMUS

Amaranthus Polygamus: *Mat-ki-bhaji:* (Hindi, Dak.); *Kirick-sale soppu:* (Kan.).

This green vegetable is extensively used in all over Mysore State. Its regular use rectifies the improper balance of body humours and prevents one from getting frequent attacks of cold, urinary diseases, blood diseases, etc. It increases urinary out and prevents the formation of stones, reduces the acidity of the system.

The juice of the whole plant mixed with *rice-washed water* is given every half an hour to cure snake bite. Juice of the fresh root mixed with *smoke-soot* commonly found in kitchen is ground into paste. To this mixture *6 parts of ghee, 4 parts of milk* is added. Then the mixture is heated to evaporate the water. This medicinal ghee is preserved after cooling. A teaspoon of it is internally given and a little is also applied over scorpion, bee, and other insects stings with gratifying result.

Fresh plants are dried in sun and they are burnt. The ash mixed with little water is applied over the face to cure pimples, black heads etc. Root juice 2 teaspoons mixed with equal quantity of honey is regularly used as a very effective uterine tonic. It cures functional disorders of uterus and enables one to conceive[4].

110. BAMBOO

Bamboo: *Bambusa-tulda* or *dendrocalamus:* (B.N.); *Vanasa* or *Vansh:* (Sans.); *Bans:* (Hindi, Urdu); *Bhans:* (Dak.); *Taba-shira:* (Arab); *Khsab:* (Pers.); *Bidru:* (Kan.); *Mangal*: (Tam.); *Bonga:* (Tel.); *Elam-kumbugal:* (Mal.); *Kalki-pan:* (Mar.); *Banash* or *Vasni-kupal:* (Guj.); *Bonus:* (Sindhi); *Karadi-bansa-Gaja:* (Ori.); *Magar:* (Punj.); *Bansa-kurbansa:* (Beng.).

Family: Graminaceae.

Zodiac: Cancer.

Food Value per 100 g. approximately

Carbohydrate	9 g.	Niacin	0.4 mg.
Protein	5.5 g.	Phosphorus	111 mg.
Fat	0.4 g.	Digesting Time	2 Hrs.
Iron	0.5 mg.	**CALORIES**	55
Vitamin A	Trace		

Constitution: *Raw:* Wet and dry 1°.
Burnt: Dry and hot.

Physiopharmacology and Therapeutics

Bamboo grows wildly in most of the parts of India. It belongs to grass family, but reaches a height of 120 feet or even more.

The stem of the bamboo is elastic and very hard due to deposit of *Silica* in the cell wall. Therefore, it is very valuable in the manufacturing of musical instruments, agricultural implements, ladders, mats, baskets, paper, brushes, walking sticks etc. Bamboo is largely used in buildings and bridges[5].

Bamboo leaves are a rich source of *hydrocyanic* and *benzoic acid.* Tender bamboo-shoots contain various enzymes such as: *nuclease, deamidase, proteolytic enzyme, amylase, amigdalin spliting enzymes* and *Silicin spliting enzymes.* MAEDA found and experimentally proved that bamboo-shoots also contain *phosphorylase* and *B-amylase.* Besides these enzymes, the juice of the pressed bamboo-shoots possesses *protease activity* and the juice shows strong *peroxidase activity.*

Bamboo-shoots are used as food by the poorer classes of people. However, *C.F.T.R.I.* of Mysore has perfected the bamboo-shoots preparations such as: *Bamboo-candy, Bamboo chutney (Sweet), Canning of Bamboo in syrup, Canning of bamboo in brine and canning of bamboo in curried vegetables.*

Bamboo Candy[2]

Select tender bamboo-shoots 6 to 10 inches long. Remove the covering leaves with a sharp knife and cut the tender portions into small pieces. Scrape the green portion on the pieces if any.

Boil the cut pieces in water 2-3 times for half an hour each time, to remove the bitter taste and other harmful acids. Change the water every time. Prick the boiled pieces with needle and thread them to 6 or 10 inches long.

Prepare syrup by mixing 3 parts of sugar with 7 parts of water. (Use 1.75 kg. of syrup per kg. of shoots).

Put the prepared bamboo-shoots or boiled pieces in the syrup and boil for few minutes. Allow them to stand in the syrup for 24 hours.

Drain the syrup and add about 10 per cent of more sugar and boil it. Pour it back on the pieces. Repeat this process every day until the concentration of the Syrup reaches 60° brix. At this stage add a small quantity of citric or tartaric acid (about 0.1 per cent of the total weight of syrup). Increase the strength of the syrup by 5° Brix each day till it reaches 75° Brix. Keep the pieces in the syrup for a week.

Boil the shoots along with the syrup for about 5 minutes. Drain the syrup while still hot and roll the pieces in finely ground sugar. Flavour may be added according to individual choice. Place the sugared pieces on wooden tray and dry them in shade. Preserve in air tight glass jars.

Bamboo Chutney (Sweet)[2]

Boiled pieces of bamboo-shoots are finely minced or finely chopped with a sharp knife. Add them in the following ingredients.

Minced or chopped tender shoots	2 kg.	Red chillies finely ground	30 g.
Sugar	2 kg.	Onions finely chopped	30 g.
Salt	95 g.	Garlic finely chopped	30 g.
Cardamom, cinamon, cumin	60 g.	Malt Vinegar	95 ml.

Add sugar, salt, and a little water to the minced shoots and warm them in an aluminium pan until sugar and salt dissolves. Tie the spices loosely in a thick muslin cloth and leave the bag in the pan. Continue to cook till all the spices have become soft. Remove the spices and press the bag to drain its contents. Boil the product adding vinegar to the desired consistency. Pack it in dry wide-mouth jars and seal them air tight. Store in cool dry place.

Canning of Bamboo in Syrup[2]

Prepare syrup by mixing sugar 2 kg., water 3 kg. and citric acid 5 g. Pour hot syrup into the cans containing bamboo pieces, leaving about $\frac{1}{4}''$ head space.

Boil the cans by placing them in water until the temperature of the product is about 93°C. Remove the cans from the water and seal them immediately with a can sealer.

Process the sealed cans in pressure cooker for 40 to 50 minutes. Later cool the cans in cold water and store them in cool dry place after wiping them.

Canning of Bamboo in brine[2]

Prepare 2 per cent salt solution by mixing refined table salt 20 g./lit of water. Boil the solution and pour into the cans having the cooked bamboo-shoots. Follow the same instructions of canning of bamboo in syrup.

Canning of bamboo in curried Vegetables

Cut the desired vegetables and after washing in cold water cut them. Wrap them in a muslin cloth and dip them in boiling water for 2-5 minutes or more depending on the vegetables you use. Remove the cloth bag from the boiling water after the vegetables are soft and dip it in cold water immediately. For preparing the liquid medium for the vegetables use the following ingredients:

Mustard (Whole)	85 g.	Turmeric (powder)	170-200 g.
Coriander (powder)	85 g.	Common salt (powder)	370 g.
Red chillies (powder)	55-85 g.	Vegetable fat (hydrogenated)	
Caraway Seeds	85 g.	Oil	1.6 kg.
Water	As necessary		

Heat the required quantity of fat till few seeds of mustard produce cracking sound when added to it. Then, add the entire quantity of mustard and fry for a few minutes. Add other spices and fry. Add some water, stir well and boil the ingredients. Fill up the cans and follow the same process of canning.

Decoction of the tender bamboo-shoots mixed with palm-ggery (*Tad-ka-gud*) is given once or twice a day for a week to

cause abortion during the first month of pregnancy. The same medicine can be used in last month of pregnancy to induce labour. Its use after the baby is born eases the process of the expulsion of placenta and prevents excessive loss of blood. It is a safe substitute for ergot in such conditions.

Decoction of the tender-shoots mixed with a tablespoonful of honey given once or twice daily is a remedy for cough, scanty-menstruation, to induce lochia after child-birth, for the eradication of thread and roundworms. SAKAI *et al.*, found that extract of bamboo leaves, contain anticancer properties. Decoction or juice of the fresh-bamboo leaves is applied as a medicine in maggot infested ulcers[4].

The leaves are given to horses as a remedy for cough and colds[5].

111. BAMBOO MANNA

Bamboo Manna: *Tawakshir:* (Sans.); *Tabashir:* (Arab., Sind. Urdu, Dak.); *Banslochan:* (Hind., Pers.); *Banas-kapoor:* (Beng.).

Bamboo manna is a white silicious substance rich in *70 per cent* of *Silicate* and *30 per cent Potash*. It is found inside the hollow space of female plants above the joints. Its *constitution* is *Wet and Cold in 2°*. It is *refrigerant*, *styptic*, *astringent*, *desiccative* and *excellerent*. Therefore, its fine powder with honey and cardamom is used in fevers, stomatitis, spermatorrhoea, leucorrhoea, piles, in excessive secretions in the body. It is a febrifuge, expectorant, tonic, demulcent and is used in asthma, paralytic complaint, ptosis, pectoral, etc.[4]

It tones up the heart and nerves and creates a feeling of well being in the body. *Safoof-e-Tabashir*, is a very well known Unani preparation for all such conditions. It was formulated by *Sharandhara* the light of ancient India. In *Ayurveda*, this preparation is called *Satoo-paladichuran*.

Ingredients:

Cinamon	1 part	Tabashir	8 parts
Cardamom	2 parts	Sugar candy (red)	16 parts
Piper longum	4 parts		

Powder these ingredients and sieve through fine cloth.

Uses

Asthma, Bronchites, Tuberculosis, Burning in palms and feet, General weakness, Impotency, Chilliness of the body, Excessive bleeding during menstruation, Lack of appetite etc.

Dose

1/2 teaspoonful with honey and ghee 3 times daily after food.

REFERENCES

1. Maeda, S. Bull, Pharma, *Research Inst.*, Japan, 41: 1: November (1962).
2. Shankar, J. V. *et al.*, *Home Scale Preparations* 25, pp. 39-41. 4th Edn. (1962).
3. Sakai, *et al.*, *J. Antibiotics*, Ser. B. 16: 387-391, (Dec. 1963), Japan.
4. Dastur, J. F., *Medicinal Plants of India and Pakistan*, 46: pp. 31-32. 2nd Edn. (1962).
5. Prof. Mathur, R. C., *Systematic Botany*, p. 474: 10. 5th Edn. (1965).
6. Muzaffar Hussain Aiwan, *Kitab-ul-Murakabath*, p. 118. 2nd Edn. (1957), Lahore.

112. BATHUA LEAVES

Bathua Leaves: *White-Goose Foot:* (Eng.); *Chenopodium album:* (B.N.); *Vāstuk:* (Sans.) *Kulfa* or *Khatas:* (Arab.); *Sarmag:* (Pers.); *Bathua-sag:* (Hindi, Urdu); *Hunchika-soppu:* (Kan.); *Bhatu-elakal:* (Mal.); *Chandan bhatu:* (Beng.).

Family: Chenopodiaceae.

Zodiac: Saggitarious.

Food Value per 100 g. approximately

Carbohydrates	5 g.	Iron	0.4 mg.
Protein	4.1 g.	Vitamin B_2	170 mcg.
Fat	0.4 g.	Potassium	200 mg.
Calcium	160 mg.	Digesting Time	1½ Hrs.
Phosphorus	90 mg.	**CALORIES**	**50**

Constitution: Cold and Wet 1°.

Physiopharmacology and Therapeutics

White goose Foot is an extremely common weed found during monsoons and winter months in the wheat and ragi grown

fields. The leaves are tasteless and contain high concentration of potash salts. The cooked vegetable is laxative, cholagogue diuretic and nervine tonic. The leaves can also be eaten raw as salad. The leaves are often used in cleaning copper vessels before tinning them. *C. Murale* and *C. quinoa* also belong to same spicies. (Prof. R. C. Mathur, *Systematic Botany*, p. 324, 1962).

Seeds

Seeds are dry and hot 1°. They are used to cure jaundice, general dropsy, scanty urination, involuntary dribbling of urine after child-birth, etc. Seeds ground finely with black antimony (Surma) is used to cure itching and excessive watering of the eyes. Decoction of the seeds is used as a medicine for atony of the intestines and fevers during summer. (M. HUSSAIN. *Quhas-ul-advia*, p. 117. 4th Edn. 1965).

113. BENGAL GRAM LEAVES

Bengal Gram leaves: *Cicer arietinum:* (B.N.); *Putasṁjā:* (Sans.); *Chaney-ki-sag:* (Hindi, Urdu); *Chaney-ki-bhaji:* (Dak.); *Hammas:* (Arab.); *Sag. Naqood-e-Bengal:* (Pers.); *Kadley-soppu:* (Kan.); *Kadalai uliagal:* (Tam.); *Sanga aku:* (Tel.); *Kadalai-ellakal: Harbara-pan:* (Mar.); (Mal.); *Chanapu:* (Guj.); *Chana-sag:* (Ori.); *Chola-sag:* (Beng.).

Family: Papilionaceae.

Zodiac: Saggitarious.

Food Value per 100 g. approximately

Carbohydrate	11 g.	Phosphorus	119 mg.
Protein	7 g.	Iron	23 mg.
Fat	1 g.	**CALORIES**	68
Calcium	340 mg.		

Constitution: Hot and Wet 1°.

Physiopharmacology and Therapeutics

Bengal gram leaves are usually used as fodder and rarely consumed as vegetable. Fresh leaves are sour due to high concentration of *Oxalic*, *Acetic* and *Malic acids*. This is obtained by spreading a clean cloth sheet over the plants overnight and in the morning the wet sheet is wrung and the sour liquid is preserved in jars. This is called *Sirka-ē-Boot*, or the vinegar of bengal gram leaves.

This liquid ½ teaspoon with 1 teaspoon of honey is a very popular medicine to cure biliousness, dyspepsia, dysentery, diarrhoea, morning-sickness etc.

A teaspoonful of the liquid mixed in a glass of *cold water* is a medicine for nausea and vomiting due to indigestion, caused by eating fatty non-vegetarian food in excess.

Fresh juice of the leaves mixed with *tender coconut water* is a specific medicine for scanty urination, vomiting due to roundworms in the stomach, dysentery, constipation diarrhoea, excessive thirst due to fevers, diabetes, summer etc. Juice is also applied over urticaria, shingles, bee-sting, snake bite etc.

Fresh leaves are chewed to cure bad breath, pyorrhoea, bleeding from the gums, bitter-taste in the mouth etc.

A tablespoonful of the fresh juice mixed with *honey* is a wonderful iron-tonic to cure iron-deficiency anaemias. It supplies as much iron as one gets by eating any one of the following:

Eggs	20	
Mutton	750	g.
Liver	100	g.
Chicken	1	kg.
Fish	2	kg.
Apples	42	
Cow's Milk	60	cups

114. BITTER SWEET

Bitter Sweet or **Black night-shade:** *Solanum nigrum:* (B.N.); *Kākmachi:* (Sans. Beng.); *Maku:* (Hindi, Urdu); *Kamunni-ki-Bhaji:* (Dak.); *Anabus-salab:* (Arab.); *Rubah-tareek:* (Pers.); *Ganikay-soppu:* (Kan.); *Manathakalli:* (Tam.); *Kachi,* or *Kamanchi chettu:* (Tel.); *Karmachu-Takqnekay:* (Pashtu.); *Kadoyellun:* (Multani); *Pat-pairoon* (Sindhi); *Kanuvan kothi:* (Punj.); *Dulcamara:* (Latin).

Family: Solanaceae.

Zodiac: Libra.

Food Value per 100 g. approximately

Carbohydrate	9 g.	Vitamin A	100 I.U.
Protein	5.9 g.	Vitamin B_1	10 mcg.
Fat	1 g.	Potassium	200 mg.
Calcium	210 mg.	Magnesium	70 mg.
Phosphorus	70 mg.	Sulphur	Trace
Iron	18 mg.	**CALORIES**	**67**

Constitution: Cold and Wet 1°.

Physiopharmacology and Therapeutics

The plant grows wildly as well as it is cultivated during monsoons all over India. Berries are round about ¼ in diametre; green when they are raw and become reddish-orange, yellowish green or purple as they begin to ripe. The colour depends on the species of the plant such as: *Solanum Sodomeum; S. aviculare* etc. SABER *et al.*, found that these species contain the gluco-alkaloids *Solasonine* and *Solamargine.* The researchers stress that there is the presence of *aglycone* which is a very important material for the synthesis of *Several sex hormones* and *adeno-corticosteroids.*

The red-berry plant or the *S. aviculare* (Lal-kamunni) is highly praised as a medicinal plant in both Unani and Ayurveda. Decoction of the *leaf-juice-curd:* (Marooq) 6 oz. with 1 oz. honey is used as a specific medicine for cardiac neurosis, general dropsy

due to liver, kidney or heart diseases, jaundice, enlargement of the liver, scanty urination, constipation, bronchitis, asthma, anaemias, piles etc.

Patients suffering from haemoptysis (Koch's) are advised to use fresh leaf-juice 4 oz. with one or two fresh or dry *figs* two to three times daily.

The bleeding stops completely after three or four days. (In severe bleeding cases it is advised to hospitalize the patient. Also specific chemotherapy should be simultaneously continued).

Leaves cooked as vegetable are used during the pregnancy and as a herbal treatment for stomatitis, palpitation, dizziness, morning sickness, torpidity of liver and spleen, rheumatism, gout, etc. (Majeed).

Leaf-juice is applied as a cure in psoriasis, ring-worm, scabies, foul-smelling ulcers. Paste of the leaves mixed with *betel leaf* and *turmeric paste* is applied over chronic ulcers, burns, cut wounds, blood-boils, sprains, contusions, suppurating wounds, herpes, rheumatic joints, anthrax etc.[5]

Poultice of the leaf-paste with *wheat-flour* is applied with very good results in blood-boils, orchitis, mumps, whitlow, burns, rheumatism, gout, skin diseases, tumours etc.

A very effective analgesic oil can be prepared by the following method.

Get the whole fresh-plants with roots berries, flowers and wash them in clean water. Extract the juice by pounding them and strain it through a fine cloth.

Mix it with equal quantity of pure *til-oil* (red sesame) or (Achi til) and put the vessel on slow fire. Evaporate all the water then add a teaspoonful of *mustard-seeds*, *garlic*, 5 cloves, *cloves* 20 per 6 oz. of oil and keep the ingredients on the fire until all of them are blackened.

Cool the oil and strain it through a cloth.

The oil is massaged and dry heat is applied in rheumatoid arthritis, gout, rheumatism, dislocation of the joints etc. The analgesic effect of the oil may be due to steroid hormones that are found in the plant. This medicine is being used in my mother's family from past two hundred years. The formula and the method of preparation is kept confidential. Only one person of the family

is told about it with an oath taking ceremony that the medicine will be used only for charitable purpose free of charge. I am very thankful to my old mother who broke the family tradition for the sake of suffering humanity. Any one who prepares it is requested to use it only to alleviate the suffering humanity free of charge and bless my great great grand father who formulated this oil.

Berries

The berries contain a toxic alkaloid *Solanine* therefore, they should be used carefully. They are alterative, diuretic, and tonic. They are used in fevers, diarrhoea, dropsy, heart-disease, etc[5].

According to researches of SABER[3] the young immature fruit of *S. nigram* contains *4.2 per cent os gluco-alkaloids* while the other organs are either poor or devoid of these principles. The plant of *S. aviculare*, contains the highest *gluco-alkaloids* (02. to 11 per cent) and has been a source of starting raw material for the synthesis of *sex hormones* and the *adenocortico steroids*. *S. sodomeum* plant contains *gluco-alkaloids* but the immature berries contain *2.72 to 2.75 per cent.* Eating berries in excess causes poisonous symptoms like: nausea and vomiting. The patient complains pain in the stomach and desires plenty of cold water. His pupils get dilated and he feels giddiness, delirium, impaired vision, purging etc. If the patient is not treated immediately he goes into convulsions and coma[7].

REFERENCES

1. Muzaffar Hussain Aiwan, *Qhaus-ul-advia*, p. 473, 4th Edn. (1965).
2. ,, ,, *Kilab-ul-Murakath*, p. 195.
3. Saber Hifny *et al.*, *Bull. Fac. Pharm.* (Cairo) 2, 51-62 (1) (1963).
4. Syed Sultan, *Kamunni Kay Adviath* Urdu MSS. (1919).
5. Dastur, J. F., *Medicinal Plants of India and Pakistan*, pp. 152-153, 211, 2nd Edn. Tarporavalla Bombay (1962).
6. Prof. Mathur, R. C., *Systematic Botany*, p. 36. 3, 5th Edn. (1965).
7. Nadkarni, K. M., *Indian Materia Medica*, pp. 1152-3, Vol. 1. (1954).

115. BRUSSEL SPROUT

Brussel sprout: *Brassica Oleracea gerniliera:* (B.N.); *Chota-bunda gobhi:* (Hindi, Urdu); *Chick kosu:* (Kan.); *Brusseles gouse:* (Mal.); *Bilaithi-banda-kobhi* (Beng.).

Family: Cruciferae.

Zodiac: Gemini.

Food Value per 100 g. approximately

Carbohydrate	9 g.	Vitamin B_1	49 mcg.
Protein	4 g.	Vitamin C	79 mg.
Fat	0.3 g.	Sodium	12 mg.
Calcium	27 mg.	Potassium	400 mg.
Phosphorus	44 mg.	Magnesium	11 mg.
Iron	0.6 mg.	Digesting Time	2.5 Hrs.
Vitamin A	210 I.U.	**CALORIES**	**60**

Constitution: Cold and Wet 2°.

Physiopharmacology and Therapeutics

Brussel sprout is a miniature species of cabbage largely cultivated in Europe and other cold places all over the world.

It is boiled and used as a vegetable. Its fresh juice is antiscorbutic, cooling, diuretic and demulcent. Being poor in sodium, and rich in Vitamin A, B_1, C and potassium it can be used by persons suffering from high-blood-pressure, nephritis, scurvy, jaundice, gastric-ulcer, obesity, diabetes, toxaemia of pregnancy etc.

Fresh juice 6 oz. mixed with *honey* given 1 hour before labour pains, eases the child birth.

116. CABBAGE

Cabbage: *Brassica olerecea capita:* (B.N.); *Band gobhi:* (Hindi, Urdu); *Karam ki bhaji:* (Dak.); *Matta-kosu:* (Kan.); *Gosura:* (Tel.); *Matta-gos:* (Mal.); *Kobhi:* (Guj. Mar.); *Band kobi:* (Beng.).

Family: Cruciferae.

Zodaic: Pisces.

Food Value per 100 g. approximately

Carbohydrate	5 g.	Vitamin C	120 mg.
Protein	2 g.	Niacin	0.4 mg.
Fat	0.3 g.	Sodium	7 mg.
Calcium	30 mg.	Potassium	277 mg.
Phosphorus	49 mg.	Magnesium	1 mg.
Iron	0.7 mg.	Oxalic acid	12 mg.
Vitamin A	2,000 I.U.	Digesting Time	2.5 Hrs.
Vitamin B_1	100 mcg.	**CALORIES**	**40**
Vitamin B_2	31 mcg.		

Constitution: Cold and Wet 2°.

Physiopharmacology and Therapeutics

Cabbage is a very popular leafy vegetable eaten all over world. It has got the similar uses of brussel sprouts. There are ten varieties of cabbage namely: *Infusion of glory, Drum head, Lucknow, Local, Pride of India, Copenhagen Market, Pride of Asia, Golden Acre, Sutton's Red Blood, and S. Earliest.*

Fresh cabbage juice mixed with its leaf juice 6 oz. taken with a teaspoon of honey twice daily is a medicine for active gastric ulcer, cirrhosis of the liver, viral hepatitis, obstructive jaundice, bleeding gums, piles, palpitation of the heart, diabetes, nephritis, cystitis, pyelitic, excessive acidity in the urine, dry, rough and itchy skin, poor sight in darkness etc.

Excessive use of cooked vegetables causes wind in abdomen, which can however be rectified by adding some *asafoetida.*

Canning of cabbage causes pink discolouration of the leaves. However, exposure of the sherds to SO_2 (Sulphur dioxide) before canning prevents the discolouration, [N. K. Sha, *et al.*, C.F.T.R I. Annual Report 1966. p. 33. (Mysore)].

117. CARROT LEAVES

Carrot leaves: *Dancus carota. Var. sativa:* (B.N.); *Granjan pat:* (Sans.); *Gajar-ki-sag:* (Hindi, Urdu); *Gajar-ka-patta:* (Dak.); *Barg-e-jazar:* (Arab. Pers.); *Kemp-gajar-mulangi soppu:* (Kan.); *Carrot ekkal:* (Mal.); *Gajjar-pan:* (Mar. Guj.); *Gajra-patra:* (Ori.).

Family: Umbelliferae.

Zodiac: Capricorn.

Food Value per 100 g. approximately

Carbohydrate	10 g.	Vitamin A	9,500 I.U.
Protein	4 g.	Vitamin B_2	140 mcg.
Fat	0.7 g.	Niacin	0.4 mg.
Calcium	340 mg.	Vitamin C	90 mg.
Phosphorus	110 mg.	Digesting Time	3 Hrs.
Iron	8.8 mg.	**CALORIES**	**56**

Constitution: Hot and Wet 1°.

Physiopharmacology and Therapeutics

Carrot leaves are usually discarded, but God has provided us a very valuable nutritional treasure in it. Drinking a glass of fresh-leaf-juice with a pinch of *salt* and a teaspoon of *lime-juice* not only supplies all the daily requirement of Vitamin A, B, C, calcium, iron etc. but also tones up the digestive system, prevents the formation of urinary calculi, strengthens eyes, lungs, heart and liver. It increases urine and washes out the waste products from the system. It is a very valuable medicine for burning sensation in eyes, in hands and feet. It increases sexual stamina and retentivity.

Fresh leaves are chewed to cure stomatitis, bad breath, bleeding from gums, pyorrhoea etc.

Juice is applied externally for dry skin, itching, etc. With a pinch of turmeric, a teaspoonful of the juice is massaged over face to cure pimples, black-heads. It prevents the formation of dry skin and whitens it.

118. CELERY

Celery: *Apium graveolense. Var. dulce:* (B.N.); *Mūri* or *Ajmoda:* (Sans.); *Ajmud:* (Hindi, Urdu); *Bazar-ul-karfas:* (Arab.); *Karfas:* (Pers.); *Sellary:* (Mal.); *Randhuni:* (Punj.); *Chanu:* (Beng.).

Family: Umbelliferae.

Zodiac: Pisces.

Food Value for 100 g. approximately

Carbohydrate	9 g.	Vitamin B_1	Trace
Protein	6 g.	Vitamin C	64 mg.
Fat	0.4 g.	Sodium	91 mg.
Calcium	220 mg.	Potassium	293 mg.
Phosphorus	140 mg.	Digesting Time	2 Hrs.
Iron	4.3 mg.	**CALORIES**	56
Vitamin A	5866-7455 I.U.		

Constitution: Hot and Dry 2°.

Physiopharmacology and Therapeutics

Celery is a very popular vegetable grown all over the West. In India the leaves are not so popular, but the root and the seeds are commonly used in Unani and Ayurvedic medicine. It is cultivated in the foot of the North-west Himalayas[1]. Fresh juice is a medicine for Vitamin A, B_1, C and calcium deficiency diseases.

Root

Powder of the dry root 1 teaspoon mixed with a tablespoonful of *honey* or *ghee* is given twice daiiy as a tonic in general weakness and malnutrition. It restores the normal function of the disordered system in general weakness. Paste of the root a teaspoonful mixed with *tender coconut water* is given to cure dropsy, and scanty urination. In flatulent colic the powder of the root ½ teaspoon mixed with fresh ginger juice 20 drops is given with warm water.

Seeds

Seeds are similar to *Anisi-seeds*. A teaspoon of the seeds soaked in a glassful of *butter milk* five to six hours and are ground in the same butter milk mixture is given as a medicine to cure indigestion, biliousness, piles, giddiness, burning in the eys etc. Seeds ground in *carrot juice* is a medicine for spermatorrhoea, nervous impotency, urinary calculi, night blindness, loss of smell, poor hearing etc. Seeds soaked in the mucilage of *tender lady's fingers* mixed with *honey* or *sugar* is given as a specific medicine for rheumatism, gout, spermatorrhoea, thinness of the semen, piles etc. Seeds soaked in the decoction of *tender bamboo shoots* 4 oz. given two to three times a day acts as a very powerful uterus evacuater in the early months of pregnancy, cures menstrual irregularities and painful menstruation. Seeds soaked in the decoction of *fenugreek seeds* (1 teaspoon per cup) and a table spoon of *honey* taken every night for a month increases general resistance during the treatment of tuberculosis of lungs, asthma, pleurisy, lung abscess, bronchitis, cirrhosis of the liver due to excessive use of alcohol, malnutrition, marasmus in children, loss of weight, etc[2]. It prevents the tuberculosis germs from developing resistance to *I.N.H.*, *Streptomycin* and *P.A.S.*, and prevents relapse. Seeds soaked in decoction of one or three *cardamom* in a cupful of water is used with gratifying results for excessive thirst, hiccough etc. Seeds soaked in plain water are given to cure ascitis, nasal catarrh, fever with cough, urinary discharges, vomiting etc.[1]

REFERENCES

1. Dastur, J. F., *Medicinal Plants of India and Pakistan*, p. 23, 35.
2. Muzzafar Hussain, *Kitabul-mufaradath*, pp. 64-67.
3. Marigowda, M. H., *Thoughts on Food and of Food*, Department of Hort. Mysore, (1965).

119. CORIANDER LEAVES

Coriander leaves: *Corindrum Sativum:* (B.N.); *Kustumbari:* (Sans.); *Kothimir:* (Hindi, Urdu, Dak.); *Kuzbera:* (Arab.); *Burge-koshniz:* (Pers.); *Kothimiri-soppu:* (Kan.); *Kothimiri:* (Tel.); *Kothamalli:* (Tam.); *Kothambir:* (Mar.); *Dhano:* (Sindhi); *Dhana:* (Guj.).

Family: Umbelliferae.

Zodiac: Scarpio.

Food Value per 100 g. approximately

Carbohydrate	5 g.	Vitamin B_2	60 mcg.
Protein	3 g.	Niacin	0.7 mg.
Fat	0.7 g.	Vitamin C	131 mg.
Calcium	140 mg.	Sodium	4 mg.
Phosphorus	60 mg.	Potassium	453 mg.
Iron	8 mg.	Oxalic acid	5 mg.
Vitamin A	8,645-13,580 I.U.	**CALORIES**	55
Vitamin B_1	49 mcg.		

Constitution: Cold and Dry 2°

Physiopharmacology and Therapeutics

Coriander plants are extensively cultivated all over India for the aromatic leaves and seeds. It is the native of S. Europe[1]. Fresh leaves are a must in every kind of curry, particularly in non-vegetarian preparations they are used to give aromatic flavour.

Seeds are fried, powdered and mixed in curry-powders. (*For details see Coriander in spices*).

Leaves contain, *Coriandool, Linacol, Geriniol, Baboreneol* and *d-pinene, l-pinene* etc., but these volatile oils are more in the seeds[2].

A teaspoonful of fresh juice taken every night with equal quantity of *honey* acts as a preventive medicine for all the deficiency disease caused by vitamin A, B_1, B_2, C and iron. Its regular use prevents from tuberculosis, bronchial asthma, allergy,

weakness of the brain eyes, ears, heart, lungs etc. It cures indigestion, flatulent colic, etc. Coriander juice can be taken as a food for emergency[6].

Fresh juice 1 teaspoon with 1-2 seeds of banana seeds (*M. Paradisica*) given daily once for seven days regularly is found to be very effective preventive measure against small-pox[3]. To be sure of high biological immunity one must get vaccinated against small-pox; live a healthy and hygienic life instead of relying on Folk-medicines. Remember small-pox is a very serious infectious disease which causes severe complications ending in death. It is said that putting fresh leaf juice in the eyes during actual infection of small-pox, prevents the eye damage[4]. Fresh juice 1-2 teaspoon mixed with a glassful of fresh *butter milk* is given 2-3 times daily for indigestion, nausea and vomiting, hiccough, excessive salivation and bitterness in the mouth, giddiness catarrhal, jaundice, piles, dysentery, during treatment of typhoid, hepatitis, ulcerative colitis, burning in the arms and pin worm infection. Chewing fresh leaves cures stomatitis, bad breath, and prevents pyorrhoea and dental caries.

Fresh juice is externally applied over forehead as a medicine for migraine, sick-head-ache, congestive head ache[5]. A teaspoonful of the juice mixed with a pinch of *turmeric powder* is applied over the face every night to cure pimples, black-heads and dryness of the skin. It bleaches the skin and blooms the complexion. Juice mixed with washing soap is applied over sprains, and rheumatic joints with gratifying results.

Fresh juice is instilled in the nose to stop bleeding due to summer heat. It stops bad smelling in the nose and prevents nasal polypy.

REFERENCES

1. British Pharmaceutical Codox, p. 639, (1911).
2. Nadkarni, K. M., *Indian Materia Medica*, p. 381, Vol. 1.
3. *Mujarebath-e-Zakai*, p. 281, (Pers. MSS), (1916).
4. Muzafar Hussain Aivan, *Kibat-ul-Mufaradath*, p. 252, 4th Edn. (1965).
5. *Mujarebath-e-Akbari*, (Pers. MSS).
6. Robert-Heilig, *Probe*, p. 227, Vol. II, No. 6, Aug. (1963), Bombay.

120. CURRY LEAVES

Curry leaves: *Murraya koenigii*, or *Bergeria koenigii:* (B.N.); *Krishnanimba* or *kāta sāka* or *Gandheta:* (Sans.); *Katnim:* (Hindi); *Kariyapath:* (Dak.); *Karbevina soppu:* (Kan.); *Karvepilli:* (Tam.); *Karivepaku:* (Tel.); *Karvaepu:* (Mal.); *Khadir limb:* (Mar.); *Mitho limb:* (Guj.); *Bhursangapathra:* (Ori.).

Family: Rutaceae.

Zodiac: Gemini.

Food Value per 100 g. approximately

Carbohydrate	15 g.	Vitamin A	13,580 I.U.
Protein	6 g.	Vitamin B_1	59 mcg.
Fat	1 g.	Vitamin B_2	198 mcg.
Calcium	705 mg.	Niacin	3 mg.
Phosphorus	60 mg.	Vitamin C	4 mg.
Iron	4 mg.	**CALORIES**	99

Constitution: Hot and Dry 2°.

Physiopharmacology and Therapeutics

Curry tree is dawny, having structure mostly as a back yard tree. It is grown in damp and hot parts of India and Pakistan[1]. Leaves contain a glucoside named *Koenigin*[3] and are aromatic. They are used in spices and for flavouring curries.

Fresh-juice one-two teaspoonful mixed with a teaspoonful of *lime juice* and *sugar* is given as a folk-medicine to cure morning sickness, nausea and vomiting due to indigestion and excessive use of fats, weakness of nerves, poor development of bones, teething troubles in children, stomatitis, etc.

Tender leaves are given with honey to cure diarrhoea, dysentery and piles. Decoction of the fresh curry leaves is given in fevers.

Eating ten fresh fully grown leaves every morning for three months is said to prevent diabetes in persons who are born to diabetic parents, and cures diabetes due to obesity. As weight begins to come down the diabetic patients stop passing sugar

in urine. Leaves are applied as a poultice over eruptions and bruises[4].

Fresh juice put in eyes makes them look bright and prevents the early development of cataract.

Fruit

Fruits are berries, green, when raw and become purple when ripe.

Juice of the berries mixed with equal quantity of *lime-juice* is applied over insect stings and bites of venomous animals, scabies, urticaria, eruptions etc.

Bark

Bark of the tree is stimulant and a powder or the decoction of the dry bark 1 teaspoon is given with cold water to stop bilious vomiting[2].

REFERENCES

1. Dastur, J. F., *Medical Plants of India and Pakistan*, p. 116, 162. (1962).
2. Syed Sultan '*Khariye ke acuiyath* (Urdu MSS), 1908.
3. Nadkarni, K. M., *Indian Materia Medica*, vol. 1, p. 195 (1955).

121. DRUM STICK LEAVES

Drum stick leaves: *Moringa oleifera* or *pterygosperma:* (B.N.); *Sobhanjana* or *Sanamaka* or *Haritapatra:* (Sans.); *Sanjana* or *Segava:* (Hindi, Urdu); *Mungay-ki-bhaji:* (Dak.); *Nuggey-soppu:* (Kan.); *Murangai:* (Tam.); *Mulaga:* (Tel.); *Murina:* (Mal.); *Sheruga-pan:* (Mar.); *Suragavo:* (Guj.); *Sanjana safer:* (Ori.).

Family: Moringaceae.

Zodiac: Leo.

Food Value per 100 g. approximately

Carbohydrate	14	g.	Vitamin A	11,235 I.U.
Protein	6	g.	Vitamin B_2	59 mcg.
Fat	2	g.	Niacin	0.7 mg.
Calcium	425	mg.	Vitamin C	217 mg.
Phosphorus	70	mg.	Digesting Time	2 Hrs.
Iron	7	mg.	CALORIES	84

Constitution: Hot and Dry 3°.

Physiopharmacology and Therapeutics

Moringa or *Horse radish* tree grows all over India and Pakistan. It is a beautiful tree mostly grown as a backyard tree in most of the South Indian homes for its drum-stick like fruits, tasty flowers and the leaves that are cooked and eaten as vegetable.

Leaves

Moringa leaves are not very popular as market vegetable, because majority of us think that the leaves are hot and are not nutritive but the chemical analysis of the leaves shows that Almighty God has treasured enormous nutritive wealth in these cheap and discarded leaves. Fresh juice of the leaves supplies the following vitamins and minerals having comparative value of other foods:

Vitamin A

Fresh juice 1 *cup full supplies* as much vitamin A as one gets by eating *any one* of the following foods:

Eggs	9	Mutton	16 kg.
Sheep's liver	50 g.	Butter	500 g.
Shelled almonds	1 cupful	Fresh cow's milk	80 cups

Vitamin C *Equal to:*

Oranges	6	Limes	6
Apples	8	Mangoes	20
Bananas	16	(Langra Variety)	3
Grapes	2½ kg.	Water melon	7½ kg.

Calcium

A handful of fresh leaves supply as much *calcium* as one gets by eating *any one* of these foods:

Almonds	900 g.	Chicken roast	3 kg.
Oranges	8	Eggs (hen's)	20
Papaya	3½ kg.	Mutton chops	2¾ kg. etc.

Drum-stick leaves are a rich source of all the *essential amino acids*. It is estimated that 100 g. *of the leaves* contain the following concentration in *grammes*[6].

Arginine	6	Phenylalanine	6.4
Histidine	2.1	Thereonine	4.9
Isoleucine	6.3	Tryptophan	1.9
Leucine	9.3	Valine	7.1
Lysine	7.6		
Methionine	2		

A glassful of drum stick leaves-soup supplies as much *protein* as one gets by eating *any one* of the following foods approximately:

Beef	100 g.	Fish	120 g.
Chicken	100 g.	Pork	101 g.
Milk	2½ cups	Eggs	2

Soup of the leaves prepared by immersing a handful of tender leaves in boiling water 6 oz. for 5 minutes with a lid on the vessel and after this period the vessel is immersed in cold water so as to cool the soup quickly. To this soup a pinch of salt, pepper, lime juice ½ teaspoon is added and drunk every morning as a tonic medicine to get protection against, malnutrition, anaemias, tuberculosis, asthma, seasonal attacks of colds and bronchitis, pre-mature oldage, pre-mature loss of strength and vigour, nervousness, functional sterility in males and females, etc.

A teaspoon of fresh-leaf juice mixed with *honey* and a glassful of *tender coconut water*, is given two to three times as a herbal-medicine during the treatment of cholera, dysentery, diarrhoea, colitis, jaundice, etc.

A cupful of the fresh leaf-juice coagulated by heating it gently on water bath, and then the clear fluid is filtered. It is mixed with milk instead of water and the infants and children are fed once a day to help them grow healthy with strong bones, pure blood and develop high resistance against infection and mal-nutrition. It costs nothing and saves one from using unnecessary synthetic tonics.

The same tonic-medicine can be regularly used during all times by all irrespective of age. Its regular use during pregnancy and lactation, helps the mother to get extra calcium, iron, vitamins at no cost and also helps the healthy development of the baby with strong nerves and bones. It acts on the uterine contracting mechanism and prevents sluggishness of uterus which we call *Uterine Inertia* and eases child birth reducing severe blood loss and post-partum complications.

Its regular use after child birth increases breast milk and helps the mother to recover quickly from lying-in-period.

A tablespoon of coagulated fresh leaf-juice mixed with a glass of fresh-juice of *cucumber* or *carrot* is an effective medicine for scanty urination,constant burning in urethra due to high acidity of urine, myxoedema, toxaemias of pregnancy, dropsy due to heart, liver, kidney disorders, hypertension, excessive thirst due to summer heat, diabetes, constipation, etc. A teaspoonful of the juice with *Rock-salt* 10 g. once daily is used to cure excessive urination of non-diabetics.

Fresh juice 1 tablespoonful with *honey*, taken every night before going to bed cures; night blindness, weak memory, loss of smelling power, poor hearing etc. Taken with *lime juice* cures vertigo, bleeding piles and bleeding from lungs and nose, hiccough, biliousness, indigestion, morning sickness, malabsorption syndrome etc.

A teaspoon of the fresh juice with *salt* is given as an emetic to weak persons and children suffering from excessive gas. A teaspoon of ghee prepared by clarifying with fresh leaves a handful per lb. of butter is given as a tonic for children.

Fresh leaf-juice is instilled in the eyes to cure fainting fits due to nervous debility corneal ulcers, burning and itching in eyes, flickering and twitching of the eye lids, falling of the eye lashes, night blindness due to vitamin A deficiency etc. Juice is instilled in the nose to cure syncope (Bhavaprakash).[8]

Leaf juice mixed with equal quantity of *radish-leaf juice* is applied over piles with gratifying results.

Juice mixed with *til oil* and heated to evaporate the watery content and the oil is applied as a medicine to cure scabies, rheumatism, sprains and contusions.

Roasted leaves are fomented to reduce pain and inflamation caused by injuries, and to reduce the water content of hydrocele.

Fresh leaf juice mixed with a pinch of *turmeric powder* is applied to extract guinea worm.

As a first aid dressing in dog bite, leaves are pounded, with few cloves of *garlic* and a pinch of *turmeric;* the wound is cleaned with pre-boiled water and the mixture is applied. (It must be remembered that dog bite causes serious complications such as tetanus even if the dog is not rabid. If bitten by a mad dog, *rabies* is sure to develop, therefore, all dog bites must be treated carefully

with a full course of 7 to 15 *Anti-Rabies-injections* that are given free in all the Govt. dispensaries and hospitals).

Fresh leaf juice applied with *lime juice* cures pimples, black heads and keeps one's face flower fresh. A teaspoonful of the fresh leaf juice mixed with 3 *peppers* is applied over temples to cure head-ache. An ounce of the fresh leaf-juice acts as a safe emetic in chronic bronchitis, asthma etc. (for adults only). Poultice of the fresh leaves is applied over glandular swellings. It reduces pain due to its counterirritant action (Allowing the poultice for a long time causes blisters.)

Fruits

Fruits like long sticks are nutritive aphrodisiac. They are cut into desired pieces and cooked as vegetable are usually eaten during their harvest time in summer. Soup of the tender pods can be used as a medicine for rheumatism, colds, impotency, small urinary stones, weakness of the nerves, enlargement of liver and spleen, constipation etc. Regular use of the pods prevents the infection from round and pin worms. Soup mixed with honey is given as a food-medicine for paralysis, Bell's Palsy, hemiparesis etc. It rectifies the menstrual irregularities, etc.[2] Pickles of the raw fruits prepared with pure vinegar is useful in curing lumbago, sciatica, paralytic stiffness of the limbs, rheumatism etc.[1] Eating the fruits cooked with unripe mango, reduces summer heat in the body and prevents iron and vitamin C deficiency.

Flowers

Flowers are hot and dry in constitution. They are cooked and used as vegetable. Flowers boiled in milk and are used as a sex-tonic to cure impotency in young persons. Fresh juice of the flowers 1 tablespoon with *butter milk* one glass is given as a medicine to cure asthmatic attacks, scanty urination, indigestion, gravel in bladder. Juice given twice with tender cocoanut water acts as a diuretic tonic-medicine during the treatment of nephritis, congestive heart failure, urethritis, cystitis, pyelitis, gonorrhoea, etc.

Bark

The corky-bark is grey and is about an inch thick. It is acrid with pungent taste and yields a coarse fibre[7].

Bark of the stem and the roots is extensively used in Unani and Ayurvedic medicine for various ailments. *Col. R. N. Chopra* and De[7] analysed the chemical contents of the bark and they found the following chemicals:

Myristic acid	7.3 per cent	Oleic acid	7.3 per cent
Palmitic acid	10.8 per cent	Lignoceric acid	3 per cent
Behenic acid	8.9 per cent	Phytosterl	9 per cent
Stearic acid	10.8 per cent		

The scientists, also extracted various useful alkaloids such as: the *platinic chloride* having yellow rectangular plates with melting point 221° and the *Picrate* having yellow wooly needles with 195° melting point.

The pharmacological action and therapeutic uses of these alkaloids prepared from the bark of *Moringa P.* were also clinically tested at *Calcutta Tropical School.* The researchers[7] confirmed that the *crystalline bases* have no marked physiological action, whereas *the Amorphous base,* has a very strong *sympathomimatic* effect on the sympathetic nerve endings of the entire human nervous net. By its stimulating action, it constricts the blood vessels and elevates the blood pressure, accelerates heart-beat. Its main action on the heart is due to direct stimulation of cardiac sympathetic nerves, but the myocardium may be slightly affected. The researchers[7] also observed that the *amorphous base* inhibits the tone and the movements the involuntary muscles of the gastro-intestinal tract and bronchioles. The stimulant action of this base was also found in other organs. It produces slight diuresis, dilates pupils and is destroyed in the liver. Large doses of this base produce depression in voso-motor nerve endings. However, its sympathomimatic action cannot be compared to *Adrenaline*[7].

Considering the facts of the above research the powder of the dry bark 4 ounces is boiled in a pint of water for about half an hour and an ounce with a teaspoonful of honey taken three times daily after food for a month cures impotency, pre-mature ejaculation, thinness of semen, scanty menstruation in young anaemic girls, asthma, bronchitis, with severe cough, scurvy, etc.

The bark 1 oz. is boiled with a handful of *tender bamboo shoots* in 18 ounces of water until 8 ounces remain. This decoction 2 ounces taken four hourly for 2 days acts as an abortifacient. An inch long piece of bark boiled and trimed to make as a pessary is inserted in the os to induce abortion in folk

medicine (Such attempts in lay hands causes grave risks). Pouring warm decoction of the bark over paralytic limbs improves blood circulation and reduces stiffness.

A handful of the fresh bark is pounded and mixed in *til* or *Coconut oil* 12 ounces *Mustard seeds* 1 tablespoon and boiled till the bark begins to turn brown, later the oil is cooled strained and preserved in a bottle. It is applied as an analgesic liniment in painful conditions of the joints, due to rheumatism, sprains, ritis, etc. Few drops of the oil mixed with some plain coconut oil is applied over the scalp to lengthen hair and prevent hairfall.

A hole is made in the stem of the tree and a full cut circular *betel nut* is inserted and the hole is closed with wheat flour paste to keep it secure. After 2 months, the nut is taken from the stem and preserved.

A piece of it if held under the tongue during intercourse prevents pre-mature ejaculation. The absorption of lignoceric acid in the circulation acts on the time mechanism of semen ejaculation and helps in delaying the passing of ejaculatory transmission.

Warm juice of the stem bark 5 drops is put in the ear to stop ear ache due to exposure to breeze.

Root

Root of drum stick tree resembles like European Horse-radish in smell and appearance. Its bark is pungent and has more medicinal value than the bark of the stem.

Decoction or the tincture of the root bark prepared by adding equal parts of *orange peel* with a pounded *nutmeg* is given ½ to 1 teaspoon thrice daily after meals as a carminative medicine in spasmodic conditions of bowels, flatulence. In hysteria, dizziness, nervous debility, the same may be used with good results.[8] Decoction of the roots mixed with pepper 2, garlic 3 cloves and honey is given an ounce thrice daily as medicine for intermittent fever, malaria, epilepsy, gout, dyspepsia, flatulent colic, ascitis enlargement of liver and spleen etc.[2, 4, 5].

In soreness of the mouth, decoction of the roots is gargled. In caried tooth, finely powdered root is filled. It must be noted that once the hard enamel of the tooth is damaged, it is not possible to regenerate it again. Therefore, to get permanent relief, one is advised either the tooth be filled or extracted.

Decoction of the fresh root (1 in 20) taken an ounce thrice daily for a month along with cardamom 1, before food, cures hiccough, hysteria, lumbago, rheumatoid arthritis, etc.[4] Taken with honey once at 6 p.m., and another dose at 10 p.m., cut-shorts the severity of asthmatic attacks[5]. Regular use of the decoction (1:20) 1 ounce thrice daily with *Asafoetida* 2 grs. is said to cause abortion in early pregnancy[4]. (In my opinion, it may not be useful in genuine pregnancy, but may be used in delayed menstruation due to lack of progestrone, primary amenorrhoea and uterine inertia).

Fresh juice boiled in water and a little salt is added to this decoction, is gargled in sore-throat, relaxed uvula, pharyngitis, hoarseness of the throat etc. Paste of the roots mixed with a teaspoonful of mustard seed is applied as a very useful liniment to cure rheumatic pains, inflamatory swellings and tumours, paralytic parts, sprains, dislocations etc. Fresh juice 5 drops is put in ears to cure ear ache[2]. Paste of root prepared with water is applied over scabies, ringworm, itching of the skin due to its dryness etc.

Seeds

Moringa

Dry seeds of moringa are nutritive and contain a very useful commercial oil known as *Ben oil*. It contains *Myristic acid 7.3 per cent, Palmitic acid 4.2 per cent, Oleic acid 65.8 per cent, Stearic acid 10.8 per cent, Behenic acid 8.9 per cent* and *Lignoceric acid 3 per cent*. 9 per cent of *Phytoserol* in the oil. The oil contains about 3.7 per cent unsaponifiable matter[8].

Ben oil is a clear liquid which is rather thick at room temperature. Its specific gravity is 0.912 to 0.915 at 60°F. It has no taste and smell. It does not turn rancid and saponifies very slowly. Therefore, it is an ideal medium for lubricating delicate machine parts like watches, cameras, etc.

Ben oil mixed with ground-nut oil is used externally with very gratifying results in the treatment of rheumatism, gout etc.[7]

Paste of the dry seed is applied in the vagina half an hour before conjugal union to increase the voluptuous feelings in both the partners. It acts as a safe contraceptive if used with little salt and honey and inserted along with a tampon before sexual intercourse.

Seeds of the fresh pods ground with water and instilled in the nose to cure head-ache due to cold[8]. Paste of *ten seeds* prepared

with *fenugreek infusion* and *honey* is given thrice daily for a month to cure ascitis caused by liver derangement. Paste of the seeds is applied over glandular swellings[2].

Gum

Gum of *moringa* is opaque and white when it first comes from the trunk, but soon becomes pinkish dark on exposure to air. It is bland and mucilaginous and becomes friable in dry air and is tough in damp air. It holds 20 per cent of its weight of water.[7]

Gum is used as a medicine to cure spermatorrhoea, excessive menstruation in anaemic girls[8], etc. Usually about 20 gr. of the gum is fried in ghee and is used with sugar and milk for the above said complainst. Fried gum is also used to cure flatulence, headache. Fresh liquid like gum mixed lime juice is applied over painful conditions of the joints, glandular swellings, etc. Boiled with castor oil is used as an analgesic medicated oil in rheumatism paralysis, neuritis etc[2]. Gum mixed in *til oil* is put in ears to alleviate ear ache. Mixed with milk gum is rubbed to cure head ache, arthritis, bubos, painful bones in syphilis[8]. Gum is inserted in the external os to cause abortion.

Dusting with D.D.T. powder over the tree prevents the breeding of hair caterpillars, that are commonly found on the stem. Touching them causes serious allergy and contact desuratitis. These worms thrive well on the sap of the stem bark and leaves.

REFERENCES

1. Muzafar Hussain Aaivan, *Quhas-ul-adia*, pp. 311-12.
2. Dastur, J. F., *Medicinal Plants of India and Pakistan*, pp. 113, 160, (1962).
3. Asgar Ali Mohammad, *Ilajul-gurba*, Ali-Bhai-Sharfali and Co., Ltd. 373. Ibrahim Rahamat-ulla-Road, Bombay 3. (Urdu).
4. Majeed, S. A., *Tibbe-Majeedi*, (Urdu MSS), (1920).
5. *Qharabadeen-e-Zakai*, (Pers. MSS), (1896).
6. Swaminathan, M. and Bhagwan, R. K., *Our Food*, p. 160. (5 Ed. 1966).
7. Chopra, R. N., *Indigenous Drugs of India*, pp. 344-47, (1934).
8. Nadkarni, K. M., *Indian Materia Medica*, pp. 811-816, (1954).

122. ENDIVE

Endive or **Chicory** or **wildchicory:** *Cichorium intybus:* (N.O.); *Kasni:* (Urdu, Pers.); *Gulsuchal:* (Hindi, Bom., Guj. and Beng.); *Hinduba* or *Shikoriah:* (Arab.); *Kasini Virai:* (Tam.); *Kasini vittulu:* (Tel.); *Kachani:* (Mar.).

Family: Compositae.

Zodiac: Pisces.

Food Value per 100 g. approximately[1]

Carbohydrate	0.9 g.	Iron	2.8 mg.
Protein	1.8 g.	Vitamin C	20 mg.
Fat	0.1 g.	**CALORIES**	7
Calcium	44 mg.		

Constitution: Cold and Wet°1.

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Endive is cultivated and is naturally distributed all over North West India, Deccan, Punjab, Kashmir etc. Endive is a salad vegetable. It is a perennial errect glabrous or hispid herb. *The leaves* are oblong tapering having a tapering stem 1-3 ft. angled and grooved. Its branches are rigid and spreading. *Flowers* are bright blue, truncate rarely white and are 5 toothed. Heads are 1-1½" in diameter, solitary and axillary clustered root. **Root.** fleshy[2].

Chemical Constituents

Endive flowers: contain a glucocide, *Chichorin:* bitter substances; *lactucin, intybin.* **Seeds** contain a *bland oil.* **Roots** contain *nitrate* and *Sulphate of potash, mucilage* and some *bitter principle*[2].

Endive flowers, seeds and root are medicinally used in the treatment of liver disorders. Decoction of the flowers, seeds or root (1 in 20) is used 1 to 2 ounces daily thrice to cure torpidity of the liver, indigestion, biliary stasis, jaundice, enlargement of the spleen etc. Plant is externally applied to cure dropsy.

Seeds

Endive or chicory seeds are roasted and mixed with coffee and is sold as *French Coffee*. Seeds are narcotic and excessive use of chicory blend Coffee causes amaurotic blindness. Seeds are used with *melon seeds* as diuretic and antilithic.

Root

Powder of the dry root ½ teaspoonful is given mixed with honey thrice daily as a very useful expectorant in chronic bronchitis. Endive is a chief constituent of *Live-52 Himco*.

123. EVOLVULUS ALSONDIS

E. alsondis: *Vishnukrantha:* (Sans.); *Shankapushpi:* (Hindi); *Vishnukanthi soppu:* (Kan., Tam., Tel., Mal.).

Family: Convolvulaceae.

Zodiac: Aquarious.

This vegetable green is also a very common medicinal herb found during rainy season all over Mysore State. There are two varieties namely: The white and the blue.

The white variety is commonly eaten as a medicinal green to increase memory power, eyesight etc. It is a laxative and a powerful uterine tonic[3]. Its soup is used to cure bilious-headache, dropsy due to liver disorders, sterility in females, intestinal worms (pin worms) etc. A cupful of the fresh leaf juice is given 2-3 times as an antidote for Krait snake bite. The juice of the root ½ a cup is given daily to cure colic due to indigestion.[3]

The blue kind is a bitter tonic, carminative, anti-malaria, and aphrodisiac. Its fresh leaf juice ½ a cup is given every day for about two months to cure insanity, asthma, colds, bronchitis, tuberculosis venereal diseases, leprosy etc[1].

The leaves of both the types are rolled and smoked in chronic bronchitis and asthma. The plants are used in dysentery[2].

Decoction of the fresh leaves (1:40) is given 2 to 4 ounces once daily with cumin seeds and milk in fevers, loss of memory, syphilis, dysentery, scrofula etc[4].

REFERENCES

1. Syed Sultan, *Qhariye-kay-Adeiyath*, Urdu MSS., (1928).
2. Mathur, R. C., *Systematic Botany*, p. 375, (6), (1965).
3. Shiva Kumar, *Arogiya-Darpana* (Kan.), (1965).
4. Nadkarni, K. M., *Indian Materia Medica*, Vol. 1, p. 531, (1954).

124. FENUGREEK

Fenugreek: *Trigonella-foenum-graecum:* (B.N.); *Medhika:* (Sans.); *Methi:* (Hindi, Urdu, Dak., Guj.); *Hulba:* (Arab.); *Shamliat:* (Pers.); *Malquze:* (Pashtu); *Menthe:* (Kan.); *Uluva:* (Mal.).

Family: Papilionaceae.

Zodiac: Tanrus.

Food Value per 100 g. approximately

Carbohydrate	10 g.	Vitamin A	6,450 I.U.
Protein	4 g.	Vitamin B_1	49 mcg.
Fat	1 g.	Vitamin B_2	165 mcg.
Calcium	455 mg.	Niacin	0.7 mg.
Phosphorus	49 mg.	Digesting Time	2 Hrs.
Iron	17 mg.	**CALORIES**	**48**

Constitution: Hot and Dry 2°.

Physiopharmacology and Therapeutics

Fenugreek is a very popular leafy vegetable cultivated all over India. It is used in preparing different types of vegetarian and non-vegetarian culinary preparations. Though the taste is bitter but still, majority of the people eat it for its medicinal value.

Fresh leaves are rich in *Trigothine.* Cooked vegetable is a medicine for liver, lungs, heart and brain disorders.

Split liquid ½ cupful mixed with a tablespoonful *honey* taken once every day is a medicine for cirrhosis of the liver, jaundice, bilious head-ache, cholescystitis, biliary colic, amoebic-liver

abscess, asthma, tuberculosis, neuritis, insomnia, bilious giddiness, etc. It is recommended that chemotherapy should simultaneously be given in all the above said diseases.

A tablespoonful leaf juice is regularly given early in the morning for about three months to cure early stages of diabetes.

Paste of the fresh leaves applied over the scalp regularly before taking bath, cures dandruff, lengthens hair, preserves the natural clour and keep the hair silky soft. Paste of the fresh leaves applied every night before going to bed and washed with warm water prevents one from getting pimples, black heads, dryness of the face, early appearance of the wrinkles, blooms complexion and makes one look years younger. Application of the paste of fresh leaves completely stops the secretion of breast milk.

Fresh juice mixed with lime-juice is applied over glandular swellings, sprains burns and contusions with gratifying results. Fresh juice is put in eyes every night to prevent and cure conjunctivitis, burning and excessive watering in the eyes etc.

Seeds

Dry seeds are brownish-yellow in colour and they are mostly used in condiments. They have a peculiar smell and are bitter in taste.

Seeds contain the alkaloid *Trigonelline, Choline, Mucilage* 6 per cent, *Proteins* 22 per cent, *Methylamine, Di-methylamine, Tri-methylamine, Betain, Nurin, Lecithine, Phosphoric acid, Sopain*, and *Neucleo-albumin*[2,3].

Dry seeds 2 teaspoonfuls soaked in a glassful of water for about 4 hours, and then they are boiled in the same water to reduce it to ¼ the quantity. Decoction is strained through a muslin cloth and a tablespoonful of pure honey is added to it. It is used every night as a tonic medicine during the treatment of tuberculosis, asthma, emphysema bronchitis, lung abscess pneumonia cirrhosis of the liver due to excessive use of alcohol, malnutrition, jaundice, poor resistance against infections, dropsy, rheumatism, anaemia, gout, lumbago, menstrual irregularities, etc.

Roasted seeds are powdered and a teaspoonful with *butter milk* is given twice a day in diarrhoea, dysentery, piles, hepatitis, indigestion, flatulent colic etc. Gruel of the roasted seeds is

given with milk and sugar to increase breast milk, inflamed conditions of the intestines. They are an effective substitute for *Cod-liver oil*[1]. Taking 2 spoonfuls powder of the roasted seeds with equal quantity of roasted powder of *Coriander seeds* with *milk* every night for a month is a effective medicine to cure spermatorrhoea, functional impotency, etc.

Unroasted seeds 2 teaspoonfuls, with *saptarangi-bark* (casearia esculenta) powder 1 teaspoon, is soaked in 8 ounces of water for overnight. Next morning the ingredients are boiled until three ounces of decoction is left. It is given every day for three months to cure diabetes melitus. Author tried this and found to be effective in moderate types of diabetes[5]. It is noted that addition of *Jasad-Bhasma 1 gr.* three times a day with this mixture gives a very promising effect in reducing blood-sugar and keeps one urine free from sugar[5]. Restriction of the excessive use of carbohydrates, regular exercise and regular check up by a physician should never be forgotten by every diabetic person. It is noted that a permanent cure is not possible with the above mentioned treatment. Hence it is cautioned that a diabetic person should always look forward to live healthy and long with judicious use of the prescribed doses of life-saving *Insulin.*

Decoction of the seeds mixed with a pinch of *turmeric powder* is used as a douche to cure vaginitis, leucorrhoea, and bad smell after menstruation.

Paste of the seeds mixed with boiled *milk* is a very effective cosmetic. It is applied over the face, hands, skin, to keep it lovely, soft, and healthy. Hair washed with seed paste, prevents from hairfall, baldness, dandruff and keeps the hair healthy, long, strong and black.

Seeds sown in the soil in which *marking nuts* are previously burried and the plants or the seeds are used to keep one's hair permanently black even in oldage. Seeds and the leaves should be eaten regularly from the early age to get the desired result. Eating the fresh leaves from the plants grown accordingly are also effective to sharpen memory, to increase sexual vigour, to build strong resistance against infection, and to prevent pre-mature old-age etc.[5]

Seeds soaked in coconut oil are found to convert it into a medicated hair oil to safeguard hair life.[7]

Paste of the seeds is applied over glandular swellings, blood boils, carbuncles, abscesses, whitlow, burning in the soles and palms etc., with excellently good results.

REFERENCES

1. Dastur, J. F., *Medicinal Plants of India and Pakistan*, pp. 169-170, 235, (1962).
2. B. P. C. p. 422, (1911).
3. Nadkarni, K. M., *Indian Materia Medica Vol. 1*, pp. 281-82.
4. Kirtikar, *et al.*, *Indian Plants*, Vol. 11, pp. 1094-95.
5. Majeed, S. M., *Tibbe Majeedi*, (Pers. MSS), p. 118, (1920).
6. Muzaffar Hussain Aivan, *Kitabul-Mufaradath*, p. 492.
Hakeem Syed Sultan *Khariye-kay-Adviyath*, (Urdu MSS), p. 380, (1930).

125. GARDEN CRESS

Garden or Water cress: *Lepidium Sativum:* (B.N.); *Chandra-ra:* (Sans.); *Halim:* (Hindi, Urdu); *Aalli-soppu:* (Kan.); *Hurāf:* (Arab.); *Sapindan:* (Pers.); *Aliviari:* (Tam.); *Aditayalu:* (Tel.); *Thutta-kaya-kamikal:* (Mal.); *Alavi:* (Mar.); *Assalio:* (Guj.); *Halio:* (Sind.); *Tezek:* (Punj.); *Chandrasana or Halim:* (Beng.).

Family: Cruciferae.

Zodiac: Cancer.

Food Value per 100 g. approximately

Carbohydrate	8.7	g.	Iron	28	mg.
Proteins	5.6	g.	Vitamin B_1	150	mcg.
Fat	1.5	g.	Digesting Time	2	Hrs.
Calcium	350	mg.	**CALORIES**	68	
Phosphorus	105	mg.			

Constitution: Hot and Dry 2°.

Physiopharmacology and Therapeutics

The glabrous plant about 6-18 inches high is cultivated all over India, Pakistan and Shillong. The leaves arise from underround part of the stem and divide twice pinnately. They are anceolate. Flowers are white, long recemes. Pods notched at the tip, margins winged, two seeded[1].

Garden Cress contains a glucoside *Glucotro-poeolin*[1].

Garden Cress is a very rich and cheap source of *Vitamin* B_1, *Calcium*, and *iron*. A cupful of fresh leaf-juice supplies as much *Vitamin* B_1 as one gets by eating *any one* of the following foods approximately:

Vitamin B_1*:*

Eggs (hen's)	5	Rice dry	12 Tablespoonfuls
Mutton	2 Slices	Wheat chapaties	(70 g. flour) 2½ Chap.
Chicken	200 g.		
Milk	1½ cupful	Green Gram	200 g.
Almonds	60 g.		

Calcium:

Milk	2 cups	Chicken roast	2½ kg.
Almonds	700 g.	Eggs (hen's)	18
Oranges	6	Mutton chops	2¼ kg.
Papaya	3 kg.		

Iron:

Liver	150 g.	Apples	56
Mutton roast	900 g.	Bananas (4.5 kg.)	29
Chicken roast	2 kg.	Oranges	50
Eggs	26	Cow's Milk	140 cups

A cupful of the fresh juice with a teaspoonful of *lime juice* and a pinch of *common salt* taken every morning for a month acts as a nature's wonderful medicine to prevent and cure iron deficiency anaemias, menstrual irregularities, asthma, cough, bleeding piles, bad smell in the nose, dirt eating habit in children, general debility during pregnancy and lactation, nervous tachycardia strange feeling of inferiority complex during menopause, menta irritability, suicidal tendencies, lack of interest in life and on often desires to run away from home. It is a medicine for acute mania after child-birth, and an effective tonic during the treatment of tuberculosis of the lungs. It can also be used as a health giving tonic after recovery from acute febrile conditions, blood-loss, etc A cupful of the juice taken every day is found to be a safe weigh reducing medicine.

Tender leaves and shoots are used to cure liver complaints, chilblains, urticaria, hiccup, giddiness, chest pain etc.[2,3]

Seeds

Seeds are bitter and sharp. The constitution of the seeds dry and hot in 2°. A teaspoonful garden Cress seeds are boiled 5 ounces of water for ½ hour and the decoction with a table-spoonful of *honey* is given as an effective medicine to increase breast milk, sexual stamina, sexual retentivity, etc. Juice of the seeds 1 teaspoon obtained by grinding with water 1 ounce, mixed with a glassful of *tender coconut* water is given as a folk medicine to cure diarrhoea, dysentery, bleeding piles, scanty urination due to liver disorders and irritation of the intestinal mucous membrane[1,3].

Seeds roasted in *ghee* and mixed with sugar are given as a tonic for general weakness in young girls and after child-birth to increase breast milk[1].

Porridge of the seeds made with *milk* is given to cause abortion, impotence, lumbago, leucorrhoea, rheumatic pains etc.[1,2]

Poultice of the seeds is applied to cure inflammations. The seeds roasted in *til oil*, and the oil is used as an analgesic medicated oil in gout, rheumatism, glandular swelling, etc. Oil massaged over pains every night, increases the blood circulation and helps proper erection during conjugal union. It should be noted that this oil is counter irritant and therefore, care must be taken to use a little at a time[4,5].

Roots

Paste of the roots is used to cure secondary Syphilis and tenesmus.

REFERENCES

Dastur, J. F., *Medicinal Plants of India and Pakistan*, pp. 102, 145, (1962).
Prof. Mathur, R. C., *Systematic Botany*, p. 305 (5), (1965).
Muzaffar Hussain, *Qhuas-ul-adviya*, pp. 521, 22, (1965).
Majeed, S. A., *Tibbe-Rahamani*, (Urdu MSS), p. 375, (1930).
Hakeem Syed Sultan, *Qhariye-kay-Illaj*, (Urdu MSS), (1910).
Nadkarni, K. M., *Indian Materia Medica*, Vol. 1, pp. 736-38, (1954).

126. INDIAN SORREL

Indian Sorrel: *Oxalis corniculata:* (B.N.); *Chāngeri:* (Sans. *Khatti-buti* or *Amrul:* (Hindi, Urdu, Punj.); *Ambate-ki-bhaji* (Dak. Guj.); *Pulpuli-soppu:* (Kan.); *Puliyarai* (Tam.); *Pullam-purachi:* (Mal.); *Henda:* (Arab.); *Culantu-puli:* (Tel.); *Taptti:* (Sindhi); *Amrulsak:* (Beng.).

Family: Oxalidaceae.

Zodiac: Saggitarious.

Constitution: Cold and Wet 1°.

Physiopharmacology and Therapeutics

Indian sorrel is a very popular herb that grows wildly during mansoons and on wet grounds. The flower like tricut leaves are sour due to high content of *Oxalic acid* and *Potassium oxalate.*[1] It is also rich in vitamin B_1, iron and calcium. A tablespoonful of fresh juice mixed with *cow's butter milk* 1 glassful daily once to cure jaundice, biliousness, dysentery, diarrhoea, excessive thirst due to diabetes, summer, etc.

Fresh juice is applied as a very effective medicine for scorpion sting[2]. Few drops of the juice put in eyes every day keeps one free from eye-strain and prevents opacity of the cornea, cataract etc. Fresh leaf juice mixed with *onion juice* in equal quantity is applied over warts, corns etc. with gratifying results[3,4].

Juice mixed with equal quantity of *castor oil* and heated to evaporate the watery content. Then the oil is cooled and kept in a bottle. Massaging the scalp with this oil every night before going to bed induces good sleep, imparts a very cooling sensation in the eyes.

Here is a very useful recipe of Indian sorrel to cure bleeding piles, haemorrhoids, bilious disorders, prolapse of the rectum in children, spermatorrhoea, excessive secretion of prostatic fluid etc.[3]

Recipe

Fresh leaf juice of Indian Sorrel	1 Pint
Fresh leaf juice of Zizyphus-jujuba (leaf)	1 Pint
Fresh Juice of Ginger	½ Pint
Sugar	2 Kg.

Direction

Boil all the above mentioned freshly strained leaf juices in ½ pint of pure *black cow's curds*, for at least ½ hour. When boiling mix *sugar* and keep on stirring until it begins to thicken. Pour it a glass jar when it is hot and cork it tightly. Use it within veek.

Dose: Four teaspoonfuls with a glass of *cow's milk* once y; preferably before going to bed. Use it regularly for onth.[3]

Contra-indications. Since Indian sorrel contains high con-ntration of oxalic acid it should not be used by persons suffering from gout, rheumatism, urinary calculi etc.

REFERENCES

1. Dastur, J. F., *Medicinal Plants of India and Pakistan*, pp. 125-175, (1962)
2. Muzaffar Hussain, *Qhausul-advia*, p. 176, (Urdu).
3. Syed Sultan, *Qhariye-key-Illaj*, (Pers. MSS), (1918).
4. Nadkarni, K. M., *Indian Materia Medica*, Vol. 890, (1954).

127. IPOMOEA

Ipomoea or Swamp Cabbage: *Ipomoea-raptans:* (B.N.); *Mushāgarni* or *Mūshakani:* (Sans.); *Nari-ka-sag* or *Musakani:* Hindi); *Chuhakani:* (Urdu); *Uzanulfar:* (Arabic); *Goosh-e-moosh:* Pers.); *Nilichi-bhaji:* (Mar.); *Undargani:* (Guj.); *Kovakani:* Sindhi); *Kalmi sag:* (Beng.); *Undarkani-pana:* (Bangla.); *Condamula saga:* (Ori.).

Family: Convolvulaceae.

Zodiac: Cancer.

Food Value per 100 g. approximately

Carbohydrate	4.2	g.	Vitamin A	3,276	I.
Protein	3	g.	Vitamin B_1	49	mc
Fat	0.3	g.	Vitamin C	137	m
Calcium	108	mg.	Niacin	0.7	m
Phosphorus	49	mg.	Digesting Time	2¼	Hrs.
Iron	3.9	mg.	**CALORIES**	31	

Sodium, Potassium, Magnesium, Copper, Manganese, Silica and Iodine ++

Constitution: Hot and Dry 2°.

Physiopharmacology and Therapeutics

'Ipomoea plant is aquatic, trailing or floating prenr some time annual herbs with long fistular stem rooting at no It is also found trailing on moist soil or mud along the b of stagnant streams, fresh water ponds, ditches, marshes wet rice fields. It is easily propagated by cuttings and spre quickly into dense masses of foliage within few weeks'[1]. It gro wildly in Deccan, Central India and near mountains, and also all over Mysore State during Monsoons.

Ipomoea leaves resemble like ears of rat and contain soft fur over them. *Flowers* are yellow and *seeds* are black.

The herb is used as vegetable and the cooked leaves are anti-scorbutic, cooling, laxative and neurotonic. The leaf juice mixed with *brinjal leaf* juice 2 teaspoonful is given as an antidote in cases of *Opium* and *Arsenic poisoning*. A teaspoonful of the juice with *almonds* 10 is given once or twice daily as a medicine to cure exopthalmic goitre, myxoedema, mild type of parkinson's disease, writer's cramp, nervous trembling of the hands hyperhydrosis (excessive sweating in hands and feet), piles etc.

Decoction of the plant 4 ounces given once daily is a medicine to dissolve small urinary calculi. Leaf juice is installed in eyes to cure conjunctivitis, corneal ulcers etc[2]. *Buds* are used in the treatment of ring-worm.[1]

REFERENCES

1. Mathur, R. C., *Systematic Botany*, p. 374 (*b*), 1965.
2. Muzaffar Hussain, *Kitabul Mufaradath*, (Urdu), pp. 223-24, 1965.

128. KHESARI LEAVES

Khesari leaves: *Lathyrus sativa:* (B.N.); *Masoora patr:* (Sans.); *Masoor ki sag:* (Hindi, Urdu); *Kessari ellakal:* (Mal.); *Khesari saga:* (Ori.).

Family: Papilionaceae.

Zodiac: Scorpio.

Food Value per 100 g. approximately

Carbohydrate	7 g.	Iron	7 mg.
Protein	5.5 g.	Vitamin A	5,964 I.U.
Fat	1 g.	Digesting Time	2½ Hrs.
Calcium	157 mg.	**CALORIES**	**63**
Phosphorus	105 mg.		

Constitution: Hot and Dry 2°.

Physiopharmacology and Therapeutics

Cooked leaves are used as a vegetable medicine, to cure eye diseases. Fresh leaf juice is also put in sore eyes, belepheritis. Leaves are used as a fodder. Seeds are split and used as food. It is found that seeds or pulse contain a neurotoxic poison that causes paralysis of the limbs known as *Lathyrism*. According to *Dr Watt*, this poisonous effect may be reduced by cooking it properly. [R. C. Mathur, *Systematic Botany*, p. 108 (5) 1965], (see Khesari dal).

129. LETTUCE

Lettuce: *Letuca Sativa:* (B.N.); *Kahu* or *Kasmi-sag:* (Hindi, Urdu, Dak., Pers., Beng.); *Qhas:* (Arab.); *Hakkarike-soppu:* (Kan.); *Avercheera:* (Mal.); *Salat:* (Guj.); *Lettus-saga:* (Ori.).

Family: Compositae.

Zodiac: Pisces.

Food Value per 100 g. approximately

Carbohydrate	3 g.	Vitamin B_2	119 mcg.
Protein	1.8 g.	Vitamin C	14 mg.
Fat	0.3 g.	Sodium	9 mg.
Calcium	49 mg.	Potassium	329 mg.
Iron	2 mg.	Folic acid	16 mcg.
Copper	Trace	Oxalic acid	13.6 mg.
Vitamin A	1,112 I.U.	Digesting Time	2 Hrs.
Vitamin B_1	38 mg.	**CALORIES**	**60**

Constitution: Cold and Wet 2°.

Physiopharmacology and Therapeutics

Lettuce is a very popular vegetable, cultivated all over India. In this country it is used as a cooked vegetable, but in Western countries it is mostly used raw as a salad vegetable.

The plant is rich in various Chemicals like: *Latucarium, Letocin, Lectopicrin, Latucic acid, Lutucerim,* trace of *Hyoscimine, Valarionic acid, Soda, Manganic-oxide, Ferric-Oxide* and *Lime.*

Eating raw lettuce has a very gratifying effect during pregnancy and lactation. Lettuce has a very important nutritional factor *folic acid* which prevents megaloblastic anaemias during pregnancy. In series of experiments with lettuce and its useful effect during pregnancy confirms that mothers who had a regular daily use of lettuce were free from nutritional anaemias. One particular benefit of lettuce eating is, it prevents one from habitual abortions. Author confirms that it has a great influence over the secretion of *progestrone hormone.* One woman who was sterile for fifteen years having no other pathological indication; became pregnant after giving her lettuce-salad with *cucumber* and *apple-cider-vinegar* for about three months along with her usual food. Eating Lettuce with *spinach, peas, asperagus,* and *cauliflower* increases the *folic acid* content of the food and supplies more *folic acid* which we require daily. It is estimated that about *300-500* mcg. of *folic acid* is daily required during the last trimester of pregnancy[1,2,3].

A glassful of fresh leaf juice of lettuce mixed with sugar or honey taken every night or in the morning is a medicine to cure

stomatitis, sprue, anaemias due to iron deficiency, etc. It prevents tuberculosis, asthma, bronchitis, jaundice, gall-bladder stones, corneal ulcers etc.

A cupful of fresh leaf juice supplies as much vitamins as one gets by eating *anyone* of the following foods:

Vitamin B_1

Eggs (Hen's)	2	Milk	3½ cup
Veal cutlet	200 g.	Almonds	30
Beef	240 g.		(shelled)
			etc.

Vitamin B_2

Egg	1	Milk	¾ cup
Beef	60 g.	Almonds	30
Mutton	100 g.		etc.

Folic acid:

Liver	25 g.	Tomatoes	2 kg.
Spinach	200 g.	Cucumber	3.4 kg.
			etc.

In olden days, an ass used to be fed with lettuce and a cupful of its milk was given daily as a medicine to cure tuberculosis[4]. Author's investigation with such ass milk along with other drugs in the treatment of tuberculosis proved to be more promising than the chemotherapy alone. Particularly in cases having multiple cavities, where surgery is the choice treatment but the patient refuses to undergo an operation; Lettuce fed ass milk a cupful along with streptomycin or *Isozone forte* (pfizers) *INH* or any other combination of *INH 300* mg. with *Thiacetezone 150 mg.*, given once daily[5,6] for 6 months, not only increases the body resistance but also helps the patient to live long. Remember once the lungs tissues are damaged it is not possible to heal completely with medicines.

Fresh juice of lettuce one cupful mixed with a teaspoonful of *amla juice* given every day in morning for a month is a medicine for insanity, hysteria, nervous exhaustion, schizophernia, menopausal tension, nervous tachycardia, bilious dizziness, excessive menstruation associated with crampy pain particularly in young

anaemic and unmarried girls, diarrhoea during menstruation, and due to indigestion, bleeding piles, etc.[7]

Juice, 1 tablespoonful or leaves (6) eaten with *cucumber* or *carrots* (1-2) after meals acts as a carminative medicine and helps the free elimination of stools. It increases sex desire and reduces acidity in the system[8].

Chewing leaves every day immediately after meals, prevents tooth decay, gingivitis, halitosis (bad breath), stomatitis, pyorrhoea, loss of excessive enamel of the teeth, and preserves the taste-detecting neurons of the tongue.

Leaves can be kept fresh by preserving them in perforated *polyethelene* bags. Packing lettuce in *Tript-Tite tray* also helps to keep it fresh[9,10,11].

Seeds

A teaspoonful of lettuce seeds mixed with *honey* is given two times daily during the treatment of whooping cough, bronchitis, asthma, colds, insanity, insomnia, palpitation of the heart, impotency, etc., with good results. The emulsion of the seeds a cupful given once or twice daily is a medicine for scanty urination, chest pain, pre-mature ejaculation, leucorrhoea, dysentery, diarrhoea. The seeds contain *lignose* which is an effective intestinal antiseptic.

REFERENCES

1. Willoughby, M. L. N., *et al.*, *Brit. Med. J. II*, 1568, (1966).
2. Martin, I. D. and Davis, R. E., *J. Obst. & Gynace. C.Wlth*, 400, 71, (1964).
3. Hibbard, B. M., *idid*, 529, 71, (1964).
4. Majeed, S. A., *Tibbē Rahamani*, p. 648, (Urdu, MSS), (1926).
5. Study of Tuberculosis at Chemotheraphy Centre, Madras, *J.I.M.A.*, July, 16, (1966).
6. Bhaskar Rao, K., *Antiseptic*, 63, 859 (1966) Madras.
7. Hakeem Jalaluddine, *Alilaj*, (Pers. MSS), 1312 (1910), Iran.
8. Pandit Krishna Nair, (Malyalam MSS), (1930).
9. Wallace, W. H. and Taylor, E. R., *Prepacking Fresh Fruits and Vegetables*, *Eul.* No. 158, 1954, Argi. Ext. Service, Univ. of Rhode Island, Kingston.
10. Aron, *pre-pack-Age*, 8 (11), 22, (1955).
11. Anon, *Mod. Package* 28 (1), 172, (1954).

130. MINT

Mint: *Mentha arvensis:* (B.N.); *Rochishe:* (Sans.); *Pudina:* (Hindi, Urdu, Dak.); *Nauna,* or *Fotanj:* (Arab.); *Poodina soppu:* (Kan.); *Pothina:* (Tam., Tel.); *Mootha veppila:* (Mal.); *Fudina:* (Guj.); *Poodina patra:* (Ori.); *Pudina sag:* (Beng.); *Mentha:* (Latin).

Family: Labiatae.

Zodiac: Taurus.

Food Value per 100 g. approximately

Carbohydrate	8.49 g.	Vitamin B_1	59 mg.
Protein	5.90 g.	Vitamin B_2	81 mg.
Fat	0.70 g.	Niacin	0.4 mg.
Calcium	440 mg.	Oxalic acid	3.8 mg.
Phosphorus	70 mg.	Digesting Time	
Iron	19.2 mg.	**CALORIES**	**56**
Vitamin A	6,101 I.U.		

Constitution: Hot 2° and Dry 2°.

Physiopharmacology and Therapeutics

Mint is a very aromatic herb that is common all over India. It is generally used as a carminative and anti-spasmodic herb in the preparation of chutney and curries. From ancient times, Romans and Greeks knew about this herb. In olden days it was believed that *Mentha* the damsal lover of God *PULTO* was transferred into this herb due to the anger of PROSARPAIN, the wife of *PULTO* and Goddess of Wealth; (Like Lakshmi of Indian Mythology). Therefore, mint is commonly known as MENTHA in *Latin*[1].

The ancient Greek physician *SAUFARSATS* used mint in the preparation of various carminative medicines. Even *Mohammadan physicians* were also familiar with this herb. *Chinese* and *Japanese* knew this herb as long as two thousand years. But it is strange how the *Hindu Physicians* missed this useful herb since

it is not mentioned in old medical books, in spite of its abundant growth in India.[1,2,3]

Mint wildly grows in Himalayan plains and Kashmir Valley in number of varieties such as: *Mentha-arvensis*, *M. Piperata*, *M. Viridis*, *M. Polligium*, *M. Sylvestris etc. M. arvensis* is cultivated for the use of culinary preparations and *M. piperata* for the distillation of *Menthol oil* (peppermint oil) and preparation of *Menthol*[1,2,3].

Fresh leaf juice of *mint* mixed with a teaspoonful of *lime juice* and *honey* is given thrice daily with excellantly good results in the treatment of indigestion, biliousness, flatulent colic, thread worms, morning sickness, iron deficiency anaemias, summer diarrhoea etc. An ounce of mint tea is given thrice daily as a home-remedy for hiccough, colic, indigestion and colds. Giving mint tea for four days earlier of the expected menstrual time cures spasmodic dysmenorrhoea in young girls. Gargling fresh mint decoction with salt cures hoarseness due to shouting or singing loudly. It keeps the voice clear if used before singing. Therefore, it is a boon to singers and orators.

A teaspoonful of fresh mint juice mixed with 2 teaspoonfuls of *pure malt vinegar* (Mohan's) and equal quantity of *honey* stirred in 4 ounces of *carrot juice* is given thrice daily as a medic-cated-tonic during the treatment of tuberculosis, asthma, bronchitis. It liquifies the sputum, nourishes the lungs, increases body resistance against infection and prevents the harmful effects of antitubercular drugs. It prevents the asthmatic attacks by its secrolytic action and reduces congestion in air passages.

Chewing few fresh leaves of mint daily is a nature's own antiseptic dentifrice. The chlorophyll combined with other antiseptic chemicals in the mint, kills all the harmful odour causing germs. It strengthens the gums by nourishing the required nutrients and thus prevents tooth decay, pyorrhoea, pre-mature fall of the teeth etc. It also keeps the mouth flower fresh and increases the sense of taste in the tongue.

Salad prepared with *tomatoes*, *onions*, *cucumber*, *fresh lime juice*, *malt vinegar*, *table salt*, (a green Chilly if desired) dressed with *fresh mint* and *coriander leaves* is a food-medicine if used daily. It kills the harmful germs contaminated in the food, eases digestion, and supplies all the necessary fresh natural vitamins,

minerals, enzymes. It removes the unwanted chemicals from the blood by increasing urinary output and helps one to live long. This salad is a boon during cholera epidemics and prevents the infection. It is tested that cholera germs will never thrive in the persence of *menthol, camphor, steriophin, potassium* etc., that are contained in this *salad.*

Application of fresh mint juice over face every night, cures pimples, and prevents from dryness of the skin. Juice is also applied over insect stings, eczema, scabies, contact dermatitis etc. Snuffing the powder of the dry leaves cures chronic rhinitis, bleeding from the nose, loss of smelling power etc.

Menthol oil or (Oleum mentha pip B.P.C.)

Menthol oil or *peppermint oil* is distilled from the fresh leaves of *M. piperata* (black variety) during the flowering time. The oil distilled from white variety is more aromatic than the oil distilled from the black variety but it yields less oil. Menthol oil is colourless but sometimes it becomes yellowish pale or greenish yellow when it is recently distilled. It becomes darker and thicker as it becomes old. If menthol oil is cooled to a low temperature and few crystals of *menthol* are added in it separation of menthol occurs quickly. The specific gravity of *menthol oil* is 0.9000 to 0.920 at 45°. It is soluble in alcohol 70 per cent (2:1)[4].

Chemical Composition

The chief chemical composition of *peppermint oil* is *Menthol, menthyl acetate cineol, inactive pinene, l-limonene, cadinene, phellandrene, acetic aldehyde* and *acid, isoleveric aldehyde* and acid, *amyl alcohol,* and *demethyl sulphide.* The English oil contains more menthol (60 to 70 per cent)[4].

Medicinal Uses

Peppermint oil 1 to 3 drops on a lump of sugar is used as a carminative, aromatic stimulant in flatulent colic, indigestion etc. It acts as a sedative on the stomach and relieves distension. Hence it is effectively used in periodical palpitation of the heart due to intra-abdominal pressure. *Soda-mint-Boots* tablets are made from *soda-bicarb, ammonium chloride* and *peppermint oil.*

2 to 4 tablets swallowed with water are found to be very effective in acid-indigestion and excessive vomiting in children. (Children should be given ½ tablet 3 times daily.) Sucking one or two *sodamint* tablets 3 to 4 times daily relieve irritation in the throat and act as saline expectorant in bronchitis, asthma etc.

Application of menthol oil 2 drops in a teaspoon of *coconut oil*, over painful joints and dislocations alleviates pain and cures inflammation due to its local anaesthetic and rubificient effect. Being antiseptic, it is applied as throat paint mixed with honey in diphtheria, tonsillitis, and relaxed throat. It is a chief constituent of *Mandle's paint*. The oil mixed with equal quantity of *clove oil* is put in caried tooth to relieve pain. Its application with *lime juice* over the exposed parts prevents mosquito bite because it acts as a mosquito repellant.[4]

Menthol (Peppermint-ka-phool)

In 1829 A.D. a chemist by name *Gmelin* explained the method of the preparation of Menthol from mint. *Dr. Perera* in 1862 A.D. used China menthol as an analgesic. *Dr. A. Dincken* wrote about the antiseptic effects of menthol in 1879 A.D. Later, *Dr. Rosenberg* in 1885 A.D. prepared a nasal spray with *menthol; ether* and *alcohol*, which is being used even today as a local anaesthetic.[1]

Menthol is prepared by freezing peppermint oil and the colourless, acicular or prismatic stick like crystals are separated from the oil. Menthol crystals are brittle, having a strong peculiar smell of peppermint. If a crystal is put on the tongue, it creates a warm aromatic taste followed by a sensation of cold on drawing air into the mouth. Its chemical formula is $C_6 H_9 OHCH_3 C_3 H_7$. It melts at 43° and its specific gravity is 0.890. If menthol is exposed to air, it evaporates. It liquifies when it is mixed with crystals of *Thymol* and *Camphor*. It is insoluble in water and glycerine, but dissolves in *alcohol, Chloroform, Olive oil, petrol, liquid paraffin* and in *etherial oils*[4].

Medicinal uses of Menthol

Internally menthol is rarely used. But mixed with *camphor, Thymol, eucalyptus oil, carbolic acid* in the following proportion, can be used carefully.

Menthol Mixture

Recipe

Menthol	1 part	Pure Eucalyptus oil	4 parts
Thymol	1 part	Carbolic acid	⅛ part
Camphor	4 parts		

Add all these ingredients in a blue bottle and shake well or keep in the sun after stoppering tightly. After some time it forms into a liquid. Dilute this liquid with double the quantity of *rectified Spirit* and use in the following diseases. I have clinically tested this preparation in these diseases and found gratifying results. Even it can be used without carbolic acid.

Dose 1 to 2 minims for children above 4 years.
4 to 6 minims for adults.

Directions for use of Menthol mixture

Children's Colds

Add 5 drops of the mixture in a teaspoon of coconut oil and mix it well. Then apply liberally all over the chest and back gently. For children above 4 years add a drop of medicine on a lump of sugar and give it orally 3 to 4 times daily. This has been found to be very effective in clearing the air passages and destroying bacteria.

Cold in the head and chest

Add 20 to 30 drops of the medicine into a vessel containing steaming hot water. Inhale the medicated steam by covering the head with a towel. The relief that follows this treatment is really very remarkable. To safeguard the throat from infections adults can take 5 drops with sugar 3 to 4 times daily. The popularity of world famous *Vicks Vapour Rub* and Vicks Medicated Drops is due to these medicines in them.

Sore throat and Colds

Sore throat is a very infectious disease caused by very dangerous germs that damage kidneys and heart. They create a ground for still more serious throat infections like diphtheria and septic

tonsillitis. Therefore, never neglect sore throat carelessly. As soon as you feel the slightest pain in the throat while talking or swallowing, put 3 to 5 drops on a lump of sugar or Sugar candy and suck it slowly 3 to 4 times daily. It gives an immense relief in a day. If the pain persists consult a physician and get your throat fully examined and take the specific treatment. There is no harm in continuing to suck medicated sugar while you are getting treatment. This medicine is a very effective local antiseptic.

Influenza

Influenza is also a very infectious disease caused by various strains of Virus. In early stages, inhaling the medicated steam and using it internally 4 to 6 drops (Adults) 3 to 4 times daily cuts shorts the serious effects of influenza. Its regular inhalation by putting few drops on a clean hanky is found to be very effective for clearing the nasal congestion. A little application over the temples and forehead reduces headache.

Burns and Scalds

Add few drops of medicine in coconut oil or cod liver oil and apply it over the injured part and cover it with sterilized cotton wool. Even simple burns, when they are contaminated prove to be very fatal, therefore, all such injuries should be immediately attended by a physician and treated properly.

Minor cuts and Sores

Minor cuts and sores can be treated at home without any danger. Apply few drops mixed with *Dettol* and bandage them properly. It prevents infection and heals the cut wounds quickly. Sometimes cut wounds damage an underlying blood-vessel and cause severe bleeding, therefore, in such injuries one must seek a physician's help to prevent blood loss. Cuts with contaminated rusty garden tools and meat cutting knives are very dangerous however minor they are, they must properly be treated by a physician to prevent the forthcoming infection like tetanus, sepsis etc. It can be applied for bee sting, scorpion sting etc. Mixed with til oil it can be used as a very effective analgesic balm in rheumatism, dislocation, chest pain lumbago, sciatica etc.

Internal uses of menthol mixture

Menthol mixture 4 to 6 drops (adults) and 1 to 2 drops children (above 4 years) along with a teaspoonful of *lime-juice* or ½ to one teaspoonful of *malt vinegar* given 3 to 4 times daily is a specific medicine for indigestion, flatulent colic, diarrhoea, bacillary dysentery, vomiting, food poisoning, in early stages of Cholera. It can be given to prevent and expel threadworms.

All these medicinal properties are attributable to the antiseptic and local anesthetic effects of the ingredients used in menthol mixture. The patent Balms like, *Wintogeno, Amruthanjan, Novin, Vicks vapour rub* etc., contain these chemicals in different proportions.

Few crystals of menthol dissolved in *Eau-de-cologne* form an icy cool preparation. It gives a feeling of soothing and cooling effect after it is applied over the face. The famous 4711 *ice-Eau-de-cologne* of Germany is an example of mentholated preparation.

REFERENCES

. Gulam Geelani, *Magzanul advia* (Urdu) II Vol., pp. 702 to 715. 1st Edn. (1915).
. Nadkarni, K. M., *Indian Materia Medica*, Vol. 1. pp. 788-789, (1954).
. Chopra, R. N., *Indigenous Materia Medica*, pp. 188 to 193, (1936).
. *British Pharmaceutical Codex*, pp. 626 to 629, (1911).
. J. Bosisto & Co. Ltd., *Literature on Parrot Brand Eucalyptus Oil*, Melbourne, Australia.

131. DILL-LEAVES

Peucedanum graveolens (Dill-leaves)*:* or *Anethum sewa:* (B.N.); *Misroya or sthatapushpi:* (Sans.); *Sowa* or *Soyee-ki-sag:* (Hindi, Urdu, Punj.); *Suyee-ki-bhajee:* (Dak.); *Sabsigay-soppu:* (Kan.); *Shibbut:* (Arab., Pers.); *Satakuppi:* (Tam.); *Shatakupivitulu:* (Tel.); *Chatukuppa:* (Mal.); *Shepu:* (Mar.); *Surva-nu-bi:* (Guj.); *Suva:* (Sindhi); *Suyee-biol:* (Kashmiri); *Shoolapha:* (Beng.).

Family: Umbelliferae.

Zodiac: Gemini.

Constitution: Hot 2° and Dry 1°.

Physiopharmacology and Therapeutics

Dill plants are grown all over India and Europe for culinary uses. The plants were known to Greeks as *Anethum*. They used to put Dill-leaves in their caps or used to cover their heads with leaves to induce sleep. The pinate thin needle like leaves contain certain volatile oils like *Anethine*, *phallanderene*, *d-limonene*, *apiol* and other *sterepthenes*. The name *Dill* is also derived from *Dilla* which means to induce sleep. It is believed that the name soya or suyee is attributable to its needle like leaves. It is not because of the needle shape of the leaves, but this name is derived from *Sooya* in Hindi that means *Slept*. Because Hindu physicians knew that keeping few prigs of dil-leaves near the pillow induces one to sleep soundly.[1]

Decoction of the fresh leaves 1 to 2 teaspoons is given mixed with every feed helps the babies to sleep well and prevents digestive disorders. Eating the cooked vegetable regularly aids digestion and prevents constipation. Given liberally after child-birth increases breast milk and prevents early ovulation. Hence, its regular use acts as natural *family planning* aid.

Decoction of the fresh leaves 2 ounces mixed with a teaspoon of *Parsley Juice* is given thrice daily with excellently good results in spasmodic menstrual pain in young girls and absence of menstruation due to anaemia, exposure to cold and pregnancy. *Apiol* contained in the leaves acts by local reflex irritation during passing along with urine and exerts its therapeutic action in such conditions. Taking this medicine with *Erbolin* (Glaxo) or *Methergin* (Sandoz) 1 tablet 2 to 3 times daily under the supervision of a physician is a specific treatment for excessive bleeding after child-birth, migraine, etc. It causes abortion in early months of pregnancy. *Ergopiol* is another useful medicine which can be used if *Dill leaves* are not available in such conditions.

Paste of the fresh dill leaves is applied as a poultice to ripen blood boils. Its application with little *turmeric* powder prevents formation of pus in ulcers and heals them quickly. Leaves boiled in *Til Oil* is used as a liniment to reduce swelling and pain of the joints.

Dill seeds

Dill seeds yield a very powerful carminative oil known as oil of Dill or (*Oleum Anethi, B.P.*) seeds roasted in *ghee* with *fenugreek seeds* in equal quantity and a teaspoon of the powder mixed with *curds* or *butter milk* is given as a specific medicine for diarrhoea and acute bacillary dysentery, flatulent colic, indigestion, etc.

Infusion of the *dill seeds* 2 ounces mixed with *honey* is given thrice daily as a home remedy for colds, influenza, bronchitis, etc. Seeds boiled in water along with the roots is externally applied in rheumatic pain of the joints.[3]

Dill Seed Oil

Dill seed oil is obtained by distillation of the *Dill seeds*. It is colourless when fresh but becomes yellow after some time. The taste of the oil is bitter sharp and burning. Its chief chemical constituent is *carvone, limonene, phellandrene terpenes* and a, *paraffin hydrocarbon*[2]. Its specific gravity is 0.905 to 0.920 B.P.[2]

A drop of *Dill oil* put on a *soda-mint* tablet or in a teaspoon of honey is given immediately after food as a medicine for hyper-acidity, flatulent colic, hiccup, diarrhoea due to indigestion etc. The popularity of world famous *Woodward's Gripe mixture* is due to *Dil oil* in it. A drop of *Dil oil* given with *castor oil* prevents gripping pain in the abdomen and increases its purgative action by relaxing the intestines.

REFERENCES

1. Gulam Jeelani, *Magzanul advia,* Vol. I, pp. 730-733, (1912).
2. *British Pharmaceutical Codex,* p. 672, (1911).
3. Nadkarni, K. M., *Indian Materia Medica,* Vol. I, p. 934, (1954).

132. RED SORREL

Red or **Field Sorrel:** *Rumex vesicarius* or *crispus:* (B.N.); *Amla-vetasx:* (Sans.); *Chukkay-ki-sag:* (Hindi, Urdu, Dak., Beng.); *Chukkay soppu:* (Kan.); *Hummaz:* (Arab); *Turshah:* (Pers.); *Suk-gu-kire:* (Tam.); *Shukku:* (Tel.); *Pidlivanchi:* (Mal.); *Chuka-biji:* (Mar.); *Bijband:* (Sindhi).

Family: Polygonaceae.

Zodiac: Scorpio.

Constitution: Wet and Cold 2°.

Physiopharmacology and Therapeutics

Red sorrel is a very popular and common green available all over India and Pakistan. It is sour due to the presence of *oxalic acid* in the form of *potassium oxalate tartaric acid etc.*, cooked vegetable is useful for liver disorders. Fresh juice of the leaves 1 tablespoon mixed with a glass of buttermilk is given thrice daily as a medicine in jaundice, bilious vomiting, morning sickness etc. The fresh leaf juice is used in snake bite[1,2]. Paste of the leaves is applied to reduce swelling[3].

Root

Root contains *Rumacin, Lapathin, Emodin, Chrysophanic acid* etc.[1,2,3,4]

Juice or infusion of the fresh root (1:10) ½ to 1 ounce is given thrice daily with gratifying results in disorders of blood, lymphatic and liver. It is given with excellently good results in scurvy, jaundice, hepatitis, pharyngitis, chronic bronchitis, chronic skin diseases etc.[1] It purifies the blood and keeps one charming. Root is used to stop bleeding from gums and tooth-ache. The roasted seeds are given to cure dysentery, ephemeral fever, nausea, vomiting, indigestion, dyspepsia leucorrhoea etc. Seeds are internally used and externally applied to allay pain caused by scorpion or insect sting[1,2,6].

REFERENCES

1. Nadkarni, K. M., *Indian Materia Medica*, Vol. I, p. 1079, (1954).
2. Mathur, R. C., *Systematic Botany*, p. 319, (1965).
3. Chopra, R. N., *Indigenous Drugs of India*, p. 524, (1936).
4. Compt Rend., 1043, (1886).
5. Pharm. J. 105, C.C. 111, 353, (1920-1927).
6. Muzaffar Hussain, *Kitabul Mujaradath* (Urdu), pp. 221-22, (1965).

133. SPINACH

Spinach: *Spinacia-olerecea:* (B.N.); *Apodika* or *Pālaka:* (Sans.); *Palak-ki-Sag:* (Hindi, Urdu, Dak.); *Basalay-Soppu:* (Kan.); *Asfanāq:* (Arab., Pers.); *Vasole-kiray:* (Tam.); *Dumpa* or *Mathur Bachhale:* (Tel.); *Vasala-Cheera:* (Mal.); *Phalanga-Saga:* (Ori., Beng.).

Family: Chenopodiaceae.

Zodiac: Pisces.

Food Value per 100 g. approximately

Carbohydrate	3.5 g.	Vitamin A	2,578 I.U.
Protein	1.7 g.	Folic acid	127 mcg.
Fat	1 g.	Iodine, Lecithin	0.009 mg.
Calcium	60 mg.		
Phosphorus	11 mg.	**CALORIES**	**32**
Iron	5 mg.		

Spinach contains the following essential Amino acids (g per 100 g. proteins:[1])

Arginine	6.4	Methionine	2.0
Histidine	2.8	Phenylalanine	5.4
Isoleucine	5.4	Theronine	3.4
Leucine	8.0	Tryptophan	1.3
Lysine	7.6	Valine	5.0

Constitution: Cold 2° and Wet 1°.

Physiopharmacology and Therapeutics

Spinach plants are largely cultivated all over India and it is popular Salad green vegetable. The leaves are cooling ry nutritive[2].

chief chemical constituents of spinach are *Essential Amino* n, Vitamin A and Folic acid. When the comparative , one wonders that Spinach is one of the cheapest t supply the same amount of proteins as one gets quantity of meat, beef, fish, eggs, chicken etc.

Eating fresh Spinach daily supplies the required quantity of Iron, Vitamin A and Folic acid. The clinical indications of these life giving food components are already known to you.

Since Spinach contains the highest concentration of *Folic acid*, we investigated its uses in the following diseases and found good results.

In lications of Spinach in Pediatrics

Indian children are nutritionally backward and majority of them are brought up unhygienically. The cycle of malnutrition exists in both the ways, that is: if a child is exposed to infection, particularly of gastro-intestinal tract, he suffers from diarrhoea and vomiting and if the child is robust or lucky, he overcomes this episode in an exhausted condition and suffers from malnutrition especially of iron and protein deficiency. On the other hand if a child is living in a poor and unhygienic environment, the chances of catching infections of both respiratory and gastro-intestinal tract are more and in the majority of cases the mortality is often high. Due to poverty, and ignorance, these unfortunate children are usually left in the hands of fate. To be treated by a private consultant, their parents cannot afford his fees, and if they go to a general hospital where the medical services are free, they get a handsome prescription and the poor parents are asked to buy the required medicine. Therefore, they become an easy prey to quacks who promise to cure the helpless destitutes cheaper than the cost of the medicines that were prescribed by the generous doctor. The ultimate result is obvious.

The children that call on us as emergency cases are usually found to be suffering from diarrhoea associated with marked iron deficiency anaemia. The microscopical examination of the stools did not show any bacterial infection in most of these cases still the presence of watery diarrhoea increased our curiosi investigate the underlying cause in these children. For thi pose 30 children of various ages ranging from three mo years were selected and were divided in 3 equal groups. having bacterial infection with shigella and salm treated with specific chemotherapy and those having diarrhoea were treated with plain spinach leaf ju three times daily on the basis of MERCEDI

that most of the children who suffer from non-bacterial diarrhoea are found to be suffering from Folic acid deficiency. The other groups of 10 children having both bacterial and non-bacterial diarrhoea were given *Spinach leaf-juice* mixed with Folic-acid 5 mg. T.C.F. 2 to 3 times daily and plain folic acid 5 mg. T.C.F. with water. Children who had specific treatment and *Folic acid cum spinach leaf juice* showed remarkable improvement than the children who had mere *folic acid*. This investigation led us to believe that spinach has an excellent effect in aiding the absorption of synthetic folic acid. In older children supplementing iron in the form of *sybron-Parke-Davis* one teaspoon *Folic acid T.C.F.* 5 mg., vitamin B_{12} (*Macrabin-Glaxo*) 50 mcg. one tablet of each mixed with *Spinach leaf juice* 1 tablespoonful given thrice daily has given wonderful results in improving the haemoglobin level in the blood and mitigating the gastro-intestinal disorders. One great advantage of using fresh spinach juice is that it supplies high class essential amino-acids without supplementing the costly animal protein foods such as meat, fish, eggs, chicken which are beyond the reach of poor patients and there is no such social or religious objection as one finds in case of animal foods. Though megaloblastic anaemia is not common in children, but still McIVER[3] has pointed out that frequent attacks of respiratory and gastrointestinal infection appears to play an important role in the development of megaloblastic anaemia in them. Therefore, we believe that regular use of spinach juice seems to be a boon to children.

Indications of Folic acid

oducts which are very low in folic acid content. HERBERT[4] onsiders that the average daily requirement of folic acid to naintain normal erythropoiesis is 50 mcg. In pregnancy more would clearly be required. HERBERT[4] also described how folic acid deficiency would be produced by boiling all foods in large amounts of water. In his experiment the full picture of megaloblastic erythropoesis appeared after 4½ months of such a diet[18].

The inclusion of fresh salads in the diet of pregnant mother is of considerable importance. Considering the high cost of lettuce, other cheaper vegetables like: *cabbage*, *cucumber*, fresh *asparagus* can be substituted to get the daily requirement of folic acid[18]. *Spinach* being the richest source of folic acid can be regularly used to prevent the deficiency of folic acid[9, 10, 11, 12, 13, 14, 15]. Regular use of spinach during pregnancy prevents threatened abortion and accidental haemorrhage,[16, 18] temperate-sprue associated with lassitude, shortness of breath, loss of weight, diarrhoea etc.[17, 18]

Fresh leaf juice of Spinach one ounce mixed with *liver soup* or *Lacrabin-Glaxo* 50 mcg. one tablet taken thrice a day is a specific eatment for lack of breast milk, haemolytic anaemias, general ity after child birth, glossitis, jaundice, cirrhosis of the liver g the treatment of tuberculosis, nia, epilepsy and mentally retarded e used in all the diseases that are

ch leaves along with *Horse-*
nful is given twice
ently good results.

ve-tonic to increase memory. It is a boon to students and elligent persons. It induces sleep, keeps one fresh and healthy. ts regular use is found effective in reducing the pain in chronic heumatoid arthritis[21].

Infusion of the fresh leaves of spinach prepared with two teapoonful of *Fenugreek seeds* (Methi) mixed with a pinch of *Ammonium chloride* and *honey* an ounce thrice daily is used with gratifying results as an effective tonic expectorant during the treatment of ronchitis, tuberculosis, asthma and dry cough due to congestion n the throat. It sooths the bronchiolus, liquifies the tenacious putum, and forms healthy tissues in the lungs and increases sistance against respiratory infections. The same may be ven as a liver-tonic in jaundice, general edema of the body id to increase the urinary acidity during the use of mercurial iretic like: *Mersalyl* in the treatment of congestive cardiac lure, severe edema of the lungs etc.[22]

Decoction of the fresh spinach leaves mixed with a pinch of *mmon salt* is gargled to cure acute sore throat, enlarged uvula, yngitis, acute tonsillitis, hoarseness due to cold etc.

r *K. M. Nadkarni* in his famous book *Indian Materia Medica* age *1165, 3rd Ed., (1954)*, writes that *Oleum chenopodii* d *from spinacia Oleracea*. It is not correct. *Oleum Che-* derived from the fruit *Chenopodium ambrosioides* . *anthelminticum*. The plant of *American wormseed* he fruit grows abundantly in Southern United States America. The popy seeds like fruits are very light enish-yellow or brown in colour. The fruits are he autumn to extract a kind of aromatic volatile oil lls like *Eucaliptus oil* having pungent and bitter taste[24]. a very powerful vermifuge used in the treatment of lumbricoid round worms. Oil of chenopodium 20 to 25 drops mixed n castor oil is given to an adult early morning for this purpose. t can also be given in a capsule followed with a magnesium ulphate purgative. This oil has become vague after the discovery of piperzine citrate like: *Helmacid-Glaxo*, etc. *Neo-Bedermin-Bayer* etc. The syrup, or capsules used according to the instructions of its makers is found to be a very effective medicine in the treatment of *ankylostomiasis*, *oxyuriasis* and *ascariasis*.

How to prevent Spinach spoilage

Spinach being a very valuable leafy vegetable its spoilge c be prevented by dipping the freshly cut leaves in dilute soluti of streptomycin sulphate, oxytetracycline and chlortetracycli (25 mcg/ml.) and packing the leaves in ventilated polyethyle bags within two hours after cutting them and stored at 32°F[25]. It is observed that summer spinach is more susceptible to dec than that grown in cooler season[27]. However, the storage li and the microbial spoilage could be reduced by a mild *hyp chlorite* treatment before pre-packing[28].

REFERENCES

1. Swaminathan, M. and Bhagawan, R. K., *Our Food*, pp. 160-61, (1
2. Mathur, R. C., *Systematic Botany*, p. 324, (1965).
3. Mercedes, V. VDADE, Torregrosa *et al.*, *Clinical Pediatrics*, Vol. 3 6, p. 354, June 1964. T.C.F. Abstracts, No. 1, p. 10, (1966).
4. Chanarin, I., Rothman, D., Berry, V. *Br. Med. J., i.* 480, (1965).
5. Chanarin, I., *Lancet*, 393, Vol. II, (1965).
6. Vitale, J. J., Seta, K. Hellerstein, E. E. *Fedn. Proc. Fedn. Am. Biol.* 718, 24, (1965).
7. Valez, H., Restrepo, A., Bustamente, J., Vitale, *J. J. Am. J.* C 383, 16, (1965).
8. T.C.F. *Abstracts*, No. 2, pp. 3-4, (1966).
9. B. M. J., Vol. I, 73-136, No. 5427, p. 75, Jan. 9, (1
10. Gatenby, P. B. B., and Li'llie, E. W., *Brit. Med. J.*,
11. Mackenzie, A., and Abbott, J., *ibid.*, 1114, 2, (1960)
12. Chanarin, I., Macgibbon, B. M., O'Sullivan, W. J., *Lancet*, 634, 2, (1959).
13. Herbert, V., *Proc. roy. Soc. Med.*, 57, 377, (1964).
14. Stokstad, E. L. R., in Herbert, V., *The megaloblastic Anaemias*, P New York, (1959).
15. T.C.F., *Abstracts*, No. 4, pp. 5-7, (1965).
16. B. M. J., p. 5370, Dec. 7, (1953).
17. *Abstracts of the World medicine*, p. 85, Feb., (1964).
18. T.C.F., *Abstracts*, No. 3, pp. 4-5, (1964).
19. Mohammad Akbar, *Tibbe-Akbari*, Pers. Mss., (1882).
20. Aman, and Seethalakshmi, F.R.C.S., (Eng.), *Effects of Spinach on non-specific diarrhoeas, Clin. Inv.* O.P.D. No. 18. F. No. 12, I.A. Hospital, Mysore, (1965-67).
21. Aman, 'Clinical investigation of Spinach and Brahami' in Diseases of Joints F. 7, (1966).
22. Aman, *Clinical investigation of Spinach in the treatment of Diseases of Lungs and Heart*, F. No. 28, (1965-67).

Nadkarni, K. M., *Indian Materia Medica*, Vol. I, pp. 1164-65, 3rd Edn., (1954).
British Pharmaceutical Codex, p. 287, (1911).
25. Friedman, *et al.*, *J. proc. Amer. Soc. Hort. Sci.*, 57, 285, (1951).
26. Beeker, *et al.*, *Food Technology*, 14, (3), 127, (1960).
27. Popast, *et al.*, *Canad Committee, Fruit Veg. Process. Rep.*, (1954).
28. Srinivasan, A., *et al.*, *Reviews in Food Technology*, Vol. 3, pp. 83-84, (1961), C.F.T.R.I., Mysore.

134. MISCELLANEOUS VEGETABLES

Artichoke: *Cynaracardunculus* or *Helianthus tuberosus:* (B.N.); *Hatichuk:* (Hindi).

Family: Compositae.

Constitution: Hot and Dry.

Physiopharmacology and Therapeutics

Artichoke belongs to the family of sun-flower. Its subterranean tuberous stems are rich in carbohydrate having much inulose. They are cooked and eaten in place of potatoes. They can also be eaten uncooked. Pickles, chips, flour, artichoke sugar, etc. is prepared from this plant. Artichoke sugar (levulose) is used as a sweetening agent for diabetics, and alcoholic beverages like beer, brandy is prepared from the stems[2].

135. ASPARAGUS ADSCENDENS

Asparagus adscendens: *Shuviat musli:* (Sans.); *Sufed musli:* (Hindi, Urdu); *Shaquáqule hindi:* (Arab., Pers.); *Tannirvithang:* (Tam.); *Tasallogadda:* (Tel.); *Dhuli musli:* (Guj.); *Sada musli:* (Beng.).

Family: Liliaceae.

Constitution: Hot 1° and Dry 2°.

Physiopharmacology and Therapeutics

Asparagus plant is mostly used for its medicinal roots. grows in Kashmir, Nainital, Simla etc., where the snow fall i common. The plant has no stem, and the leaves resemble lik tender leaves of maize. They shoot directly from the roots.

The dried roots of Asparagus are available in bazaar as *Safe musli.* They are used in Unani medicine as an aphrodisiac Roots boiled in milk are used as a demulcent medicine. Its regul use increases the secretion of breast milk, thickens the seme cures impotency, diarrhoea and dysentery. The medicinal val of the roots is due to the presence of *Asparagin* in them.

There is another variety of Asparagus which is known a *Musli-e-siyah* (Black musli). It is a plant of *Murdania seapiflo* and has got different medicinal uses. It is used in gout, ar impotency. It increases body weight.

136. ASPARAGUS-SARMENTOSUS

Asparagus-Sarmentosus: *Satavari:* (Sans.); *Shaquakul:* (H Urdu, Arb., Pers.); *Satmuli:* (Kan. Beng.); *Kilavari:* (T *Challa gaddalu:* (Tel.); *Satavari-mul:* (Mar.); *Satvadi:* (Sin *Satavar:* (Guj.).

Family: Liliaceae.

Constitution: Cold and Wet 1°.

Physiopharmacology and Therapeutics

Asparagus plants are grown in gardens for ornamental purpose. The plants are errect or creepers and prickly. The leaves are thin like hair. Even the roots have hundreds of hair like projections. Therefore, it is called *Satavari* in Sanskrit.

In England the shoots are eaten as vegetable. In India, the roots are used as a very effective medicine for uterine complaints, such as: excessive menstruation, sterility etc. 'Satavari cordial' is a well known uterine tonic. Powder of the roots one

poon mixed with milk and honey is used once daily as a tonic ure dysentery, diarrhoea, premature ejaculation, deficiency of ast milk, general debility etc. Juice of fresh roots is used cure gonorrhoea.

Roots are boiled in til oil and used as an analgesic medicated l. *Narayan Oil* is a well known Ayurvedic oil prepared from sparagus and used to alley pain in rheumatism, gout etc[1, 2, 3, 4, 5].

Leaves smeared with til oil or ghee are applied over boils, nall-pox etc[43].

137. ATRIPLEX

riplex: *Crosifolia* or *hortensis:* (B.N.); *Mountain Spinach:* ng.); *Chakoot-ki-sag:* (Hindi); *Chakootney soppu:* (Kan.); *handanbatva:* (Mar.).

mily: Chenopodiaceae.

nstitution: Cold and Wet 2°.

hysiopharmacology and Therapeutics

Mountain spinach is extensively cultivated and is used as a pot herb. The leaves are succulent and contain calcium, iron, potassium and phosphorus. Cooked vegetable is cooling and cures constipation due to its mild laxative effect. The herb has a curative power in jaundice. It dissolves gravel in the kidneys, prevents stagnation of bile in the gall-bladder, and the formation of gall-stones. Its regular use tones up the nervous system. Eating cooked vegetable with jaggery prevents the formation of cirrhosis of the liver in children due to malnutrition. Seeds of this herb contain *Saponin*, and they are used with milk as a nervine tonic.

138. ALLIUM ASCALONICUM

Allium ascalonicum: (B.N.); *Shallot* or *Kanda—Lahsun:* (Hindi).

Family: Lilliaceae.

Constitution: Hot and Dry 1°.

Physiopharmacology and Therapeutics

Shallot is cultivated all over India and is used in place of Garlic Its regular use boiled in milk daily once prevents threatened abortion, sterility impotency etc.

139. BOERHAAVIA DIFFUSA

Boerhaavia diffusa or **repens:** (B.N.); *Spreading Hog weed* or *Small caltrops:* (Eng.); *Punnarva:* (Sans.); *Sant:* (Hindi) *Biskhopra:* (Urdu); *Handqooka:* (Arab.); *Sanadika* or *Komm* (Kan.); *Attatamamidi:* (Tam.); *Matasatado:* (Tel.); *Wah Tamilama:* (Mal., Sind); *Vasu:* (Mar.); *Itsit:* (Punj.); *Sānoori* (Beng.).

Family: Nyctaginaceae.

Zodiac: Aries.

Constitution: Hot 1° and Dry 2°.

Physiopharmacology and Therapeutics

Spreading hog weed grows wildly all over India and Pakistan during rainy season. The plant grows with numerous 2 to 3 feet long slender stem that emerge from the roots. The stem is viscid, glabrous and is covered with fine white hairs. *Leaves* are thick, green, glabrous, ovate, oblong or spherical. They are unequal pairs and have fine white hairs underneath. They

e a round and subcordate base with wavy cut margins having oth surface above. The plant belongs to the family of *Bougain illa*, therefore it bears 4 to 9 pink or white small flowers in clusters. *Seeds* are oblong and are dull-green or brown in colour and resemble like caraway seeds. *Roots* are fusiform and have a bitter and nauseous taste.

There are three varieties of the plant namely: the herb with **White flowers** (*Shweth-purna*), with **Red flowers** (*Rkat-purna*) and **Blue flower** (*Nila-purna*).

Punarnava is used in *Ayurvedic* and *Unani medicine* from past several hundred years. The ancient masters like: *Dhanavanthri*, *Charaka* used this herb in the treatment of fevers, dropsy, anaemia, eart diseases, cough, intestinal colic, bleeding tendencies, iliousness, leprosy, skin diseases etc. *Chakradatta* used this lant in the treatment of chronic alcoholism. In *Rajnighantu* is recommended as a medicine for nervous disorders[1]. Unani hysicians like *Ajmal Khan*, *Jameel Khan* of Delhi etc., used this lant in the preparation of various *kushtajaths* or *Bhasmas*. Calcined metals). In Unani system of medicine, herb with *ue flowers* is recommended in the treatment of jaundice, asthma, uberculosis ascites etc.[1] Due to its diuretic property it is called *udhari* in Sanskrit.

Scientific investigations of *Chopra* and *Ghosal* proved that the lant is rich in *Potassium nitrate* (6.41 per cent) and a bitter alka- oid resembling impure *quinine sulphate* at the rate of 300 mg. per 20 ounces of the plant (0.053) per cent. Beside these chemicals here are other *Sulphates*, *Chlorides*, and *Punarnavine* (0.01 per cent) in this herb.

The authors after clinical trial found that the plant contains the active diuretic effect which acts chiefly on the glumeruli of the kidneys through the heart, increasing the beat and strength and raising the peripheral blood pressure. Its prolonged use is not toxic. Hence infusion of the fresh herb 3 ounces or the liquid extract (*Standard Pharmaceuticals*, *Calcutta*) ½ to 1 teaspoonful three times daily is found to be effective in the treatment of congestive heart failure, dropsy, toxaemia of pregnancy. *Chopra et al.*, found that the diuretic effect in ascites becomes more effective after the fluid is tapped.[1]

Infusion or the liquid extract ½ to 1 teaspoonful with fresh leaf juice of Tulsi (occimum sanctum) 1 teaspoonful is given

thrice daily with gratifying results in the treatment of malaria, kala-azar, cirrhosis of the liver etc.

Fresh juice of the plant is applied to cure chorea. It is instilled in the eyes to cure cornea. ulcers, belepheritis, conjunctivitis, chronic ophthalmia. *Chakradatta* used this herb internally in the treatment of chronic rheumatism, pthisis and diseases of eyes. Juice of the fresh leaves with honey is instilled in eyes to cure chronic ophthalmia. It is taken internally for jaundice[8].

Root

The root of the plant is also used in Unani and Ayurvedic medicine. *Susruta* mentions its use in snake-bite and rat-bite infection. Application of the paste of the fresh or dry root prepared with water or lime-juice is recommended in the treatment of chronic rheumatism, oedematous swelling etc.[1] A piece of fresh root tied over the left thigh during labour hastens child birth.[6]

Powder of the dry root 30 grs. mixed in a tablespoonful of honey is used thrice daily in the treatment of chronic bronchitis, asthma, tuberculosis. It liquifies the sputum and eases expectoration. Powder of the root given with tender coconut water once daily for a week, cures urethritis, portal congestion, general dropsy, acidity of urine etc. Powder 30 grs. given with black cow's milk, honey and dates 7, once daily for a month cures spermatorrhoea, pre-mature ejaculation, impotency, sterility due to poor motility of sperms, nervous tension, sleeplessness, anaemia, lack of breast milk, menstrual irregularities. Powder 20 grs. mixed with ½ a teaspoonful of raw papaya sap given once daily for three days kills pinworms. Powder is used in Unani nervine tonics[1, 3, 4, 5, 6, 8].

REFERENCES

1. Muzaffar Hussain Aivan, *Qhuas-ul-advia*, p. 128.
2. Mathur, R. C., *Systematic Botany*.
3. Dastur, J. F., *Medicinal Plants of India and Pakistan*, pp. 35-37, (53), 1952.
4. *Indian Medical Gazette*, No. 5, (1923).
5. Majeed, S. A., *Biskhopra Kay Qhuas*, Urdu Mss., (1920).
6. Hakeem Syed Sultan, *Biskhoopra Key Kushta-Jaths*, Pers. Mss., (1928).
7. Col. Chopra, R. N., *Indigenous Drugs of India*, pp. 300-4, (1933).
8. Nadkarni, A. K., *Indian Materia Medica*, Vol. 1, pp. 205-7, (1954).

140. BRAHAMI

Centella asiatica: *Centella asiatica* or *Herpestis monniera:* (B.N.); *Asiatic Penny Wort:* (Eng.); *Brahami:* (Sans., Hindi, Urdu); *Onedalga soppu:* (Kan.); *Gair brahami:* (Tam.); *Sambrani-Chettu:* (Tel.); *Nirbrami:* (Mar.).

Family: Scrophularineae.

Zodiac: Pisces.

Constitution: Wet and Dry.

Physiopharmacology and Therapeutics

Asiatic penny wort is an annual creeping plant that wildly grows near damp places near the streams all over India and Pakistan. The peculiarity of the herb is that only one leaf shoots per stalk trailing from the root. Leaves are kidney shaped, shallow, toothed about 2 to 3 inches long, palmately nerved having 3 to 4 inches long stalks[8]. Taste of the leaves is bitter. Herpestis monniera is usually mistaken for Hydrocotyle asiatica (Umbelliferae) though both of the plants are known as brahami, (Chopra). Taste of the leaves is slightly bitter, but lesser than H. Javanica: Mandook parni: (Sans.).

Chemical Composition

Bose isolated an alkaloid *Brahamine* from the plant H. monniera in 1931. He found that this alkaloid has a marked effect on vascular system and rises blood pressure by its Vaso-constriction and stimulation of cardiac muscles. The respiration is stimulated in small doses. Plain muscles of small intestine, uterus etc., are also stimulated by small doses. **Bose** finds that the alkaloid resembles *strychnine* in action. Therefore, he recommends that brahami can be used with gratifying results in the treatment of nervous asthenia, nervous breakdown and other low adynamic conditions. According to him, the drug is safe and has many non-toxic advantages over *strychinine*. It is a direct cardiotonic, whereas *strychinine* indirectly stimulates the heart[8].

Brahamine has a sedative effect like Vallarine, hence the decoction of the fresh plant 2 ounces is given after meals with gratifying result in the treatment of hysteria, insomnia, epilepsy, etc. It is found that *Brahamine* has got a remarkable effect on the stimulation of natural ACTH in the body, therefore, regular use of the fresh plant produces a very good effect in relieving the pains in chronic rheumatoid arthritis, gout and rheumatic fever.

Brahami has a high concentration of potassium nitrate, therefore, its fresh juice 1 to 2 teaspoonful mixed with tender coconut water acts as a sedative diuretic during the treatment of cystitis, nephritis, pyelitis, gonorrhoea, urethritis, high acidity of the urine etc.

Unani and Ayurvedic physicians use brahami in the treatment of secondary amenorrhoea, painful menstruation, excessive bleeding during menstruation, chronic skin diseases, ulcers, itching of the skin due to vitamin B-complex deficiency in oldage, syphilitic ulcers, eczema, leprosy etc.[2,3]

Ancient physicians considered Brahami as *Sanjevani* i.e., one that rejuvenates. They used roasted fresh leaves in pure *cow's ghee* and mixed it with *honey*, *almonds*, *dates* and *cardamom* to increase memory, eye sight, vigour and vitality. They believed that regular use of this preparation increases longevity. They advised that the fresh plant should not be used regularly for more than three months.

An ounce of fresh *Brahami* leaf juice mixed with a teaspoonful of fresh *coriander juice* is given thrice daily as medicine to cure piles, jaundice, bilious giddiness, morning sickness, dyspepsia and bitter sensation in the mouth.

Eating 5 to 8 fresh *Brahami* leaves with a pinch of *cumin seeds* and *sugar* thrice daily cures dysentery. Paste of the leaves is also applied over the navel to cure diarrhoea, dysentery, blood diseases, jaundice, piles etc.

Powder of the leaves dried in shade can also be used in place of fresh leaves. The dose is10 grs. three times daily with milk. Dry powder or the fresh leaf juice of *Brahami* is externally applied to cure inflammatory swelling of the joints, due to gout, rheumatism, orchitis etc. Medicated oil prepared by mixing equal quantity of *til oil*, fresh-*Brahami leaf-juice* and *Bitter-sweet leaf juice* and the mixture is heated till all the water evaporates.

This oil can be used with remarkable effects in the above said conditions and the painful part is foamented.

Brahami Hair Oil

Brahami hair oil is very popular and is used all over India from ancient times. It is prepared as follows:

Pure coconut oil	2 parts	Cloves	1/8 part
Fresh Brahami leaf juice	2 parts	Cardamom	1/8 part

Method of preparation

Heat all the ingredients until all the water evaporates and preserve in clean bottle. If you add fresh *Amla juice* equal to *Brahami leaf juice* the medicinal value of the oil increases. Its regular use, imparts a very cooling effect in the eyes, helps you to sleep well and protects your hair from early fall and pre-mature greyness. It lengthens the hair and keeps them silky soft. It cures and prevents dandruff, alopecia etc.

Brahami gharat, *Brahami-syrup* and *Brahami confection* are some of the popular Ayurvedic patent preparations of Brahami that are effectively used in the treatment of hysteria, epilepsy and convulsion due to unknown causes.

REFERENCES

1. Muzaffar Hussain, *Kitabul Advia*, p. 125, (1965).
2. Dastur, J. F., *Medicinal Plants of India and Pakistan*, pp. 53-54, (75), 2nd Edn., 1952.
3. Chopra, R. N., *Indigenous Drugs of India*, p. 325.
4. Bose, K. and Bose, N. K., *J.I.M.A.*, Vol. 1933, Oct.
5. Nadkarni, K. M., *Indian Materia Medica*, pp. 624-25. Vol. 1, (1954).

141. COLEUS AROMATICUS

Coleus aromaticus or **Didymocarpus-pedicellata:** (B.N.); *Pathar phodi* or *pathar chatla:* (Hindi, Urdu); *Kasir-ul-hajar:* (Arab.); *Pather jod:* (Beng.).

Family: Gesneriaceae.

Zodiac: Cancer.

Constitution: Hot and Dry 2°.

Physiopharmacology and Therapeutics

Coleus aromaticus is a sub-tropical plant distributed from Western Himalayas between Chamela to Kumaon at altitudes between 2,500 to 5,500 feet.

The plant is stemless and erect. It has 2 or 3 pairs of opposite calvine leaves, that are thick, glabrous, round and ovate. They are radical 3 to 6 inches in diameter. Flowers are purple and beautiful.[2]

Leaves are found to have certain colouring matter including *Pedicin, pedicellin, pedicinin* and methyl pedicinin. They also contain an *essential oil* having *Didymocarpene* as the chief constituent.

Leaves are cooked and used as a pot herb to cure and prevent the formation of urinary calculi. I have used the decoction of the fresh leaves 1 ounce mixed with a glassful soup of horse gram along with *Cystone-Himco* 2 tablets 2 times daily for a couple of months with very encouraging results in old patients who refused operation for the removal of calculi. It is the only patent Ayurvedic drug that has a marked influence on the disintegration of calculi. (For detail information write to the manager Himalaya Drug Co., Bombay). (*Note:* Spasmodic pains with the signs of shock due to pain and internal haemorrhage require immediate surgical removal of the bigger sized calculi to save the patient, hence in such cases giving any oral treatment with urolithic drugs is not advisible. For more information read *Horsegram*). K. M. Nadkarni has written in his Indian Materia Medica about *Thick leaf lavender* as coleous. It is a different plant belonging to *Labiate* family and it is an error to consider it as coleus.

REFERENCES

1. Muzaffar Hussain, *Kitabul Mufaradat*, (Urdu), pp. 156-57, 4th Edn., (1965).
2. *Probe*, Himalaya Drug Co., bimonthly Journal, Vol. II, No. 1, Oct. 1962. Back cover page inside.
3. Col. Chopra, R. N., *Indigenous Drugs of India*, p. 485, (1933).

142. COLEUS PERVIFLOROUS

Family: Labiatae.

The spherical tubers of this plant are rich in potash. Soup is prepared in the usual way and is used as a medicine to curb the feeling of hunger. Hence taking it regularly one hour before meals checks the desire to eat. It is therefore, an ideal vegetable for diabetics and obese persons.

143. CANNA EDULIS

Canna edulis or **Indian shot:** *Kamakshee:* (Sans.); *Sabjaya:* (Hindi); *Akalbarki:* (Dak.); *Kaelahoo:* (Kan.); *Poovali:* (Tam.); *Krishna tamara:* (Tel.); *Hakik:* (Punj.).

Family: Cannanaceae.

Canna is grown as a garden plant. Its roots that are found like: rehizome contain plenty of starch combined with some B-complex vitamins. Therefore, it can be used as a food during food scarcity. Root is given to cure the bad effects of poisonous grass in cattle.

Seeds are cooling and diuretic.

144. FLYSANTHUS HYSSOPIODES

Flysanthus hyssopiodes: (B.N.); *Neerugoni-soppu:* (Kan.).

Family: Scrophulariaceae.

This green is commonly used as a folk-medicine by villagers to cure liver disorders, heat in the body, etc.

145. OLDENLANDIA

Oldenlandia: *Corymbosa:* (B.N.); *Kshepra-parpata:* (Sans.); *Indian madder:* (Eng.); *Daman:* (Hindi); *Chaiberu* or *Ciriveru gala:* (Kan.); *Cayaver:* (Mal.).

Family: Rubiaceae.

Indian madder leaves are cooked as pot herb. Its soup reduces hypersecretion of sputum in the lungs and prevent it from becoming infected. Its regular use cures chronic bronchitis, and mild type of asthma. It is a food medicine to cure jaundice, and excessive secretion of bile (R. C. Mathur). Decoction is given thrice daily as a diuretic.

146. PARSLANE

Parslane: *Portulaquadrifida:* (B.N.); *Loūi:* (Sans.); *Kulfa sag:* (Hindi, Urdu, Dak.); *Gonisoppu:* (Kan.); *Baqlatul-ahamaqua:* (Arab.); *Kharfa, Bastan afrooz, Kagani* or *Torag:* (Pers.); *Paciri* or *Tinda:* (Tam.); *Langjo sag:* (Sindhi); *Raj sag:* (Beng.).

Family: Portulaceae.

Zodiac: Aquarious.

Constitution: Cold and Wet 2°.

Physiopharmacology and Therapeutics

Parslane is a very popular pot vegetable used extensively all over South India. The leaves are thick, orate, glabrous, 1-2 inches long round and broad on the top. They contain a mucilaginous substance and *potassium oxalate.* Flowers are yellow and white. Seeds are black and resemble like poppy seeds.

Eating cooked vegetable is bland, delicious and cooling. It is commonly used as a medicinal herb to reduce heat in the

body during summer, to cure diarrhoea, dysentery, piles, cystitis, urethritis, constipation, spermatorrhoea etc.

Drinking a tablespoonful of fresh leaf juice mixed with a teaspoonful of fresh lime juice and honey daily thrice is found to be very effective in the treatment of mild type of blood spitting, bleeding from mouth, from nose and from rectum. Application of the fresh leaf-juice over the freshly cut wounds stops bleeding instantaneously.

Seeds

Seeds are cooling and diuretic. Emulsion of the seeds 1 teaspoonful, mixed with a glassful of tender coconut water is given thrice daily as a cure for scanty urination due to excessive sweating. It reduces the burning sensation in cystitis, urethritis, and relieves portal congestion. Seeds ½ a teaspoonful taken every day with water for three to 4 months, is said to increase body's own insulin and cures diabetes.

147. THICK LEAVED LAVENDER

Thick leaved Lavender or **Country borage:** *Coleus:* (B.N.); *Pashanabhedi:* (Sans.); *Panjeri ka patta:* (Hindi, Dak.); *Doddy-pathre:* (Kan.); *Karpuravelli:* (Tam.); *Ovapana:* (Guj.).

Family: Labiatae.

Zodiac: Leo.

Constitution: Hot and Dry.

Physiopharmacology and Therapeutics

Thick leaved lavender is a very popular medicinal herb, that is extensively grown in houses. The plant grows up to 3 feet having thick glabrous leaves that are covered with fine white hairs and break easily on bending them. Leaves emit a kind of aromatic smell due to volatile oils. The taste is bitterish-sour and leaves a tingling sensation in the mouth due to an essential oil *carvacrol.* Even the stalks are glabrous and covered with white hairs.

Fresh leaves 3-4 are eaten with some common salt as a cure for urticaria. They are also applied. In the body the juice of the leaf increases adrenalin and antihistamic substance. It relieves the portal congestion, increases digestive power and cures jaundice. Fresh leaf juice can be applied for centipede sting. In severe allergic reactions, eating 4 or 5 leaves along with *Foristal-Ciba*. One tablet 2 to 3 times is an specific treatment. In chronic urticaria this combination not only relieves the acute distress but also cures by rectifying the portal disorders when used for a weak regularly with Foristal tablets and then only leaves for about 20 days.

Fresh leaf juice mixed with sugar or honey is given for indigestion, colic, asthma, chronic cough, piles, epilepsy, convulsions in children[44,58].

N.B. *Foristal-Ciba tablets though harmless, should not be used by persons suffering from epilepsy, kidney failure and any other serious diseases.*

148. TRICHODESMA INDICUM

Trichodesma indicum or **Zeylanicum** : (B.N.); *Chota-kulpha:* (Hindi, Urdu, Dak., Ori., Beng.); *Chick-goni-soppu:* (Kan.); *Kazuthai-tumbai:* (Tam.); *Gusva-gutti:* (Tel.); *Lahana-kalapa:* (Mar.); *Gavozban:* (Sindhi); *Katmando:* (Punj.); *Ratisurkh:* (Kashmiri).

Family: Boraginaceae.

This plant is common throughout India and Pakistan except in the plains of Bengal. Leaves and roots are used as a cure in snake bite and scanty urination. Poultice of the leaves is applied over blood boils.[43,59]

REFERENCES

1. Joseph, K. V., *Notes for his P.U.C. and B.Sc., Students*, English (Mss.) St Philomena's College, Dept. Botany, Mysore, (1968).
2. Fischer, C. E. C., *Flora of Madras*, Botanical Survey of India, (1957).
3. Gupta, R. K., *Text book of Systematic Botany*, 1st Edn., (1961), Atma Ram and Sons, Delhi 6.
4. Ramaswamy, S. N., *Toxonomy*, 1st Edn., Maruthi Book Dept., Guntur, A.P. 1.

5. Ponon, J. B., *Five Hundred Indian Plants.* (Kannada and Malayalum Edn.) (1890 and 1918) Basel Mission Book and Tract Depositary, Mangalore.
6. Chopra, R. N., *Indigenous Drugs of India,* (1933), The Art Press, Calcutta.
7. Ainslie, W., *Materia Medica of Hindustan,* (1813).
8. Mohiddin Shariff, *Supplement to the Pharmacopoeia,* (1869).
„ „ *Materia Medica of Madras,* (1891).
9. Birdwood, G. T., *Vegetable products of Bombay,* (1865).
10. Birdwood, G. T., *Practical Bazaar Medicines,* (1920).
11. Dutta, N. B., *Commercial Drugs of India,* (1928).
12. Sen Gupta, N. N., *Ayurvedic System of India,* (1911).
13. Drury, H., *Useful Plants of India,* (1873).
14. Benty and Trimen, *Medicinal Plants,* (1880).
15. Watt, G., *A Dictionary of Economic products of India,* (1889-1904).
16. Dymock, W., *Vegetable Materia Medica of Western India,* (1883).
17. Roberts, E., *Vegetable Drugs of India and Ceylon,* (1932).
18. Dutta, U. C., *Materia Medica of Hindus,* (1877).
19. Mohan, B. S., *Medicinal Drugs of India,* (1930).
20. Fleming, J., *Catalogue of Indian Medicinal Plants and Drugs,* (1810).
21. Henry, T. A., *The Plant Alkaloid,* (1924).
22. Lakshmipathi, A., *Hundred Useful Drugs,* (1927).
23. Khory, R. N., *The Bombay Materia Medica and Their Therapeutics,* (1887).
24. Kritikar, K. R., *Indian Medicinal Plants,* (1935).
25. Kritikar, K. R., *Poisonous Plants in India,* (1893).
26. Ellis, D., *Medicinal Herbs and Poisonous Plants,* (1918).
27. Dhargalkar, L. B., *Notes on the Therapeutics of Indigenous Vegetable Drugs,* (1899).
28. Chopra, R. N., *A Handbook of Tropical Therapeutics,* (1936).
29. Dey, K. L., *Indigenous Drugs of India,* (1896).
30. Martindale, *Extra Pharmacopoeia,* (1941).
31. Chakrabarty, *A Comparative Hindu Materia Medica,* (1923).
32. Pade, S. D., *Aryabhishaka,* (1951).
33. Mahaskar, W. S. *et al., Indian plants Remedies used in Snake bites, Indian Med. Res. Memb.,* 19, (1931).
34. Warring, E. J., *Pharmacopoeia of India,* (1868).
35. Sanyal, D., *et al., Vegetable Drugs of India,* (1934).
36. Shaha, B. G., *Nighantu Adarsha,* (1928).
37. Stephenson, J., *et al., Medical Botany,* (1834).
38. Ponders, C. F., *et al., An Introduction to Materia Medica of India.*
39. Dastur, J. F., *Medicinal Plants of India and Pakistan,* (1962).
40. Dastur, J. F., *Useful Plants of India and Pakistan,* (1965).
41. Muzaffar Hussain, *Kitabul Mufaradat,* (Urdu), Lahore, (1965).
42. Muzaffar Hussain, *Kitabul Mufaradat,* (Urdu), (1965).
43. Nadkarni, A. K., *Indian Materia Medica,* Vol. 172, (1954), Popular Book Dept, Bombay 7.
44. Ali Bhai, *Tibbe-Nabui* (Urdu), Ashrafali & Co., Ibrahim Rahamatulla Road, Bombay 3.
45. Ali Bhai, *Ilajulgurba,* (Urdu).

46. Hakeem Syed Ahmed, *Mere-Mujerebath*, Mss. (1968), Mysore 1.
47. Hakeem Mohamad Abdulla, *Ghareluillaj*, (1953), Arsikere.
48. Hakeem Syed Sultan, *Qhariye ka illj*, (1940), Urdu Mss., (Kempanhalli).
49. Hakeem Javid Alikhan, *Mujarabath-e-Zakai*, Urdu Mss., (1930), Hyderabad.
50. Hakeem Rasool Sab, *Alilaj*, Urdu Mss., (1925), Mysore.
51. Pandit Nair, *Malyali Medicine*, Mss. (1967), Mysore.
52. Masurkar, *Siddha Medicine*, Eng. Mss., (Mysore), 1968.
53. Gulam Jeelani, *Materia Medica*, Vol. I and II Urdu, (1911), Lahore.
54. „ *Hindustan ki Jadi Butiyam*, (1912).
55. „ *Magzane Hikmat* (Urdu), (1912). Vol. I and II.
56. „ *Tariqul Itba*, Urdu, (1916).
57. Pandit Jagannath, *Bhariti Jadi-butiyan*, (Urdu), Vol. I and II, (1960).
58. Syed Mohammad Akbar, *Mujarebath-e-Akbari* (Urdu), Publisher Munsh Nawal Kishore, Kanpur, (1889).
59. Mohammad Zakaulla, *Qharbadeen-ē-Zakai*, (Pers.) Publisher Bhavani Parshad, Jahanabad, (1904).
60. Chandrabhansing *et al.*, *Ayurveda Sulbha Chikitsaygalu* (Simple Ayurvedic treatments) Kan. Bangalore Press Branch, Mysore, (1945).

PART IV

NON-LEAFY VEGETABLES

NON-LEAFY VEGETABLES

Non-leafy vegetables form the next bulk-food after the grains and cereals. These vegetables supply pure carbohydrates in the form of starch. They also supply minerals and vitamins. They contain plenty of cellulose and these vegetables are cheap to buy. They chiefly consist of certain fruits, roots and tubers of various plants.

149. AMLA

Amla or **Indian goose-berry:** *Phyllanthus emblica* or *Emblica officinalis:* (B.N.); *Shreephāl, Dhāttri, Āmloka:* (Sans.); *Amla* or *Anula:* (Hindi, Urdu, Pers.); *Amlaj:* (Arab); *Bettada Nelli-kai* (Kan.); *Nelli-kai:* (Tam.); *Ursire kai:* (Tel.); *Amlakai:* (Beng.).

Family: Euphorbiaceae.

Zodiac: Gemini.

Food Value per 100 g. approximately

Carbohydrate	14 g.	Vitamin B_1	28 mcg.
Protein	0.4 g.	Vitamin C	720 mg.
Fat	0.5 g.	Niacin	0.4 mg.
Calcium	15 mg.	Digesting Time	2½ Hrs.
Phosphorus	21 mg.	**CALORIES**	**60**
Iron	1 mg.		

Constitution: Cold 1° and Wet 2°.

Physiopharmacology and Therapeutics

Amla tree grows wildly all over India bearing thousands of fruits per each harvest. Grafted trees are also cultivated for its valuable fruits which are the richest source of vitamin C and gallic acid. Our ancient physicians knew the medicinal value of amla and they used it in various medicinal preparations like *Chyavanaprash, Jawarish-e-amla,* etc., which are still the pride

of Ayurveda and Unani medicine. These medicines are highly potent in the treatment of tuberculosis, general weakness, impotency, loss of weight, gastro-intestinal disorders etc.

In this scientific century one wonders about the therapeutic knowledge of these masters who by mere practice discovered the medicinal secret of amla without knowing about vitamins which were unknown and undiscovered then.

In this country amla is used in various other culinary preparation also. Pickles, conserve, syrup, jam etc., are the examples.

Amla being rich in vitamin C along with gallic acid, it should be used fresh and raw. Cooking it to prepare syrup, jam, etc., destroys vitamin C. The best and cheap method of preserving the medicinal and nutritional value of amla is to mix its juice with common salt and preserve in air tight containers. Regular use of this amla juice salt is the cheapest source of vitamin C for our daily requirement.

Comparative food value of Amla

A tablespoonful fresh juice of amla gives as much vitamin C as one gets by eating any one of the following foods:

Oranges (medium size 150 g. each)	9½ kg.
Guavas (,, ,, 100 g. each)	2 ,,
Grapes	18 ,,
Apple (,, ,, 50 g. each)	102 ,,
Bananas (,, ,, 150 g. each)	52 ,,
Mangoes (,, ,, 300 g. each)	3 ,,
Pineapples	1
Cow's milk (milk 200 g. per cup)	180 cups etc.

Amla in spite of freely available is not much valued, because of the ignorance of its nutritive value. If every one knows its wonderful hidden nutritional treasure, and uses it regularly as a food, I bet India stands in the forefront of health and longevity. God has gifted invaluable treasures in the form of herbs and fruits having health giving qualities but due to our laziness and ignorance we have totally neglected them and are going through a short cut road to pre-mature death.

A tablespoonful of the fresh fruit juice mixed with equal quantity of honey taken every day early in the morning is the surest medicine to prevent one from tuberculosis of the lungs,

asthma, bronchitis, bleeding tendencies, scurvy, diabetes, anaemias infection, weakness of memory, cancer, stress, tension other psychoneurotic disorders, influenza, colds, pre-mature oldage, loss and greyness of hair.[9,11]

The same can be used as a medicated tonic during the treatment of tuberculosis, lung-abscess, measles, diphtheria, small-pox, scarlet-fever, pneumonia, typhoid, hepatitis jaundice, piles, excessive bleeding during haemoptysis, hematemesis, haemorrhoids, epistaxis bleeding due to cancer, excessive bleeding during menstruation, abortions, child-birth, post partum-haemorrhage, slow healing of ulcers, fractured bones, before and after surgery, dental caries, gingivitis, acute cardiac emergencies, high blood-pressure, post-partum mental disorders, schizophernia, etc. A cupful of pure amla juice with honey given twice daily preserves eye sight, cures conjunctivitis and glucoma. It wonderfully reduces intra ocular tension.[12]

A tablespoonful of amla juice mixed with a cup of fresh bitter-gourd juice taken once daily for a couple of months stimulates the Isles of Langerhans and help them to secrete their own natural insulin. Thus in a geniune diabetic, it reduces the blood sugar, imparts a feeling of well being, prevents from neuritis, anaemia, general weakness, infections and other complications. It is remembered that in diabetes, taking insulin or other oral anti-diabetics, diet control should also be simultaneously continued while taking this medicine. One appreciates that the total dosage of these drugs gradually falls and their use becomes less after few months of regular use of this natural medicine. It prevents eye complications in diabetics.

A teaspoon of amla juice mixed with popy-seeds milk, sugar one to two teaspoons given once or twice a day is a very effective medicine to cure dysentery, diarrhoea, colitis, amoebiasis, piles etc.

A tablespoonful of the juice mixed with a cupful of coconut milk daily twice for a week expels tape-worm and hook worms.

A tablespoonful of amla juice mixed with equal quantity of banana leaf or flower juice and honey two teaspoonfuls taken with a glassful of black cow's boiled milk daily once for a couple of months regularly, is an excellent medicine for excessive bleeding during menstruation, sterility, scanty urination due to kidney disorders. Taken with a banana, and fresh ripe figs (2) daily

once, is a medicine for bleeding from lungs due to Koch's infection. Fresh juice is applied externally to cure conjunctivitis.

In off season, dry fruits can be used instead of the fresh amla. They should be soaked overnight and are used in place of fresh fruits.

Powder of the dry fruits 1 teaspoonful mixed with jaggery 2 teaspoonfuls is given twice daily for a month to cure rheumatism, gout, constipation, piles, rectal fissure, anaemia, jaundice, loss of hair, premature greyness etc. Amla can be used in all diseases that are explained in *Vitamin C*.

Dry powder of amla 1 teaspoonful given with a glassful of butter milk once daily is a medicine for burning in the rectum, soles and palms. Given with a teaspoonful of dry bark of wild-fig or Jamun-seeds daily once is a medicine to control sugar in the urine of a diabetic. Dry amla is a constituent of triphala —a laxative Ayurvedic medicine.

Decoction of the dry fruit is used as a douche for leucorrhoea, gonorrhoea etc. It is used as a hair wash to preserve the colour and to lengthen the hair. It is an efficacious eye wash in ophthalmia (Dastur, J. F.).

Dry fruit is burnt and the powder is mixed with coconut oil. It is used as a soothing dressing in burns, scalds, scabies and itch.

Amla Hair Oil

The author has formulated. This hair oil and its regular use prevents hairfall, premature greyness, lengthens hair, imparts a feeling of cooling sensation in the eyes and cures insomnia.

Recipe

Fresh Amla juice	1 pint
½ kg. Cuscus grass (*Khus*)	
Indian Valarian (*Nitarbala or Sougandha bala*)	
Lichen (*Chadella or Ushna*)	
Valarian (*Jatamasi or Balchad*)	
Long Zedory (*Kapur kachri, Zarnābad*)	
Sandal powder (*Burad-e-sandal*)	
100 g. Cloves (*Lawang*)	
Cardamom (*Ilachi*)	

½kg.	Fresh Rose flowers (*Gulab key phool*)	
	Fresh Champak flowers (*Champey key phool*)	
	Fresh Orange flowers (*Narange key phool*)	
	Fresh Pomelo flowers (*Chakotra key phool*)	
	Til oil	1 kg.

Preparation

Powder coarsely all the dry ingredients and soak them in a pint of water in a clean vessel for about 12 hours. Then put them on the fire and when they begin to boil, slow the fire and heat until half of the water evaporates. Squeeze the ingredients and take the decoction by straining it through a muslin cloth. Then heat the decoction with oil and heat it until all the water is evaporated. Add amla juice little by little into the hot oil and after all the watery content is evaporated, take the vessel from the fire and put the fresh flowers into the hot oil and keep the vessel open so as to evaporate the water contained in the flowers. Leave it undisturbed for a day. Then put the oil with flowers in a transparent glass jar and cork it tightly. Put this jar in morning sunshine for an hour daily for about 40 days. Then strain the oil and preserve in a clean dry bottle. Hakeem Muzafar Hussain[4] has also composed a similar formula in his book *Kitabul Murakabath* (*Urdu*) *p. 85*, but he has not included flowers and the quantity varies. He has also described a simple method of preparing *Amla Hair oil:*—

	Recipe
Fresh Amla juice	1 part
Til oil	2 parts

Method of preparation

Heat oil, and add amla juice little by little when the oil is sufficiently hot. Continue to heat the mixture until only oil remains. Then cool the oil and strain it through a muslin cloth. Add little oil colour (green) and some perfume of your own choice and use it as an *Amla Hair Oil.* Personally I have not tried this oil.

There is another method described by some author in which small bits of amla are put in til oil and are exposed to sunlight until all the bits become black. Then strain the oil and use it for

hair. It will have the gratifying effect to lengthen hair and prevents premature greyness and fall.[4]

Seeds

Amla seeds, both dry and fresh are used in medicine. Infusion of the seeds is used as a medicine in eye strain caused by sun glare. Powder of the seeds (6) mixed with sugar is given with milk once daily for a fortnight is an excellent medicine for spermatorrhoea[11].

Infusion of the dry seeds is given with gratifying results in small-pox, diabetes, nausea and vomiting, giddiness due to biliousness, strangury, etc[11].

Bark

Fine powder of the bark a teaspoonful with turmeric powder ½ teaspoonful is given with buttermilk to cure gonorrhoea. (Dr K. M. Nadkarni). Paste of the bark mixed with onion juice is applied to alleviate pain caused by scorpion sting. Bark is used in tanning and dying[2]. Infusion of the inner covering of the roots is given for indigestion and colic. Putting bits of bark in water purifies it and settles the muddy content[2].

Leaves

Paste of the leaves one tablespoonful mixed with honey or buttermilk is given as a medicine to cure dysentery, diarrhoea. Roasted flowers and leaves of amla are fomented to relieve the retention of the urine due to simple non-surgical causes, flowers are cooked as vegetable.

150. STAR-GOOSE BERRY

Star-Goose Berry: *Phylanthus distichus:* (B.N.); *Lavani:* (Sans.) *Harfi:* (Hindi, Urdu); *Kirnellikai:* (Kan.).

Family: Euphorbiaceae.

Zodiac: Pisces.

Star-goose berry is mostly used in making pickles. It is rich in oxalic acid. The fruit is bad for throat and causes pharyngitis, and cough. Eating it with common salt prevents morning

sickness, biliousness, giddiness, indigestion, anaemia, weakness of heart, rheumatism etc. It is cold and wet in 2° [9].

REFERENCES

1. Dastur, J. F., *Medicinal plants of India and Pakistan*, p. 79, 109, (1962).
2. Prof. Mathur, R. C., *Systematic Botany*, p. 190: 9 (*e*) (1965).
3. Muzaffar Hussain, *Kitabul advia*, (Urdu), pp. 63-64, (1965).
4. Muzaffar Hussain, *Kitabul Murakabath*, p. 85, (1957).
5. Nadkarni, K. M., *Indian Materia Medica*, Vol. 1.
6. Harper, H. A., *Review of Physiological Chemistry*, pp. 67-69, 8th Edn., Lange Publications L. A. California, U.S.A., (1961).
7. Burns, J. J., *A.J. Med.* 26, 740, (1959).
8. Dutra-de-Oliviera, J. E., *et al.*, *Am. J. Clinical Nutrition*, 7:630, (1958).
9. Majeed, S. A., *Zathi Nusqujath*, Urdu Mss. (1918).
10. Pandit Chandra Bhan Singh, *Personal Experiences with Amla*, (1967).
11. Hakeem Syed Sultan, *Qhariye Kay Illj*, Urdu Mss.
12. Aman, '*Clinical Study of Amla in relation to intraocular Pressure in Glaucoma*' F. No. 20. 1966-67.

151. ASH GOURD

Ash Gourd or **White Gourd melon:** *Bennicasa hispida:* (B.N.); *Petha-kaddu:* (Hindi, Urdu, Dak.); *Mahaduba:* (Arab.); *Kadu-e-roomi:* (Pers.); *Budigumbla kai:* (Kan.); *Kaliyan-pushnikai:* (Tam.); *Budigummadi:* (Tel.); *Eleven kumalanga:* (Mal).; *Khola:* (Mar. Guj.); *Chalkuma* or *Magda:* (Beng.); *Painikakhan:* (Ori.).

Family: Cucurbitaceae.

Zodiac: Aquarious.

Food Value per 100 g. approximately

Carbohydrate	3 g.	Vitamin B_2	63 mcg.
Protein	4 g.	Niacin	0.4 mg.
Fat	4 g.	Vitamin C	4 mg.
Calcium	28 mg.	Sodium	2 mg.
Phosphorus	35 mg.	Potassium	211 mg.
Iron	0.4 mg.	Digesting Time	2½ Hrs.
Vitamin A	Trace	CALORIES	14

Constitution: Cold 2° and Wet 1°.

Physiopharmacology and Therapeutics

The giant sized ash coloured fruit is commonly cultivated for its nutritive and medicinal value. It has found a high place, as every new house is adored with it on the top of the front door after reciting some manthras to protect from evil spirits. Fruit is cooling, laxative, diuretic and anabolic and can be used as a wholesome nutritive vegetable by all, particularly by diabetics and obese. It supplies the bulk food having low calories and imparts a cooling effect in the system during hot season. Due to its diuretic action, it increases the urine, washes out the unwanted waste products from the system and neutralizes the bad effects of mercurial and vegetable poisons[4].

Ash gourd has a wonderful blood-clotting property, therefore, from time immemorial, its fresh juice mixed with a teaspoonful of amla or lime juice is recommended as a specific medicine to stop profuse bleeding from lungs, nose, piles, haematuria etc[5].

Petha Sweet-meat or Candy

A very delicious candy is prepared from the pulp of the fruit by the following method:

Select good quality fully ripe fruit with tough skin. Cut the fruit into slices and remove the inner soft pulp and seeds. Then peel the skin and cut it into desired sized and shape pieces.

Prick the cut pieces gently with a bamboo pricker or stainless steel fork and immerse them for 3-4 hours in lime water (Calcium hydroxide) prepared by dissolving 60 g. of quicklime in a litre of water and decanting the clear fluid after allowing the mixture to stand for an hour. The immersing time depends on the softness; the softer the fruit, the longer it is immersed. Then drain the lime water and wash the pieces in clean water throughly.

Then cook the pieces for about 20-30 minutes in boiling water and drain off the water. Spread the pieces on a clean cloth sheet preferably a turky towel so as to remove some moisture.

Prepare syrup by adding 2 parts of water in 3 parts of sugar and it should be equal to three times the quantity of pieces.

When the syrup is filtered, add these pieces and continue to heat till it begins to thicken and gives 2-3 threads when drawn between the two fingers. Allow the whole mass to stand over-night, then drain off the extra syrup. Add flavouring essence of your own choice and store the pieces in a clean air tight jar[6].

This sweet can be used as a medicine to increase weight, in tuberculosis, weakness of heart, heat in the body, thinness of semen, anaemia, etc.[4]

Seeds

Shelled seeds are anabolic and particularly when given with coconut milk, they expel tapeworm, lumbrici etc.[4]

Peel

Peel and seeds boiled in coconut oil is used to lengthen hair, prevent dandruff, dryness of scalp, burning in the eyes, lack of sleep etc.[4]

REFERENCES

1. Muzaffar Hussain, *Qhuas ul advia*, p. 171, (1965).
2. Prof. Mathur, R. C., *Systematic Botany*, p. 158 (5), (1965).
3. Swaminathan, M. and Bhagawan, R. K., *Our Food*, p. 136 (1966).
4. Majeed, S. A., *Tibbe Rahamani*, Urdu Mss.
5. Harindranath, Malayalam Mss.
6. Shankar, J. V., *et al.*, *Home Scale preparations of Fruits and Vegetables*, p. 38, 24, (1962).

152. BITTER GOURD

Bitter gourd: *Momordica charantia:* (B.N.); *Kāravell* or *Krimighna:* (Sans.); *Karela:* (Hindi, Urdu, Dak., Mar., Guj., Ori., Beng.); *Hagal kai:* (Kan.); *Pavakka:* (Tam.); *Qhisha-ul-himar:* (Arab.); *Kakra:* (Tel.); *Kepakka:* (Mal.).

Family: Cucurbitaceae.

Zodiac: Leo.

Food Value per 100 g. approximately

Carbohydrate	9	g.	Vitamin B_1	70	mcg.
Protein	9	g.	Vitamin B_2	95	mcg.
Fat	1	g.	Niacin	0.4	mg.
Calcium	35	mg.	Vitamin C	87	mg.
Phosphorus	140	mg.	Digesting Time	2	Hrs.
Iron	5.4	mg.	**CALORIES**	60	
Vitamin A	210	I.U.			

Constitution: Hot 3° and Dry 3°.

Physiopharmacology and Therapeutics

Bitter-gourd is a very popular fruit-vegetable cultivated all over India. There are two varieties of bitter gourd: the larger kind is long, oblong and pale green in colour, the other kind is small, little oval and dark green. Both the types are bitter in taste and turn reddish-orange when they ripe. The seeds are white in raw fruits and become beautifully red when the fruits ripe.

Karela is specifically used as a *folk medicine* for *diabetes* from ancient times.

Besides karela, there are number of other herbs used in diabetes as *folk medicine*. They are: *Jamun*, and *its seed*, *Gulair: (ficus glomerata)*, *Gūd mar: (S. Gymnema)*; *Fenugreek leaves and seeds*, *Saptarangi: (casearia esculanta)*; *Salajeet: (Asphalt)*; *Coriander seeds*, *Lettuce*, *Red-rose-flower*, *Fennel seeds etc.*[3,4] Among these common fruits and herbs, I selected *Karela*, *Fenugreek*, and *Coriander seeds* and used them in the treatment of *diabetes melitus*. The study data is described below.

Duration of research: from *1957* to *1967*.[15]

Number of patients treated 210.

Males 190
Females 20

Age	Males	Females	Males B.P.	Females B.P.	Urine Sugar	Weight lbs	Fasting (mg.)	G.T.T. ½ hr.	1 hr.	1½ hr.	2 hr.
15–20	6	2	100/70	100/70	1–2%	80–120	110	150	240	210	180
20–25	4	1	100/80	100/70	1–3%	110–130	118	120	230	210	200
25–35	25	5	130/90	110/80	1–4%	150–170	120	170	250	220	200
40–60	140	10	160/110	150/100	1–4%	150–200	120	190 +	260 +++	340	250 ++++
60–80	15	2	160/100	140/80	1–2%	120–150	110	150	195	++++ 210	160
15–80	190	20	*Before treatment*								

Group treated with Karela Juice only

1 ounce fresh karela juice once daily in empty stomach for about 3 months with usual low carbohydrate diet and regular check up of sugar in urine.

Age	Males	Females	Males B.P.	Females B.P.	Urine Sugar	Weight	Fasting m.g.	G.T.T ½ hr.	1 hr.	1½ hr.	2 hr.
15-20	4	1	100/70	100/70	Nil	80-100	100	150	175	200	150
					Trace				+	++	+
20-25	2	1	100/80	100/70	Trace	100–120	95	140	175	210	170
					1%					++	—
25-35	8	2	120/80	100/70	Nil	120–140	100	150	185	150	120
							Nil	Nil	Nil	Nil	Nil
40-60	10	4	140/95	130/90	1–2%	130–165	120	175	210	190	130
								+	++	+	+
60-80	4	1	140/85	130/80	Nil	95–100	95	150	190	140	120
							Nil	Nil	Nil	Nil	Nil
15-60	28	9	*After treatment*								

2. *Group treated with karela juice 1 ounce fenugreek-seed decoction for 3 months*

No. of patients	Age	Males	Females	Males B.P.	Females B.P.	Urine Sugar	Weight	Fasting m.g.	G.T.T. ½ hr.	G.T.T. 1 hr.	G.T.T. 1½ hr.
(*a*) 3	15-20	2	1	100/70	100/70	Nil	80-160	100	156 —	180 —	210 ++
(*b*) 1	20-25	1	—	100/70	—	Nil	95-110	80	140	180	200 ++
(*c*) 6	25-35	5	1	110/80	100/70	Nil	110-120	90	110	170	130
(*d*) 10	40-60	8	2	140/95	125/80	Nil	100-120	105	148	160	135
(*e*) 2	60-80	2	—	120/80	—	—	85-90	90	110	160	120
22	...	18	4	*After treatment*							

3. *Group treated with karela juice + Fenugreek decoction ana Saptarangi bark decoction for 3 months*

No. of patients	Age	Males	Females	Males B.P.	Females B.P.	Urine Sugar	Weight	Fasting m.g.	G.T.T. ½ hr.	G.T.T. 1 hr.	G.T.T. 1½ hr.
(*a*) 4	15-20	4	—	100/80	—	Nil	80-100	100 —	130 —	165 —	145 —
(*b*) 5	20-25	2	1	100/80	100/80	Nil	100-110	106	140	165	130
(*c*) 19	25-35	17	2	110/80	100/80	Nil	110-120	90-100	140	170	150
(*d*) 15	40-60	10	5	130-150/95-100	120/100	Nil	120-160	100-110	145	170	120
(*e*) 4	60-80	5	...	130-160/80-100	—	Nil	100-110	80-90	110	130	115
47	...	38	8	*After treatment*							

Discussion

During 1957-1967—210 patients of diabetes melitus were treated in *3 divided groups.*

Group 1. In this group of 37 patients, only 17 responded to *bitter gourd.* However, the patients in (*a, b, d*) division did not respond and they were later treated with insulin and *Rastinon* 1 g. t.s. until the urine became sugar free.

Group 2. All the 18 patients in (*c, d, e*) division responded very well, but those of (*a and b*) did not respond to *bitter gourd* and *fenugreek* infusion. Although the fasting urine remained sugar free, but the G.G.T. did not improve and sugar appeared after 1½ hours of glucose administration. This phenomenon indicates that diabetics who regularly take insulin do not get any benefit from *bitter gourd.* However, the author observed that *bitter gourd* can exert its hypoglycaemic action in such cases who are not treated with insulin regularly even if the other oral antidiabetics fail to give any relief. This clearly indicates that bitter gourd has a different action from those of oral antidiabetics and stimulates the beta-cells of pancreas even if they have stoped the secretion of insulin. Even *Chattarjee* confirms about the hypoglycaemic action of bitter gourd and writes, 'This study confirms that *karela juice* has a marked antidiabetic effect and it appears that mode of action of the fruit is different from that of *tolbutamide* as believed is a stimulation to greater release of insulin by the beta cells of the pancreas i.e., the hypoglycaemic effect of *tolbutamide* is accomplished through insulin itself. It appears that *Momordica-charantia* can execute its hypoglycaemic action in those cases where insulin secretion from pancreas is almost stopped. But it cannot prevent the increased fatty acid oxidation in the liver. This is observed by its ineffectiveness in high ketosis'. Therefore, the author cautions that diabetics who are also suffering from chronic liver, heart, lung and eye disorders like, *cirrhosis of the liver, amoebic liver abscess, infective hepatitis, jaundice, hypertension, mitral stenosis, bradycardia, cardiac ischaemia, pericarditis, lung abscess, pulmonary tuberculosis, glaucoma,* etc., should always be treated with insulin and other suitable drugs by an experienced physician. Because these diseases always become more complicated and cause great and irrepairable damage to health. Take for example, a complicated abscess in a diabetic which is not suitably treated, becomes gangrenous and the only choice to save one's life is to amputate the affected part. Even then, the risk of life is more. However, taking fresh juice of *bitter gourd* an ounce daily is not harmful.

Group 3. On the advice of an old Unani physician, the author included the infusion of the bark of *Casseria esculanta* (Saptarangi or Jangli cowri). This tree grows wildly in western ghats and interior parts of Kerala, and is used as a remedy for diabetes from bygone days[5, 6]. Recently *Nantiyal* also confirms about its hypoglycaemic action. The infusion of the powdered bark one tablespoon was soaked with a tablespoonful of *fenugreek* in about 2 glassful of water during the night and infusion was prepared by boiling the mixture for about one hour and the cold extract was mixed with an ounce of fresh *bitter gourd juice*. Three ounces of the mixture along with *calcined zinc** 1.5 grs. and *calcined emerald** 2.5 grs. was given in empty stomach once daily for 3 to 6 weeks regularly.

The patients after the 2nd week showed great response and felt better generally. Some of them who had burning feet syndrome in (*c and d*) division felt very much better and their sleep improved too. When once the urine became sugar free and G.T.T. was normal, the quantity of the mixture was reduced gradually and the patients were advised to check their urine by themselves and continue the diabetic diet with a monthly medical checkup.

After two years of observation in these patients, the author confirms that careful investigation of a diabetic patient can bring immense relief and prolong life by administering the described herbs with control diet and regular medical checkup. Many patients who lost their weight considerably showed remarkable improvement even after discontinuing the treatment. This clearly speaks, that there is a close relationship of obesity and diabetes. The author agrees with *Viswanath* who writes, 'The exact mechanism of remission is unknown and at the moment we have only to speculate on the basis of our knowledge of the mechanism of diabetes. Diabetes being the end result of multiple factors, it is understandable, that the change in the degree of one or other factors may correct the metabolic aberration.

It is known that the diabetic tendency present at birth, is subjected to series of influences as the age progresses, and that the age at which diabetes develops and its severity will depend on

* These are available as *Kushta-e-Jasad* and *Kushta-e-Zamarrud* from *The Texilla Ayurvedic Pharmacy*, Chandosi, U.P.

the nature and intensity of such influences. Just as the patient is shifted to the stage of chemical diabetes, and then to frank clinical diabetes, from the stage of prediabetes, it is possible by correcting some of these factors, to shift him back to the stage of prediabetes. An analysis of these prejudicial factors throw light on the possible mechanism of the remissions.

One factor which is definitely shown to reduce the carbohydrate tolerance and precipitate diabetes, is *obesity*. The mechanism by which this happens has not yet been elucidated. According to *Dole* the *free fatty acid* (F.F.A.) concentrations in plasma, was significantly elevated in the obese. This high (F.F.A.) content, reduces the entry of *glucose* into the muscle cells, and thus exerts an action opposite to that of *insulin*. Another relevant finding has been the elevated *cortisol* production in the obese (*Baird*[10] and *Mylnary*[11]).

One of the most important causes for remission in our cases was the reduction in weight, as 3 of our 7 cases were associated with a marked weight reduction. In these patients it would appear that the benefit was due to a reduction in the total metabolism and that the insufficient supply of *insulin* for the obese state is adequate when the total body mass is reduced. However, mere diet-restriction not associated with significant weight loss was found to induce remission in one of our cases.

In these cases, it is most probable that acute reversible processes are taking place in the *pancreatic islets* and that prompt and adequate treatment, rescues a number of knocked-out functioning units, thus helping to produce sufficient insulin (*Newburgh*).[12] *Allen and his associates* have demonstrated that in animals, *islet cells* in a state of hydropic degeneration can be redeemed, by relieving the functional over strain on these cells, by restoring to and maintaining the blood-sugar at normal concentrations by means of *diet* and *insulin*. *Lukens* and *Dohan*[13] have confirmed these observations.

Among the other causes of remissions may be mentioned certain types of liver diseases and endocrine disorders such as hypoadrenalism and hypoparthyroidism.

In the other age groups, there may be an associated gradual exhaustion of some of the anti-insulin factors.

In the light of the above statement, the hypoglycamic effect of *karela* may be due to reducing the weight indirectly stimulating

the secretion of insulin. Therefore, for persons who have mild type of diabetes, regular use of *karela* seems to be an ideal vegetable. Diabetics are usually under nourished and majority of them suffer from malnutrition. *Karela* being rich in all the essential vitamins and minerals; notably *vitamin A*, B_1 B_2 *C Iron* etc., its regular intake acts as a shield and prevents many complications like: hypertension, eye complications, neuritis, defective metabolism of Carbohydrates, etc., and it increases body resistance against infection. Persons taking karela, require lesser doses of insulin or oral antidiabetics and *Jasad Bhasma* + *Karela* increases the action of *Tolbutamide*. After series of experiments, *Kulkarni* and *Gaitonde* write 'when 100 mg., of tolbutamide was administered in a single dose there was no fall in the blood sugar level but when this dose was given with *Jasad Bhasma* + *Karela* to there was a small but definite fall in blood sugar. These experiments suggest that by adding *Jasad Bhasma* + *Karela* to *tolbutamide* there might be a true potentiation of the action of *tolbutamide*. [Capsule p. 109, Vol. III, No. 7, December 25, (1964), Himco, Bombay].

Recently, LOTILKAR *et al.*,[16] report that karela is rich in a hypoglycamic factor *Charantin*. It has been isolated in pure state from *Memordica Charantia*. They state that *Charantin*, 50 mg./kg., administered orally lowers blood sugar by 42 per cent at the 4th hour. The meanfall during 5 hours being 28 per cent. The authors claim that it is more potent than tolbutamide in hypoglycemic activity but the pattern of blood sugar changes is similar to both. The hypoglycemic action of Charantin in depancreatized cats is less, but not abolished indicating a pancreatic as well as extra-pancreatic action. It exerts non-specific anti-spasmodic and mild cholinergic blocking activity.

The authors are confident that the blood sugar lowering action of karela juice 50-60 ml. daily could also be related to some other factors beside Charantin. They are doubtful if charantin, a phytosterolin, i.e., a sterol glycoside, represents all the hypoglycemic activity present in the fruit karela. The beneficial clinical results reported from the above mentioned quantity of fresh fruit juice could not be entirely due to few mg. of Charantin that is present in them. But all these advances are still far from the therapeutic goal of what is known as 'cure', as they have only so far helped us to have a convenient maintenance therapy, and

the 'cure of diabetes' verily constitutes a challenge to investigators' (*Haveliwala. Probe. p. 172. June 1962, Himco, Bombay*).

Uses of Karela in other diseases

A cupful of fresh juice of bitter gourd with a teaspoonful of lime juice taken sip by sip in empty stomach daily for four to six months cures the blood disorders like; blood boils, scabies, itching, psoriasis, lichen planus, ring-worm, and other fungal diseases. Its regular use in endemic regions of Leprosy acts as a preventive medicine[13].

A cupful of fresh karela juice mixed with a tablespoonful of honey taken once daily for 3 months cures asthma, bronchitis, piles, anaemia, gastric ulcer, cirrhosis of the liver, catarrhal jaundice, painful menstruation rheumatism, gout obesity etc. It tones up the nervous system, strengthens heart muscles, safe-gaurds the liver, prevents from intestinal parasites etc. Fresh juice is a very powerful hemostatic and soothing medicine, therefore, it can be used as an antiseptic dressing for minor cut wounds, burns, scalds boils eruption etc.[1]

Leaves

Karela leaf juice is used as medicine from ancient times, particularly, a teaspoonful of the fresh juice is given as a safe purgative and emetic to children. A cupful of the juice is given immediately in snake bite, acts as an emetic and restores the sense. I have no personal clinical experience with snake bite cases, therefore, I reserve my opinion about it.

Leaf juice 3 teaspoonfuls mixed with a glassful of *butter-milk* taken every morning for a month is a very effective medicine for haemorrhoids. It can also be used as an antidote for alcoholic intoxication and liver damage due to alcoholism.

Fresh juice two teaspoonfuls with equal quantity of *white onion juice* and a teaspoonful of *lime juice* is given as an excellent medicine in the early stages of cholera and other types of diarrhoea during summer. It can also be given as a remedy to cure urticaria, jaundice, whooping cough, bleeding from nose lungs etc.

An ounce of fresh leaf juice, *7 pepper, 3 garlic 1 oz.* of *palm-jaggery* taken every day for 3 to 4 months acts as a very effective medicine to cure functional sterility in women[15].

Externally, leaf juice is applied as a styptic and soothing antiseptic like its fruit juice. Leaves are applied over breast to increase

breast milk. Juice is applied to cure burning sensation in soles and palm. It is also applied around the eyes to cure night blindness[1].

Roots

Bitter gourd plant roots are also used in folk medicine from ancient times. A teaspoonful of the root paste mixed with *honey* or *tulsi leaf juice* (ocimum sanctum) 1 teaspoonful given once every night for a month acts as an excellent medicine for asthma, bronchitis, pharyngitis, colds, rhinitis, hysteria, hoarseness, etc[18]. Paste of the root 1 teaspoonful mixed with *papaya sap* 20 drops is given before going to bed followed with *castor oil* as purgative in the morning is a safe medicine for round worms. Bitter gourd seeds two to three are also used to expel round worms. Paste of the roots is applied over piles[1]. Few drops of bitter gourd flowers juice mixed with equal quantity of *ginger* juice is put in nose to awake the hysterical unconscious person.

REFERENCES

1. Dastur, J. F., *Medicinal plants of India and Pakistan*, p. 112, 158, (1962).
2. Prof. R. C. Mathur, *Systematic Botany*, p. 158, 4, (1965).
3. Gulam Jeelani, *Hindustan ki-Jadi Butiyan*, Pub. W. Nawal Kishore (1912), Vol. 1, 1st Edn.
4. Muzaffar Hussain, *Kitabul advia*, p. 370, (1965).
5. Basu and Kirtikar, *Indian Medicinal plants*, Vol. II, pp. 1094-95.
6. Nadkarni, K. M., *Indian Materia Medica*, Vol. 1, pp. 281-82.
7. Chaterjee, K. P., *Antidiabetic principle in Memordica Charantia, Capsule*, Vol. VI, Aug. 1967, No. 5, (Himco, Bombay).
8. Nautiyal, Ramesh, C. D., *Role of Saptarangi in the treatment of Diabetes melitus*, Antiseptic, Vol. 64, pp. 907-916, No. 12, Madras, (1967).
9. Viswanath, M., *Remission in Diabetes*, Antiseptic, Vol. 64, pp. 83-88. No. 2, Madras (1967).
10. Baird, I. M., *Lancet*, 2, 1022, (1963).
11. Mylnary, *et al.*, *J. Clinical Endoc. and Met.*, 22: 587, (1962).
12. Newburgh, L. H. and Conn, J. W., *J.A.M.A.*, 112: 7, (1939).
13. Majeed, S. A., *Tibbe-Rahamani* Urdu Mss., p. 118, (1928).
14. Pandit Chandra Bhan Singh (*Ayurvedic Physicians* Agrahar, Mysore).
15. Aman and Jayamani, C. S., B.Sc., M.B.B.S., D.G.O. (Dublin), R.M.O. Indo-American Hospital, Mysore.
16. Lotilkar, M. M. and Raja Rama Rao, M. R., *Indian J. Pharm.* 28: 129-133. May, 1966 (Capsule Vol. VI, December 1967, No. 9. Himco, Bombay).
17. Gupta, V. S., *et al.*, *Further observations on the antidiabetic effects of Tinospora cordifolia* (Gulbel) *and Caesaria esentanta* (Saptarangi) Capsule, p. 20, May (1968).

153. BOTTLE GOURD

Bottle gourd: *Langeria Vulgaris:* (B.N.); *Tiktatumbi:* (Sans.); *Lauki* or *tumri, hara* or *Lamba kaddu:* (Hindi, Urdu, Pak.); *Qhara:* (Arab.); *Kadu-e-daraz:* (Pers.); *Soray kai:* (Kan.); *Sorakka:* (Tam.); *Kumra:* (Beng.); *Loki:* (Punj.).

Family: Cucurbitaceae.

Zodiac: Aquarious.

Constitution: Cold and Wet 2°.

Physiopharmacology and Therapeutics

White gourd or bottle gourd is extensively cultivated vegetable for its cheapness, and medicinal value. Fruit is yellowish green, having the shape of a bottle. Pulp is white with white-seeds embedded in spongy flesh.

Cooked fruit is refrigerant, diuretic, sedative and imparts a feeling of relaxation after eating it. It is cooked with mutton, lentils, red-gram dal and with many other pulses. According to *Dr C. D. Mehta* of Bengal T.B. Sanatorium, it is one of the best and cheapest vegetables recommended for tubercular patients. His extensive researches confirm that regular use of cooked bottle gourd develops immunity against tubercular germs[2]. Its soup is an useful food for persons suffering from jaundice, diabetes, gastric ulcer, colitis, piles, insanity, high blood pressure, congestive heart failure etc.

A glassful of fresh juice prepared by grating the whole fruit mixed with a teaspoonful of *lime juice* given once daily to cure burning sensation in urinary passage due to high acidity of urine is highly appreciated. It is as effective as alkaline mixture. Given routinely during the treatment of urinary infection with sulpha drugs, it acts as an alkaline diuretic. I found very gratifying results by giving a cupful of the juice in hemoptysis in young tubercular and in highly nervous hypertensive patients.

A glassful of plain juice with a pinch of salt taken every day during summer prevents excessive loss of sodium, quenches thirst and helps one to work without getting tired. It is a useful medicine for excessive thirst due to severe diarrhoea, diabetes, and excessive use of fatty or fried foods. It helps digestion and acts as a laxative in chronic constipation.

Juice mixed with equal quantity of *tender coconut water* given 1 to 2 ounce every ten minutes during cholera, and severe dehydration due to other causes of gastro-enteritis has given me very gratifying results. Particularly it is a very valuable medicine to restore electrolyte fluid balance in cases where saline drip facilities are not readily available.

Fresh juice is applied over body, soles and palms to cure burning and itching sensation.

Macerated fresh pulp is applied over shaved head to cure insanity, hysteria, etc. It can be even rubbed over hair in such conditions in female patients.

Fresh bottle gourd juice 8 ounces mixed with *Til* or *Sesame oil* 2 ounces is heated until all the water evaporates. The remaining oil is kept in a clean bottle. Massaged over scalp every night acts as a very effective medicine for insomnia, dryness of the scalp, burning in the eyes. It imparts a cooling sensation in the eyes. Oil massaged, regularls over chapped hands and soles heals them quickly and permanently.

Bottle gourd candy or halwa

Select a medium sized tender fruit and peel the skin. Cut the pulp and remove the seeds and spongy flesh. Grate the required quantity of fruit and cook the mass for about 10-15 minutes without adding any water. Then cool it and squeeze out the remaining liquid by pressing through a mul cloth.

Recipe

Cooked Mass	4 cupfuls	Milk khoa	100 g.
Raisins	1 tablespoon	Ghee (pure)	1 cupful
Cinnamon	2 inch piece	Saffron	¼ teaspoon
Cardamom	3 pods	Sugar	4 cupfuls
Almonds (shelled)	50	Cloves	6
Pista	50		

Preparation Method

Immerse shelled almonds in hot water for about half an hour and remove the skin. Grind 40 almonds with saffron and set the paste aside. Cut the remaining almonds into fine slices.

Heat ghee in a stainless steel or tinplated vessel and fry the pieces of almonds, raisins, pista. After they are golden brown take them from ghee. Fry cloves, cinnamon, cardamom for about 5 minutes and then put the cooked bottle gourd mass and fry until brown. Add almond paste and sugar mixed khoa and cook for about 15-20 minutes on slow fire until all the watery content evaporates. After the halwa is cooked, take it from the fire and transfer it to another clean and dry glass or stainless vessel when it is hot. Mix the fried almond pieces, raisins, pista etc., and add ½ a teaspoonful of pure rose water to it. It can be kept in a clean well stoppered bottle for a fortnight or even more if the sugar concentration is more in it[3].

Uses

A tablespoonful mixed in a glass of pure cow's milk is a wonderful weight increasing and cooling tonic. It tones up the nerves, heart, liver etc.

Peel

Juice of the peel is also rich in potassium, therefore, it can be given as a diuretic. Hair oil can also be made similarly as usually. Inner side of peel is rubbed over face to whiten the complexion. Few drops of juice is put in eyes daily, imparts a cooling sensation and prevents eye strain.

N.B. *Eating raw fruit is bad for stomach and intestines.*

REFERENCES

1. Mathur, R. C., *Systematic Botany*, p. 158: 2, (1965).
2. Muzaffar Hussain, *Kitabul advia*, p. 364, (1965).
3. Miss Suriya Begum, Mysore.

154. BRINJAL

Brinjal: *Egg Plant: Solanum melongena:* (B.N.); *Pitaphala* or *Kulirica:* (Sans.); *Baingan:* (Hindi, Urdu, Dak.); *Badanjan:* (Arab.); *Badney kai:* (Kan.); *Katterikaya:* (Tam.); *Vanki:* (Tel.); *Bangey:* (Mar.); *Valutina* or *Vazuthinnga:* (Mal.); *Vitawoon:* (Multani); *Vangan:* (Sindhi); *Ringa:* (Guj.); *Baigan:* (Ori., Beng.).

Family: Solanaceae.

Zodiac: Leo.

Food Value per 100 g. approximately

Carbohydrate	6.3 g.	Vitamin A	50 I.U.
Protein	1.5 g.	Vitamin B_1	55 mcg.
Fat	0.4 g.	Vitamin B_2	95 mcg.
Calcium	210 mg.	Niacin	0.6 mg.
Phosphorus	61 mg.	Oxalic acid	29.1 mg.
Iron	1.7 mg.	Vitamin C	25 mg.
Potassium	229 mg.	Digesting Time	2½ Hrs.
Sodium	3 mg.	**CALORIES**	**35**

Constitution: Hot and Dry 1°.

Physiopharmacology and Therapeutics

Egg plant is mostly cultivated for its fruits which are several in varieties such as: *Pepkin Black* (giant) *Long purple, Improved round long greenish-pale,* etc. Some of them are bitter and contain more seeds. The plants are prickly when grown as a field crop, but when grown in the rich soil of the gardens, the prickles disappear to some extent[1].

Brinjals are wholesome, and form a bulk diet for poor class. However, excessive use of greenish yellow brinjals is not healthy. It causes acidity in the system. Persons who have allergic diathesis and hot constitution are advised to consume sparingly.

Tender violet brinjal soup is used as a liver tonic in torpidity of liver.

Water in which pieces of cut brinjals are soaked for about half an hour is used as a medicine for excessive perspiration which stops after washing the hands daily once for a fortnight. Rubbing fresh amla juice and let it dry in hands alternately is also a specific folk medicine for hyperhydrosis.

Paste of boiled brinjals in *buttermilk* is applied with a pinch of *turmeric powder* to extract guinea worm and to reduce swelling after injuries.

Eating cooked tender brinjals (purple) with *buttermilk* every day for a month or two, increases the capacity to absorb vitamin E, stimulates the secretion of progestrone hormone and prevents from threatened abortion. It is given as a medicine to cure functional sterility.

Water in which small bits of tender brinjals are squeezed is given in one to two tablespoonful doses every hour to counter act the poisoning effects of belladona or Arsenic album[2].

Brinjals can be preserved for 4-6 weeks in CO_2[4].

Leaves

The leaves of brinjal are narcotic, and antispasmodic, therefore, the fresh juice ½ a tablespoonful with honey is given daily thrice to cure whooping cough, bronchitis, congestion in the lungs, difficult expectoration and as an antidote for Arsenic album poisoning.[2] Root juice is also mixed with leaf-juice to increase its medicinal effect in the above said diseases. Fresh leaf and root juice a teaspoonful of each mixed in tender coconut water is given to alleviate thirst in fevers.[2]

Seeds

Brinjal seeds are stimulant. According to Dr. Sanyal of Calcutta, giving brinjal seeds ½ to 1 g. daily for three days is said to develop immunity against measles and smallpox for an year.

REFERENCES

1. Prof. Mathur, R. C., *Systematic Botany*, p. 362, (1) b. (1965).
2. Majeed, S. A., *Jadi-Butiyoon kay Qhuas*, Urdu Mss., (1918).
3. Taneja, C. R., *Magzan Maqfi Ilaj*, Urdu, p. 19, (1966).
4. Nagaraja, N. *et al.*, *Food Science and Technology*, Vol. 1, No. 3, p. 43, (1964).

155. BROAD BEANS

Broad Beans: *Vica faba:* (B.N.); *Kali-saim-ki-phalli:* (Hindi, Urdu, Dak.); *Kare-chapparda-avre-kai:* (Kan.); *Baquala e Aswad* (Arab.); *Baqala-e-siyah:* (Pers.); *Karpu Avaraikai:* (Tam.); *Peda-chickudu:* (Tel.); *Avarakka:* (Mal.); *Papdi:* (Guj.); *Simba:* (Ori.); *Makkhan sem:* (Beng.).

Family: Papilionaceae.

Zodiac: Pisces.

Food Value per 100 g. approximately

Carbohydrate	8.4 g.	Vitamin B_1	80	mcg.
Protein	5.6 g.	Vitamin B_2	10	mcg.
Fat	0.4 g.	Niacin	0.7	mg.
Calcium	49 mg.	Vitamin C	25	mg.
Phosphorus	61 mg.	Digesting Time	3	Hrs.
Iron	2 mg.	**CALORIES**	60	

Constitution: (Fresh): Cold and Wet 1°.
(Dry): Cold and Dry 1°.

Physiopharmacology and Therapeutics

Broad bean creepers are cultivated all over India for the sake of nutritive pods. The pods are greenish-purple in colour and have 3 or 4 having dark-purple seeds. Fresh pods and seeds are used in the preparation of various curries.

Soup of the fresh pods prepared with other green leafy vegetables is nutritive and a safe liquid food for invalids. Soup mixed with a little *rock salt* is given as an expectorant and diuretic.

Paste of the fresh seeds is applied over face to cure black heads, pimples, etc. Its regular use with few drops of fresh *lime juice* is a whitening cosmetic.

Paste of the leaves is applied as a cure for ringworm. Infusion of the leaves is used as a medicated shampoo to prevent dandruff. Fresh shoots of the creeper mixed with a *green chilly paste* is given as an antidote for drunkenness.

156. DOUBLE BEANS

Double beans: *Faba-vulgaris* (B.N.); have more or less the same nutritive and medicinal value as broad beans. Being a high carbohydrate food, it should be carefully used by diabetics.

157. CALABASH CUCUMBER

Calabash cucumber: *Luffa aegyptiaca:* (B.N.) *Raja-koshataki:* (Sans.); *Ghiaturai:* (Hindi, Urdu, Dak.); *Tiprikayi:* (Kan.); *Guttibira:* (Tam.); *Nunibeera:* (Tel.); *Pandhara bhoopala* or *Ghosali:* (Mar.); *Chruakkai:* (Mal.); *Turiya* or *Dhudi:* (Guj.); *Turi:* (Sindhi); *Lau:* (Ori.); *Dhundul:* (Beng.).

Family: Cucurbitaceae.

Zodiac: Aquarious.

Food Value per 100 g. approximately

Carbohydrate	2.8 g.	Vitamin A	Trace	
Protein	0.4 g.	Potassium	210	mg.
Fat	0.4 g.	Sodium	7	mg.
Calcium	21 mg.	Digesting Time	2.5	Hrs.
Phosphorus	7 mg.	**CALORIES**	**28**	
Iron	0.7 mg.			

Constitution: Cold and Wet 1°.

Physiopharmacology and Therapeutics

Luffa belongs to ridge gourd family, and the plants are cultivated all over India for the fruits which are eaten as vegetable. A thick ghee like liquid oozes when the fruit is cut, therefore, it is called *ghee turai.*

Due to its high potash content, the cooked vegetable forms an alkaline base in the body, increases urinary output and creates a cooling sensation in the system. It is a low calorie food, therefore,

obese and diabetic persons can eat the cooked vegetable liberally. Its regular use during summer prevents the excessive potash loss and keeps one fresh.

Seeds and Leaves

Seeds are emetic and used in asthma, bronchitis. They are used as a safe purgative in weak persons. Fresh leaf juice is put in eyes to cure granular conjunctivitis. Pounded leaves are applied locally with garlic juice in leprosy.

158. CAULIFLOWER

Cauliflower: *Brassica-botrytis:* (B.N.); *Phul-gobhi:* (Hind Urdu, Dak.); *Qhambith:* (Arab.); *Kamlarovi:* (Pers.); *Huvu-kosu* (Kan.); *Kovippu:* (Tam.); *Kosu huvu:* (Tel.); *Kali-flower:* (Mal.) *Phool-kobi:* (Mar., Beng.); *Pangoli:* (Guj.).

Family: Cruciferae.

Zodiac: Aquarious.

Food Value per 100 g. approximately

Carbohydrate	2.5	g.	Vitamin A	60	I.U.
Protein	3.5	g.	Vitamin B_1	105	mcg.
Fat	0.5	g.	Vitamin B_2	90	mcg.
Calcium	28	mg.	Folic acid	2	mg.
Phosphorus	60	mg.	Niacin	2	mg.
Iron	1.4	mg.	Vitamin C	70	mg.
Potassium	285	mg.	Digesting Time	2	Hrs.
Sodium	12	mg.	**CALORIES**	**40**	

Constitution: Cold and Dry 2°.

Physiopharmacology and Therapeutics

Cauliflower plants belongs to cabbage and knol-kol-family There are number of varieties in cauliflower, but the following are very popular as market vegetable *Holland No. 16, Burpee Seed-*

Anjha, Snowball, Lucknow early and *Lucknow local, Early London, Large white cape* etc.

Cauliflower is cooked in different culinary preparations. Fresh raw or delicately cooked flower is a good source of folic acid and vitamin C. Hence it is an ideal vegetable during pregnancy. Excessive use of this causes flatus which can be prevented by adding some fresh ginger juice to its preparation.

Canning of cauliflower causes discolouration which can however be prevented by adding K.M.S. in the blanching solution (350 ppm SO^2) *Snowball, Lucknow local* and *Anjha* are suitable for canning. (C.F.T.R.I. Annual Report 1966, p. 33).

Fresh cauliflower juice 1 ounce taken early in the morning for a month or two prevents acid diathesis, cures gastric ulcer, and stops bleeding gums.

Leaves

Usually cauliflower leaves are discarded and are not used as vegetable. They are the cheapest source of vitamin A between 10,000 to 12,000 I.U. per 100 g.

A cupful of the juice taken every day regularly is prevents night blindness, dry skin, chronic rhinitis, loss of smell, urinary calculi, sterility, pre-mature greyness. Drinking it daily during pregnancy helps the foetal growth, eases labour and prevents early conception after child birth by delaying the appearance of menstruation.

Knol-Khol (Brassica caulocarps) has the similar nutritive and medicinal value.

159. CHOCHO MARROW

Chocho marrow: *Sechium-edule:* (B.N.); *Vilayethi Baigen* or *Bail baigen:* (Hindi, Dak., Urdu); *Seemay-badney-kai:* (Kan.); *Chocho kambo:* (Mal.); *Phutikai:* (Ori.).

Family: Cucurbitaceae.

Zodiac: Cancer.

Food Value per 100 g. approximately

Carbohydrate	3 g.	Vitamin A	30 I.U.
Protein	0.7 g.	Vitamin C	5 mg.
Fat	0.4 g.	Potassium	220 mg.
Calcium	140 mg.	Sodium	5 mg.
Phosphorus	30 mg.	Digesting Time	1½ Hrs.
Iron	0.7 mg.	CALORIES	20

Constitution: Cold and Wet 1°.

Physiopharmacology and Therapeutics

Marrow plants are grown all over India for the delicious fruits. Many tasty side dishes can be prepared from the marrow. Cooked vegetable contains less fibre and supplies low-calories for more bulk, therefore, it is a suitable diet for invalids, diabetics, children, obese persons etc. Fresh leaf juice is put in eyes to cure conjunctivitis.

160. CLUSTER BEANS

Cluster beans: *Syampsis-tetra-gonoloba:* (B.N.); *Matki-kiphalli:* (Hindi, Urdu, Dak.); *Gori-kayi:* (Kan.); *Kotharaka* or *Kothavarani:* (Tam.); *Grouchekkudu:* (Tel.); *Kothavara:* (Mal.); *Govrai:* (Mar.); *Govar:* (Guj.); *Thorsin:* (Beng.).

Family: Papilionaceae.

Zodiac: Cancer.

Food Value per 100 g. approximately

Carbohydrate	9 g.	Phosphorus	46 mg.
Protein	3.9 g.	Vitamin A	329 I.U.
Fat	0.4 g.	Digesting Time	3 Hrs.
Calcium	129 mg.	CALORIES	56

Cluster beans are largely grown all over India. It is a common vegetable, but it has some bitter taste. Its excessive use causes biliousness. Chewing one or two fresh beans early in the morning prevents bad breath in the mouth and cleans the tongue. Tender fruit juice is put in eyes to cure night blindness.

161. CUCUMBER

Cucumber: *Cucumis sativus:* (B.N.); *Karkati* or *Sukasa:* (Sans.); *Kakri:* (Hindi, Urdu); *Kankadi:* (Dak.); *Bazrula* or *Qhisa:* (Arab.); *Khiyar:* (Pers.); *Southy kai:* (Kan.); *Mulluvellari* or *Kirakai:* (Tam.); *Vallari:* (Mal.); *Kheera:* (Mar.); *Kakri* or *Tansal:* (Guj.); *Badrang:* (Sindhi); *Kakudi:* (Ori.); *Shasha:* (Beng.).

Family: Cucurbitaceae.

Zodiac: Cancer.

Food Value per 100 g. approximately

Carbohydrate	2.8 g.	Vitamin B_1	28 mcg.
Protein	0.4 g.	Vitamin B_2	4 mcg.
Fat	0.5 g.	Niacin	0.4 mg.
Calcium	14 mg.	Vitamin C	8 mg.
Phosphorus	28 mg.	Potassium	149 mg.
Iron	1.4 mg.	Sodium	7 mg.
Chlorine	5.60 per cent	Digesting Time	3 Hrs.
Sulphur	5.90 per cent	CALORIES	14
Vitamin A	Trace		

Constitution: Cold 2° and Wet 2°.

Physiopharmacology and Therapeutics

Cucumber plants are grown along with water melon plants during summer. There are number of varieties of cucumber but *C. sativus* (kakdi) and *C. Melo-eitilissimus*[2] (kheera) yellow cucumber etc., are very popular. Both the varieties have more or less the same nutritive and medicinal value, but yellow cucumber is more digestible than the green variety[3].

Cucumber is mostly eaten as raw along with pepper and salt. It is used as a salad and small pieces are mixed with *buttermilk* or cooked as vegetable. It is usually eaten after non-vegetarian food to prevent excessive thirst and indigestion. It is advised to eat it without peeling and only to cut the ends and scrub the scum and wash it well before cutting[5].

A glassful of cucumber juice mixed with *glucose* or *honey* and a teaspoonful of *fresh lime juice* given twice daily acts as a very effective diuretic in high-blood pressure, toxaemias of pregnancy, ascitis, cystitis, nephritis, pyelitis, scanty urination due to dehydration during severe vomiting and diarrhoea etc. Plain juice with a teaspoonful of *fresh mint juice* is given with very gratifying results in biliousness, giddiness, weakness due to excessive diuresis caused by mercurial or oral diuretics, indigestion, excessive thirst due to fever or diabetes[5,6,7].

A cupful of juice taken every day mixed with a glassful of *butter-milk* and a pinch of *salt* prevents the bad effects of summer heat and keeps one flower fresh during the entire day.

Grated cucumber is spread over face, eyes, and neck and relaxed by lying for about half an hour is found to be very effective beauty aid. Its regular use prevents from pimples, black head, early wrinkling of the skin, dryness of the face etc. It makes one look years younger blooming with radiant beauty. Pulp massaged over soles imparts sound sleep and cures burning in the soles and eyes.

Seeds

Cucumber seeds are fattening and are rich in fats and proteins. They are also rich in potassium hence emulsion of the shelled seeds is usually given to cure burning sensation in urinary tract, scanty urination due to liver, heart, and kidney diseases, weakness during tuberculosis etc[8]. Emulsion of the shelled seeds mixed with *almond milk*, *honey*, *cow's milk* is used as a general tonic to increase weight, memory, and to impart cooling effect in the system[5,7,8]. Its regular use prevents the formation of urinary calculi in persons who are predisposed to such episodes.

Emulsion of the shelled seeds mixed with *curds* is used regularly to dissolve the gravel in urinary tract and reduce hyperacidity of urine[6,7].

Emulsion of seeds mixed with a teaspoonful of *fresh amla juice* or *rose petal juice* given thrice daily for a week cures hematuria due to pyelitis, cystitis and haemoptysis[5,6,8].

Leaves

A glassful of fresh leaf juice mixed with *tender coconut water* given one to two ounces every hour is a medicine for excessive

thirst during cholera[6,7]. It acts excellently by restoring the electrolyite liquid balance in dehydration. The same is also given during the treatment of dropsy, gonorrhoea, etc.

Root

Paste of the fresh root mixed with *rice water* and *honey* is used as a medicine to stop bleeding from nose, mouth, lungs and rectum.[7]

REFERENCES

1. Aykroyd, W. R. '*Nutritive value of Indian Foods and Planning of Satisfactory Diets*'. 6th Edn. I.C.M.R., (New Delhi), 1963.
2. Mathur, R. C., '*Systematic Botany*', p. 158, (c and d), (1965).
3. Muzaffar Hussain, '*Kitabul advia*' (Urdu), pp. 375 and 394, (1965).
4. Swaminathan, M., and Bhagawan, R. K., '*Our Food*', p. 137, 5th Edn., (1966), Ganesh & Co., (Madras).
5. Hakeem Bakshi Sahib, '*Mere mujrabath*', (Urdu Mss.) Mandi Mohalla, Mysore (1966).
6. Hakeem Syed Sultan Sahib, '*Qhariye-kay-adirath*', Kempenhalli, (Kunigal), Urdu Mss., (1936).
7. Hakeem Syed Mustafa Sahib, '*Nusquajath*', Pers. Mss. Mandi Mohalla, Mysore, (1935).
8. Pandit Chandrabhansingh, '*Halli Vidya*', Kan. Mss., Mysore, (1950).

162. FRENCH BEANS

French beans: *Phaseolus vulgaris:* (B.N.); *Beans ki phalli* or *Badi-Baqala:* (Hindi, Urdu); *Benis kai:* (Kan.); *Beans:* (Mal.).

Family: Papilionaceae.

Zodiac: Leo.

Food Value per 100 g. approximately

Carbohydrate	3.8 g.	Vitamin B_2	0.06 mg.
Protein	1.7 g.	Niacin	0.3 mg.
Fat	0.2 g.	Vitamin C	14 mg.
Calcium	50 mg.	Sodium	10 mg.
Phosphorus	28 mg.	Potassium	282 mg.
Iron	1.7 mg.	Oxalic acid	31.2 mg.
Vitamin A	221 I.U.	Digesting Time	3 Hrs.
Vitamin B_1	0.08 mg.	**CALORIES**	**26**

Constitution: Cold and Wet 1°.

Physiopharmacology and Therapeutics

French beans are available all over Indian vegetable markets during all round the year. They are cooked in various ways and several varieties of curries are prepared from them. Excessive use of the beans causes gas in the intestines. Cooked pods are useful in preventing constipation. Soup can be given to patients suffering from typhoid, diarrhoea, dysentery, colitis, gastric ulcer, diabetes, etc.

Juice of the fresh beans is applied over face to cure pimples.

Leaf juice is applied as a liniment to alleviate pain due to sprain.

163. GOA BEANS

Goa Beans: *Shinvi:* (Sans.); *Seaim ki phalli:* (Hindi, Urdu, Dak.); *Chapparda-avare kai:* (Kan.); *Gilafalshool:* (Arab.); *Bakalae-hindi:* (Pers.); *Danool:* (Guj.).

Family: Papilionaecae.

Zodiac: Aquarious.

Constitution: Cold 1° and Dry 1°.

Physiopharmacology and Therapeutics

Goa beans are cultivated as a back yard plant in most of South Indian homes. The creeper is trailed on pendals and yields plenty of pods that are cooked in various curries.

Leaf juice is a specific for ring worm. It is applied with one's own saliva every morning before washing the mouth. Fresh leaf juice mixed with *neem oil* and heated to evaporate the water is daily applied to cure baldness. Its regular use prevents premature hair fall. It cures chronic ulcers[1].

Green beans can be packed in semi-moisture proof cellophane bags to keep them fresh for 9 to 10 days[3, 4]. Packing in unperforated cellophane bags causes spoilage due to carbon dioxide accumulation[5].

REFERENCES

1. Muzaffar Hussain, '*Kitabul advia*', Urdu, p. 314, (1965).
2. Mathur, R. C., '*Systematic Botany*', p. 109, P. (d), (1965).
3. Stokes, D. R., '*New Breakthroughs in produce Pre-packaging*,' U.S.D.A., Packaging show, Berrien Springs, Mich. (1959).
4. Sthal, A. R. and Mustard, M. J., *Proce. Flori. State. Hort. Soc.*, Tampa, November, (1949).
5. Liberman, M., Schomer, H. A., and Ezeel, B. D., '*Pre-package*', 4 (4), 24, (1950).

164. KANDORI

Kandori: *Coccinda indica:* (B.N.); *Kanduri* or *Kiber:* (Hindi, Urdu, Dak.); *Quai:* (Tam.); *Bimbika:* (Tel.); *Pilimbi pulli:* (Mal.); *Kandoli:* (Mar.); *Qhandhadi:* (Sindhi); *Tela kocha:* (Beng.).

Family: Cucurbitaceae.

Zodiac: Pisces.

Constitution: Cold and Wet 2°.

Physiopharmacology and Therapeutics

Fruits are very popular all over India and used as vegetable. Tender fruits are green long looking like small cucumber with white longitudinal stripes. They become red when ripe. Fruits can be used raw. Juice of the fresh and tender fruits is used to cure diabetes. But, I did not find any blood-sugar reducing quality in it. However, fresh juice can be used as a substitute to cucumber juice to improve urinary out put. It is cooling and nutritive. Leaves fried in ghee are applied in dermatitis, eczema, scabies etc.

165. KHAMRAK

Khamrak: *Averrhoa carambola:* (B.N.); *Kamrak:* (Hindi, Urdu, Pers.); *Kamrakshi:* (Kan.); *Kirmir:* (Mar.); *Pulli:* (Mal.); *Tunrak:* (Guj.); *Kamrang:* (Beng.).

Constitution: Cold and Wet 1°.

Khamrak is a riddged fruit very sour to taste due to oxalic acid. Fruit is green when tender, but becomes yellow when ripe. It is a useful fruit to cure biliousness, vomiting and giddiness. Its excessive use is bad for throat, lungs and persons having rheumatic diathesis. Juice is used to remove stains from clothes.

166. LADY'S FINGER

Lady's finger or **Okra:** *Hibiscus esculentus Syn. Abelmoschus esculentus:* (B.N.); *Pātali* or *Tindisha:* (Sans.); *Bhindi:* (Hindi, Urdu, Dak.); *Bamiya:* (Arab., Pers.); *Bendey kai:* (Kan.); *Venda kai:* (Tam.); *Bhanda:* (Mar., Ori.); *Vendakka:* (Mal.); *Bhendoo:* (Guj.); *Bhendiyoon:* (Sindhi); *Dhirus:* (Beng.).

Family: Malvaceae.

Zodiac: Virgo.

Food Value per 100 g. approximately

Carbohydrate	7.3 g.	Vitamin B_2	60 mcg.
Protein	2.1 g.	Niacin	0.7 mg.
Fat	0.4 g.	Vitamin C	14 mg.
Calcium	88 mg.	Sodium	54 mg.
Phosphorus	56 mg.	Potassium	323 mg.
Iron	1.4 mg.	Oxalic acid	10.3 mg.
Magnesium	22 mg.	Digesting Time	2½ Hrs.
Vitamin A	58 I.U.	**CALORIES**	54
Vitamin B_1	61 mcg.		

Constitution: Cold and Wet 2°.

Physiopharmacology and Therapeutics

Like other common vegetables lady's fingers are very popular all over India. There are numerous varieties but, *American long*, *Chickni* and *White Velvet* are very popular. Pods are cooked in various culinary preparations. There is a mucilage in the pods, which acts as a binding material. Therefore, it is employed in India for clarifying sugarcane juice in gur manufacture. A mucilagenous preparation from the pods is used as a plasma replacement or blood volume expander[3]. Mucilage is also used as a soothing emollient medicine in the treatment of diarrhoea, dysentery, gastric ulcer, politis, etc. Excessive use of pods causes indigestion.

Tender lady's finger 4, are cut into one inch pieces and are boiled in water 8 ounces, for about 15 minutes. After cooling, the pieces are squeezed and the mucilage is extracted and strained through a muslin cloth. To this mucilage a tablespoon of *honey* and a pinch of *rock salt* is added and is used once daily as a medicine to cure burning sensation in the throat, in the stomach, in rectum and in urinary passage. It acts as an expectorant if sipped slowly in chronic bronchitis, asthma, emphysema, tuberculosis. It gives a soothing effect in cough and scraping sensation in throat due to tonsillitis, pharyngitis, laryngitis, etc.[4]

A cupful of mucilage mixed with a ripe *banana* and a glassful of *butter milk* is given thrice daily as a tonic-food during the treatment of typhoid, colitis, hepatitis, cystitis, gonorrhoea jaundice, diarrhoea, dysentery, sore feeling in the chest after food during early months of pregnancy etc.[5, 8]

Fresh seedless tender pods 2, are given with *sugar-candy* twice daily as a specific medicine to cure leucorrhoea, spermatorrhoea, thinness of semen, functional impotency, pre-mature ejaculation, diabetes, constipation, catarrhal jaundice, burning in the soles, eyes, and all over the body, etc.[6, 7]

Pulp of the pod is applied as a very soothing poultice to cure whitlows, boils, carbuncles etc. Its application over face and washed after half an hour before going to bed daily softens the skin, cures pimples and acts as a whitening beauty aid. Scalp washed with pulp remains free from dandruff and other complaints[1, 8].

Leaves

Leaves of lady's finger are applied as a soothing poultice Leaf-mucilage is used as a soap to wash oily skin and hair. Seeds of ripe pods are roasted and used as coffee[3].

Roots

Infusion of the roots is given as a medicine to cure syphilis[3]. Powder of the dry roots mixed with equal quantity of dry powder of *sweet potato* 2 teaspoonfuls with *honey* is given thrice daily to cure excessive bleeding during menstruation, and spermatorrhoea[1]. Taken with *banana-leaf juice* for a month cures sterility[9].

REFERENCES

1. Muzaffar Hussain Aivan, '*Kitabul Mufaradath*', (Urdu), pp. 138-39. (1965).
2. Aykroyd, W. R., '*The Nutritive value of Indian Foods and the Planning of Satisfactory diets*', 6th Edn., Rev. Gopalan, G., and Balasubramaniam, S. C., Indian Council of Medical Research, New Delhi, (1963).
3. Prof. Mathur, R. C., '*Systematic Botany*', p. 176 (c), (1965).
4. Dr Mohiddine Shariff, (Madras) *Materia Medica*, (1891).
5. Pandit Birj Narayan, A.B., M.S., M.B., B.S., Malayalam Mss. (1920), (Kerala).
6. Hakeem Syed Sultan, '*Qhariye key Illaj*', Urdu Mss. (1920), Kempanhalli.
7. Majeed, S. A., '*Mere Mujarabath*', Pers. Mss. (1921), Sira.
8. Hakeem Bakshi Mahaboob-Ali Khan, '*Random Notes*', English Mss. (1935), Mysore.
9. Pandit Shivakumar, '*Arogiya Darpana*', Bangalore, (1955).

167. PEAS

Peas: *Pisum sativum:* (B.N.); *Saheela* or *Vartula:* (Sans.); *Matar:* (Urdu); *Badla:* (Hindi); *Bataney:* (Dak.); *Kharsanna:* (Arab); *Gavoo dama:* (Pers.); *Bataney kai:* (Kan.); *Pattaani-podh*; (Tam., Tel.); *Vatana:* (Mar.); *English-pyaru:* (Mal.); *Watana:* (Guj.); *Matra:* (Ori.); *Bilota motor:* (Beng.).

Family: Papilionaceae.

Zodiac: Cancer.

Food Value per 100 g. approximately: (3/4 cup)

Carbohydrate	17	g.	Vitamin B_1	340	mcg.
Protein	6.7	g.	Vitamin B_2	160	mcg.
Fat	0.4	g.	Niacin	0.8	mg.
Calcium	21	mg.	Vitamin C	26	mg.
Phosphorus	139	mg.	Sodium	8	mg.
Iron	1.5	mg.	Potassium	79	mg.
Magnesium	34	mg.	Sulphur	6	mg.
Oxalic acid	6	mg.	Digesting Time	3	Hrs.
Vitamin A	680	I.U.	**CALORIES**	98	

Constitution: Hot 1° and Dry 2°.

Physiopharmacology and Therapeutics

Garden peas are cultivated from pre-historic times, and today, they are one of the most popular items of non-leafy green vegetables. There are 18 varieties of peas such as: *Blue Bentham, Marrow-fat, Type-19, Type-163, Early Badger, Dalwitch, Comando, Wando, Type-17, Type-29, Type-61, Type-56, Bonnevilla, Dwarf Baby Super, Pride of India, Bonnia, Salvia, Perfection, Banarsi sweet.* Peas are used garden fresh, in the form of dehydrated peas, and canned peas. But fresh peas are preferable for vitamins like, B_1, B_2 and C. In India fresh peas are rather more expensive than the dry ones. However, dry peas are roasted and one of the common food items sold by roadside hawkers at cheap rate.

Though fresh green peas are rich in vitamins, but contain a gastro-intestinal irritant known as *Trigonelline.* This substance causes gripping pain and stools mixed with blood and mucous if one eats raw peas. Therefore, peas immersed in boiling water for about 10 minutes should only be consumed. Excessive use of peas causes indigestion, flatulence and colic like pain, therefore a moderate use is advised.

A cupful of peas are boiled in 1/2 pint of water for 10 minutes. On cooling it a tablespoonful of *tomato juice* is mixed in it and used daily as a very effective nervine tonic in old and weak persons. It increases the desire to eat and aids digestion of carbohydrates due to the chemical action of vitamin B_1 and prevents vitamin B_1, B_2 and C deficiency.

Paste of the fresh peas is applied over the inflamed breast to reduce pain and swelling.

168. PUMPKIN

Pumpkin: *Cucurbita maxima:* (B.N.); *Kushmānda:* (Sans.); *Mitha-kadu:* (Urdu, Dak.); *Kumra:* (Hindi); *See-kumbulkai:* (Kan.); *Kadoe halo:* (Arab.); *Kado-e-shireen:* (Pers.); *Gumadikaya*; (Tel.); *Pushalni Kumbulkaya:* (Tam.); *Chekkara-kumpalam:* (Mal.); *Tambada Bhoompada:* (Mar.); *Lal bhupala:* (Guj.): *Kumara:* (Beng.).

Family: Cucurbitaceae.

Zodiac: Aquarious.

Food Value per 100 g. approximately

Carbohydrate	5.3 g.	Vitamin A	84 I.U.
Protein	14 g.	Vitamin B_1	61 mcg.
Fat	0.4 g.	Vitamin B_2	44 mcg.
Calcium	12 mg.	Niacin	0.4 mg.
Phosphorus	20 mg.	Vitamin C	4 mg.
Iron	1 mg.	Digesting Time	2 Hrs.
Potassium	259 mg.	**CALORIES**	28
Sodium	2 mg.		

Physiopharmacology and Therapeutics

Sweet pumpkin is a very popular fruit-vegetable in India. It is globular in shape and its inner pulp, orange in colour.

Cooked fruit is a wholesome low-calorie diet which is fit for diabetic and obese persons. A cup of fresh juice made by grinding the pulp with water and strained through a thin cloth and the same is mixed with honey and fresh lime juice is a real medicine in blood spitting in active tuberculosis, bleeding piles, enlarged prostate, etc.

'The part of the fruit-stalk which is in immediate contact with the ripe gourd is removed and dried and made into a paste by rubbing it with water and given as a specific medicine for bites of venomous insects of all kinds, chiefly for that of centipede. It is applied externally as well as given internally' (Dr K. M. Nadkarni).

Seeds

Seeds are rich in fat and proteins. BRESSANI, analysed hemically and found 48.4 per cent crude fat and 31 per cent proteins. *Libscher* demonstrated in sheep that the organic matter of the seeds was highly digestible. MASUROWSKY showed that ternel is non-toxic. Seeds are rich in Arginine and Lysine, herefore are recommended as a cheap source of A class proteins Probe. p. 128, Feb. 1964. Vol. III. Himco, Bombay). Emulsion of 50 shelled seeds is given once before going to bed as a cure for *inchi* and *tape worm*. Emulsion of 20 shelled seeds with 20 shelled nd *demembraned almonds* mixed with a *black cows milk* sweetened with *honey* is daily given as a weight increasing tonic during the treatment of tuberculosis, asthma, loss of weight due to malnutrition, Kwashiorkor disease, Cirrhosis of the liver due to protein leficiency, anaemias, loss of the sense of smell, weakness of memory tired feeling after reaching, writing and manual work. Particularly it is a boon to growing children and pregnant women. By giving this mixture for 3 months I found children grew well, and their intelligence improved.

Leaves

Leaves are heated and fomented as poultice to ripen the blood oils. Leaf juice is applied as a cure for ring worm, scabies, dry itching etc.

169. CUCURBITA PEPO

Cucurbita Pepo: (B.N.); *Kumra:* (Hindi); is also a popular variety of pumpkin and has got more or less the same nutritive and food value.

170. RIDGE GOURD

Ridge Gourd: *Luffa-acutangula:* (B.N.); *Kashātaki:* (Sans.) *Turai:* (Hindi, Urdu, Dak.); *Qhisha-e-hindi:* (Arab.); *Shaturai* (Pers.); *Heeray kayi:* (Kan.); *Pikkumakai:* (Tam.); *Burkai* or *Peechukam:* (Tel.); *Peechakam* or *Peechinga:* (Mal.); *Dodka* (Mal.); *Jhoom: Kadan:* (Guj.); *Dilturai:* (Sindhi); *Janhai:* (Ori.) *Jhinga:* (Punj.); *Ghoshalta:* (Beng.).

Family: Cucurbitaceae.

Zodiac: Saggitarious.

Food Value per 100 g. approximately

Carbohydrate	4.2 g.	Vitamin A	57.5 I.U.
Protein	0.4 g.	Vitamin B_1	66 mcg.
Fat	0.4 g.	Vitamin B_2	10 mcg.
Calcium	40 mg.	Digesting Time	2½ Hrs.
Phosphorus	40 mg.	**CALORIES**	**18**
Iron	2 mg.		

Constitution: Cold and Wet 1°.

Physiopharmacology and Therapeutics

Ridge gourd is a very delicious vegetable that is popular all over India and Pakistan. Cooked vegetable forms a low-calorie food, and is recommended for diabetics. Its regular use prevents and cures constipation. Soup is nutritive for convalescents and children. Fresh juice is given regularly in diabetes of adrenal deficiency.

Seeds

Seeds of ridge gourd contain a chemical similar to *Emeline*, hence it is effectively used in acute and chronic amoebic dysentery. *Dr Mohiddine Sharieff* of Madras tried the seeds 5 to 10 grs. with *butter-milk* and found good results in amoebic dysentery. Seeds are laxative due to *colocynthin* like alkaloid and are rich in *Luffin* a bitter substance.

Leaves

Leaves are applied externally to alleviate pain in piles, eczema etc. Fresh juice is put in eyes to cure granular conjunctivitis and styes. Pounded leaves mixed with garlic are applied locally in leprosy.

Root

Root of the plant is used as a diuretic and laxative in dropsy.

171. BITTER RIDGE GOURD

Bitter Ridge Gourd: *Luffa echinata:* (B.N.); *Kantha phala* or *Koshataki* or *Varatakosha:* (Sans.); *Bindaal:* (Hindi); *Ghager bail* or *Kadvi toorai:* (Dak.); *Panibira:* (Tam.); *Qhashaul hamar:* (Arab.).

Family: Cucurbitaceae.

Physiopharmacology and Therapeutics

The plant grows all over India. Its bitter fruits are not used as food. Bitter ridge gourd contains a bitter chemical which acts on the renal arteries, dilates them and increases the renal circulation. Due to this marked diuresis takes place. Therefore, infusion of the fresh fruit one teaspoon mixed with a glass of tender *coconut water* or *cucumber juice* is given with excellently good results in scanty urination due to liver or spleen disorders. It is not advisable to use as a diuretic in congestive cardiac failure, because it has got another bitter chemical which constricts the coronary arteries and impairs the free circulation causing angina like pain in the heart which vanishes after inhalation of amyl nitrate. This may be a reflex action on vagus and needs further investigation. *Dr Hemchandra Sen* used the infusion of this fruit (1 in 80) in doses of 1 to 2 ounces three times daily combined with *nitro-hydrochloric acid* as a medicine for scanty urination, enlarged spleen and liver due to malaria, cirrhosis of the liver (Indian Materia Medica, K. M. Nadkarni, p. 745). The bitterness of the fruit acts as a tonic, increases, appetite cures

constipation due to its laxative effect and acts as an anthelmintic However, its concentrated infusion causes vomiting and drasti- purgation

Ancient physicians used bitter ridge gourd in various disease like piles, jaundice, ptosis, hiccup, general anasarca, fevers etc According to *Watt*, in olden days, the infusion of the fruit use- to be applied on the whole body as a treatment in fevers and in- jaundice the infusion of the fruits was generally applied over th- head. Dilute infusion was also regularly recommended in- flatulent colic. I have not investigated much about this fruit- therefore, I have nothing to comment of my own.

Muzaffar Hussain writes that infusion of 3 or 4 fruits is given as an abortifiacient. The same is also given with *honey* as a medicine for asthma, syphilis, leprosy. The paste of the fresh fruits mixed with *ghee* is applied over piles with some benefit. Even fumigation of the dry fruits shrinks the piles.

Leaves

The angular kidney shaped leaves of Luffa echinata are also used in medicine. Juice of the fresh leaves or fruit mixed with honey is applied in eyes to prevent cataract in oldage. An ounce of leaf-juice is given as an emetic in snake bite. An ounce of leaf-juice mixed with equal quantity of *Ram til oil* is used once daily for 2 days during menstruation as a specific remedy for sterility. During this treatment one is advised to take milk and rice only. (Qharabadeen-e-Zakai).

172. SNAKE GOURD

Snake Gourd: *Trichosanthes anguiana:* (B.N.); *Chichinda:* (Sans.); *Chichonda:* (Hindi, Urdu, Dak.); *Padaval kai:* (Kan.); *Puttla* or *Lingapotla:* (Tam.); *Potlakaya:* (Tel.); *Padvalanga* (Mal.); *Padawal:* (Mar.); *Pandola:* (Guj.); *Chachindra:* (Ori.); *Chichinga:* (Beng.).

Family: Cucurbitaceae.

Zodiac: Virgo.

Food Value per 100 g. approximately

Carbohydrate	4.2 g.	Vitamin B_1	39.5 mcg.
Protein	0.4 g.	Vitamin B_2	60.1 mcg.
Fat	0.4 g.	Niacin	0.4 mg.
Calcium	50 mg.	Vitamin C	2 mg.
Phosphorus	21 mg.	Oxalic acid	1 mg.
Iron	1.3 mg.	Digesting Time	2½ Hrs.
Vitamin A	157.5 I.U.	**CALORIES**	21

Constitution: Cold 2° and Wet 2°.

Physiopharmacology and Therapeutics

Snake gourd plants are grown all over India for the sake of snake like greyish-white spongy fruits that are available in every vegetable market. Snake gourd is nutritive and creates a cooling effect in the body. Particularly, it is found useful to check the night sweating during the active phase of tuberculosis of the lungs. Being a low calorie-food diabetics can safely take to reduce the weight and have more nutrition by eating it in more quantity. Ripe fruit and its seeds are laxative and cause indigestion, therefore, they are not recommended as food.

Leaves

Leaves of snake gourd plant are used in folk-medicine all over India. A teaspoonful of the fresh juice is given early in the morning as an emetic and purgative to children suffering from constipation, whooping cough, etc.

173. WILD SNAKE GOURD

Wild Snake Gourd: *Trichosanthes cucumerina:* (B.N.); *Jangli Chichonda:* (Hindi) is also used as vegetable though it grows wildly. The fruit is laxative and nutritive.

Leaves

Juice of the fresh leaf juice one to two teaspoons is given thrice daily as medicine for heart disorders like, palpitation, pain in the

heart on manual exertion etc. Infusion of the leaves one to two ounces with coriander seed decoction is used thrice daily to cure jaundice, bilious disorders, giddiness, constipation, bilious fever, portal congestion etc. The juice of the leaves is also applied locally over hepatic area to reduce congestion in congestive Cardiac failure. It is locally applied as a cure in malarial fevers and it is massaged over the scalp as a remedy for baldness alopacia areata. (Dastur, J. F. 'Medicinal Plants of India and Pakistan').

Seeds

Seeds (3 or 4) are used internally as antifebrile, anthelmintic and in indigestion due to atonic dyspepsia. (Prof. R. C. Mathur, 'Systematic Botany').

Roots

Paste of the root is a strong purgative.

174. PARWAL

Parwal or Patwal: *Trichosanthes dioica:* (B.N.).

Fruits are used as vegetable. They are cooling, diuretic and nutritive. In *Kanpur* many varieties of sweetmeats are prepared from parawal. Fresh juice of the unripe fruit is used as laxative (Prof. R. C. Mathur).

Infusion of the leaves is similarly used in the diseases described in wild snake gourd.

175. SOYA-BEAN

Soya-bean: *Glycine Soja* or *max:* (B.N.); *Bhat:* (Hindi); *Gari-kulay.* (Beng.).

Family: Papilionaceae.

Zodiac: Taurus.

Food Value per 100 g. approximately[1]

Carbohydrate	20.9	g.	Vitamin A	710	I.U.
Protein	43.2	g.	Vitamin B_1	730	mcg.
Fat	19.5	g.	Vitamin B_2	760	mcg.
Calcium	240	mg.	Niacin	2.4	mg.
Phosphorus	690	mg.	Digesting Time	3	Hrs.
Iron	11.5	mg.	**CALORIES**	432	

Essential Amino Acids g. per 100 g. Proteins[2]

Arginine	7.2	Methionine	1.3
Histidine	2.4	Phenylalanine	4.9
Isoleucine	5.4	Threonine	3.9
Leucine	7.7	Tryptophan	1.4
Lysine	6.3	Valine	5.3
Cystine	1.8		

Constitution: Dry 1°.

Physiopharmacology and Therapeutics

It is confirmed that in China, Soya-bean has been cultivated and used as food as early as 3,000 B.C. Now, it is cultivated during rainy season in Sub-Himalayan districts up to 6,000 feet. Soya-bean is the richest vegetable food known so far when compared to other pulses.

Comparative food value of Soya-bean

A cupful of Soya-beans supply as much *protein* as one gets by eating any one of the following foods:

Mutton	250	g.	Chicken	170	g.
Liver	225	g.	Cow's milk	8	cupfuls
Fish	180	g.	Eggs	6	(normal size).
Beef	175	g.			
Cheese	175	g.			

Soya-bean, being low in carbohydrates and rich in non-acid proteins it is highly recommended as a safe food for diabetics, heart patients, persons suffering from liver and kidney disorders etc. Soya-bean is an ideal protein food for vegetarians, because it is the richest source of proteins. It can be safely used as a substitute for protein in meat, eggs, fish and milk. It is a non-fattening food suitable for obese. Its versality is so good that

almost any flavour of flesh, fish or fowel may be produced in various Soya-bean products[3].

A Japanese food manufacturer *Mr Nisshin*[11] has prepared a meat substitute from soya-beans after extracting the oil from them. He claims that *artificial soya meat* is more nutritive, healthier than real meat because soya-bean protein is not fattening and is more digestible. This artificial meat is 95 per cent protein and has no smell, taste or colour. It is believed that Yokohama will start producing 10 tons of meat within the year and it is the largest factory of its kind in the world.

A very useful nutritive infant food is prepared from Soya-bean combined with barley malt and skimmed milk powder[12].

Soya-bean milk[4]

Soya-bean is soaked in water for 2-4 hours and dried in sun. The outer covering is removed by means of wooden huller. The dal thus obtained can be preserved for long periods. The husk can also be removed by soaking soya-bean in water overnight, and in the morning the covering is removed by rubbing and washing in water.

Soya-bean contains a bitter substance which can be removed by soaking Soya-bean dal in 6 cupfuls of warm water containing half a teaspoon of Soda bicarb (*Cooking Soda*) and allowed to soak for about 10 minutes and the water is drained off. This process also removes the colouring matter from Soya-bean. Soya-bean contains a factor which inhibits the action of the digestive enzyme *Trypsin* and this factor can be destroyed by heating. The digestive and nutritive value can be increased by autoclaving in steam 125°C for 2 hours[6].

The washed Soya-bean dal is ground into fine paste in stone grinder adding a little water to it. Then the paste is stirred in 15 cups of water if the dal is one lb. The milky mixture is boiled for 15 minutes and allowed to cool slightly. Then it is strained through a muslin cloth. To this ½ a cup of clear lime water, (*Calcium-hydroxide*) sugar and ½ a teaspoon of common salt is added to improve taste. Set aside for an hour and decant the upper part of the fluid. This is the *Soya-bean milk* ready to use. The residue can be used for making dosai, vadai etc.

Comparative value of Soya-bean milk with Cow's milk[4]

Nutrients	*Cow's milk*	*Soya bean Milk*
Protein (g)	3.2	2.4
Fat (g)	4.9	2.5
Carbohydrate (g)	4.6	3.2
Calcium (g)	0.11	0.08
Phosphorus (g)	0.07	0.104
Iron (mg.)	0.2	1.2
Calories	75	51
Vitamin B_1 (mg.)	0.045	0.042
Vitamin B_2 (mg.)	0.17	0.04
Niacin (mg.)	0.1	0.24
Vitamin C (mg.)	17.8	21.6

A cupful of soya-bean milk mixed with a teaspoonful of honey taken every night is a wonderful nerve and protein tonic to improve brain fag, mental irritability, nervous tension, insomnia, forgetfulness, neuritis, psychoneurosis, hysteria, acute mania, etc. It tones up the nervous system due to its rich concentration of *lecithin*, *vitamin* B_1 and *glutamic acid*. Cow's milk is deficient in iron and lecithin, therefore soya-bean milk is superior-food for anaemic and nervous persons.

Soya-bean milk is the choice food for those who are allergic to cow's milk and other intestinal disorders. It is also a safe liquid food for persons having high blood pressure, diabetes, tuberculosis, asthma, bronchitis etc. Children and infants can also be fed on soya-bean milk if cow's milk causes gastro-intestinal and skin disorders. *Soya-bean-milk* can be regularly applied over face as a whitening skin-food.

Soya-bean curds[5]

To the prepared soya-bean-milk two teaspoonful of glucose or honey are added to 4 cups of milk. The milk is allowed to cool, and $\frac{1}{2}$ a teaspoon of cow's milk curds is added and allowed to stand for 12 hours. This curds can be used as a substitute for cow's milk curds.

With all these nutritive value of soya-bean, it is still not so popular in India. According to *McCarrison* excessive use of soya-bean interferes with the absorption of iodine mechanism and causes goitre[1]. However, eating soya-bean along with sea food like: lobster, fishes etc., may prevent the iodine deficiency.

Toxic factor in Soya-bean

Soya-bean is now a major crop in the world. It supplies a substantial part of the total oils and fats produced. Soya-bean protein is the best and cheapest source available of vegetable protein but its use in human nutrition is still limited since soya proteins, like other oil-seed proteins contain materials which interfere with digestion, some of which are poisonous. Untreated soya-beans cannot be eaten at all by humans—the cleaning, processing and improving soya protein is still expensive'.

'Among the nitrogenous constituents, a number of toxic and inhibitory substances have been detected. Allergic substances causing asthma have been reported. Soya-bean meal is known to contain a trypsin inhibitor. Dr Nathan Sharon *et al.*, of Israel have isolated aglycoprotein from soya-bean meal. This protein causes clotting of red blood corpuscles. However, as glycoproteins are extensively degraded in the alimentary canal during digestion, no harmful effects are normally expected because of their presence in the meal[13].

REFERENCES

1. Aykroyd, W. R., '*Clinical Dietetics and Nutrition*,' by Antia, F. P., p. 544, 1st Edn., (1968).
2. Swaminathan, M. and Bhagawan, R. K., '*Our Food*', p. 160, 5th Edn., (1966).
3. Swaminathan, M. and Bhagawan, R. K., '*Our Food*', p. 48, 5th Edn., (1966).
4. Swaminathan, M. and Bhagawan, R. K., '*Our Food*', p. 50, 5th Edn., (1966).
5. Swaminathan, M. and Bhagawan, R. K., '*Our Food*', p. 50, 5th Edn., (1966).
6. Antia, F. P., '*Clinical Dietetics and Nutrition*', pp. 215-217, (1966).
7. McCarrison, R., *Indian Med. J. Res.*, 21, 179, (1933).
8. Alexander Nelson, '*Medical Botany*', p. 203, (1945).
9. Nadkarni, K. M., '*Indian Materia Medica*', Vol. 1, p. 581, (1954).
10. Zyieglemayer, *Cal. Muni. Med. Gez.*, Vol. XXXIV, No. 2, p. 49, May (1941).
11. '*Artificial, Meat Health*, Vol. 46, No. 5. (1968), Madras.
12. Chandrashekra, M. R., *et al.*, 'Development of Infant Foods based on Soya bean', *J. Food Sci. & Tech.*, Vol. III, No. 3. pp. 94-96. October, (1966).
13. Science & Culture, 1965, 31, 514: *Indian J. of Pharmacy*, March, 1966: Capsule, Himco, Bombay, May, (1968).

176. SUNDAKAI

Sundakai: *Solanum-torum:* (B.N.); *Sonde kai:* (Kan.); *Sundak-kai:* (Tam.); *Ushtikaya:* (Tel.); *Sundakka-unangithum:* (Mal.); *Til-bigun:* (Beng.).

Family: Solanuceae.

Zodiac: Capricorn.

Food value per 100 g. approximately

Carbohydrate	60	g.	Iron	20 mg.
Protein	7.3	g.	Vitamin A	745 I.U.
Fat	1.7	g.	Digesting Time	
Calcium	350	mg.	**CALORIES**	266
Phosphorus	175	mg.		

I have personally no knowledge about this vegetable therefore much is not known.

177. SWORD-BEAN

Sword-bean: *Convalia-gladita:* (B.N.); *Mahashibee:* (Sans.); *Talwar phalli:* (Dak.); *Dod-benis* or *Kathi-benis kai:* (Kan.); *Katutambratam:* (Tam.); *Advitham:* (Tel.); *Valvera:* (Mal.); *Abayani Shing:* (Mar., Guj.); *Maharda:* (Ori.); *Kath-Sem:* (Beng.).

Family: Papilionaceae.

Zodiac: Leo.

Food Value per 100 g. approximately

Carbohydrate	6.3	g.	Vitamin A	40 I.U.
Protein	2.8	g.	Vitamin B_1	81 mcg.
Fat	0.5	g.	Niacin	0.4 mg.
Calcium	60	mg.	Digesting Time	2 Hrs.
Phosphorus	40	mg.	**CALORIES**	40
Iron	2	mg.		

Constitution: Wet and Cold.

Physiopharmacology and Therapeutics

Fruits are nutritive and the soup can be given as a liquid food for children and invalids.

Leaves

Juice of the leaves has a curative value in skin diseases. It is used as Shampoo to prevent and cure dandruff.

Ash of the dry leaves is given with honey as a preventive medicine in puerperal fever.

Roots

Paste of the root is applied in the eyes to prevent epileptic convulsions and insanity. Fumigation of the roots is used as a cure for piles and malaria fever (Hakeem Syed Sultan).

PART V

ROOTS AND TUBERS

Next to *leafy and non-leafy vegetables*, **Roots and Tubers** are largely consumed as vegetables. These vegetables contain carbohydrates in the form of starch, but they are easily digestible when compared to those of *Grains*, *Cereals* and *Pulses*. Fresh vegetables belonging to this group; also supply *minerals*, *vitamins*, *fibres* etc., and they are cheap to buy.

178. BEET ROOT

Beet Root: *Beta vulgaris:* (B.N.); *Choquandar:* (Hindi, Urdu); *Siliq:* (Arab.); *Kempu* or *Raktad Gadday:* (Kan.); *Beet:* (Mal., Mar., Guj.); *Savran:* (Sindhi); *Beta:* (Ori.).

Family: Chenopodiaceae.

Zodiac: Leo.

Food Value per 100 g. approximately

Carbohydrate	7 g.	Vitamin B_2	91 mcg.
Protein	1.7 g.	Vitamin C	90 mg.
Fat	0.4 g.	Sodium	60 mg.
Calcium	199 mg.	Potassium	300 mg.
Phosphorus	60 mg.	Oxalic acid	40.4 mg.
Iron	1 mg.	Digesting Time	2 Hrs.
Vitamin A	Trace	**CALORIES**	12
Vitamin B_1	0.5 mcg.		

Constitution: Hot and Wet 1°.

Physiopharmacology and Therapeutics

Beet plant is cultivated all over India for its pleasing coloured and nutritious roots. There are various varieties of beets such as: *Crimson Globe, Egyptian early yellow, Sunset, Globe, Blood-red (long)*[1,2,5] etc.

Beet root is largely eaten as salad in both raw and cooked form. The chief constituent of beet roots are *non-nitrogenous substances* in the form of *sugar*. It is for this reason beet root is extensively cultivated for sugar making purpose. In Germany alone, more than one and a half million tons of beet root per year is used for making beet-sugar.[6] In India progress is also being made to make sugar from beet root.

Cooked beet root can be used as a bulk-food without any fear by obese and diabetics who are undergoing systematic insulin or oral anti-diabetic treatment. Cooked vegetable with meat or mutton preparations acts as a digestive aid, helps their quick absorption and prevents the excessive formation of *indole* due to putrification of protein in the intestines. The cellulose content of the beet acts as a bulk residue, increases peristalsis and eases the passage of stool, hence its regular use prevents habitual constipation and lowers blood pressure in hypertensive persons.

Eating raw beet root with *honey* is the cheapest source of vitamin C. Therefore, its regular use keeps the body to maintain its vitamin C level constantly.

A wineglassful of fresh beet root juice mixed with a tablespoonful of *honey* taken every morning before breakfast, helps the healing of gastric ulcer. It increases the urinary output due to its rich potassium content, and cures hypoglycaemia (Deficiency of potassium). Adding a teaspoonful *lime juice* to it increases its medicinal value and can be given as a liquid food during the treatment of jaundice, hepatitis, nausea and vomiting due to biliousness, piles, tuberculosis, cholera, diarrhoea, dysentery and lowered state of body resistance after major surgical operations, etc.

Fresh beet-root juice mixed with equal quantity of fermented *Malt Vinegar* can be applied as a soothing dressings for urticaria, chronic ulcers, bee stings burns and chapped skin. Few drops of fresh juice are sniffed by putting them on the palm to cure chronic head-ache due to nasal congestion. This should be repeated twice daily and be continued for a fortnight.[7]

Leaves

Leaves are eaten as green-leafy vegetable, and the juice mixed with *lime juice* taken once daily cures jaundice, bleeding piles and gastric ulcer[7]. Leaves are applied to burns and bruises[6].

Decoction of the leaves is used as a shampoo with gratifying result in the treatment of dandruff, and hair-fall[3].

Seeds

Seeds are cooling and the emulsion mixed with *honey* is used as a mild diaphoratic.

REFERENCES

1. Aykroyd, W. R., *'The Nutritive Value of Indian Foods and Planning Satisfactory Diets'*, 6th Edn., Rev. Gopalan, G., and Balsubramaniam, S. C., Indian Council of Medical Research, New Delhi, (1963).
2. Swaminathan, M. and Bhagawan, R. K., *'Our Food'*, p. 136, 5th Edn., C.F.T.R.I., Mysore, (1966).
3. Muzaffar Hussain Aivan, *Kitabul Advia*, p. 214, (Urdu).
4. Majeed, S. A., *Tarkari-Kay-Mizaj*, (Constitutions of Vegetable) p. 210, Urdu Mss., (1920).
5. Sham Singh, *et al.*, *Vegetable Growing in Delhi State*, p. 15, Indian Council of Agri. Research, New Delhi, (1952).
6. Prof. Mathur, R. C., *'Systematic Botany'*, p. 325, 5th Edn., (1965).
7. Hakeem Syed Sultan, *'Mere-Mujerebath'*, (My Medicinal Specifics), p. 140, Urdu Mss., (1928).

179. CARROT

Carrot: *Daucus carota Var. Sativa:* (B.N.); *Garanjan:* (Sans.); *Gajar:* (Hindi, Urdu, Dak.); *Jazar:* (Arab.); *Zardak:* (Pers.); *Gajar-mulangi:* (Kan.); *Pechachamulangi:* (Tel.); *Karat:* (Mal.); *Gajra:* (Ori.).

Family: Umbelliferae.

Zodiac: Scorpio.

Food Value per 100 g. approximately (1 large).

Carbohydrate	1.2 g.	Vitamin B_2	60 mcg.
Protein	9.3 g.	Niacin	4 mg.
Fat	0.3 g.	Vitamin C	5 mg.
Calcium	39 mg.	Sodium	47 mg.
Phosphorus	37 mg.	Potassium	482 mg.
Iron	0.8 mg.	Oxalic acid	5.6 mg.
Vitamin A	12,000 I.U.	Digesting Time	2.5 Hrs.
Vitamin B_1	60 mcg.	CALORIES	47 29

Constitution: Hot and Wet 2°.

Physiopharmacology and Therapeutics

Carrot plant is cultivated for its nutritious root. Carrot is a popular vegetable eaten all over the world raw as well as a cooked vegetable. Tender roots are pickled in vinegar, sweet meats, curries, stews, soup etc., are also prepared from fresh carrot. There are many varieties such as: *Champion Scarlet Horn, Early Gem, New Red Intermediate, Long orange, Half Long Scarlet* and *Chantenay*[3]. Among all these varieties, *Champion S.H.* and *N.R. Intermediate* contain 10-15 times more vitamins A in the form of *Carotene* than the yellow variety[4].

Fresh raw dark coloured carrot is the cheapest source of vitamin A, fat soluble hydrocarbon (C_{40} H_{56}) vitamins B_1, C, D and E and other minerals. It contains a digestive enzyme and acts as a very powerful diuretic[5].

Chewing a carrot immediately after food, kills all the harmful germs in the mouth, cleans the teeth, removes the food particles lodged in the crevices, prevents bleeding of the gums and tooth decay. It cures the habitual constipation and bad smelling in the mouth. It increases saliva, and quickens digestion by supplying the necessary enzymes, minerals and vitamins. Regular eating of carrot prevents the formation of gastric ulcer, cancer and other digestive disorders. It cures habitual constipation due to its rich contents of fibres. Eating a carrot immediately after any type of non-vegetarian food, not only hastens digestion, but also prevents the excessive formation of *uric acid*. Persons having the tendency of stone formation in the urinary tract can be immensely benefited by eating a carrot everyday. It is found that *Carotenes* of carrot have an anti-lithic properties. Similarly middle aged persons having weak sexual errection can be helped by taking a carrot with a *half boiled egg* dipped in a table spoonful of *honey* once daily for a month or two. According to *Aviceena*, this recipe increases sex stamina, by releasing sex hormones and strengthens the sexual plexus. It has a greater influence on the maturity of sperms and thickens the semen. It is for this reason, *Carrot Halva* that is prepared according to Unani specifications is considered as a very effective tonic to improve sex and to cure sterility in males.

A glassful of carrot juice mixed with a tablespoonful of *honey*, a teaspoonful of fresh *lime-juice* taken every day early in the morning before breakfast is a very effective drink to cure morning sickness, biliousness, gastritis, gastric catarrh, scanty urination, urethritis, cystitis, nephritis, painful micturation due to high acidity of urine, general edema due to liver, kidney or heart failure, premature ejaculation of the semen, general weakness immediately after conjugal union, etc.[6, 7].

A glassful of carrot juice mixed with a desert spoonful of fresh *amla juice*, and a tablespoonful of *honey* taken once or twice daily is a safe protective natural medicine during the treatment with *Radium*, and *Cobalt* in cancer. It increases body resistance against colds and infections, prevents night blindness, early aging, loss of memory, weakness of nerves, brain, heart, lungs, and liver.

Adding a glassful *karela juice* to the above recipe and used every day for six months cures diabetes permanently[7] (It may be useful in mild type of diabetes, however, all diabetics are advised to have a complete check up before using any other medicine).

A cupful of carrot juice mixed with honey and pure *cow's milk* taken every night with ten *shelled almonds* is a very effective tonic for all who work mentally. It increases the thinking capacity and memory. It is particularly useful for persons undergoing treatment for tuberculosis, asthma, cancer, gastric ulcer, urinary stones etc.

Excessive use of carrots causes yellow discolouration of the skin, which is harmless and disappears on stopping eating carrots. This discolouration of the skin is known as *Hypercarotenosis* and should not be mistaken for jaundice.

Leaves (see carrot leaves 112 leafy vegetables).

Seeds

Carrot seeds are stimulating, diuretic and nervine tonic. A teaspoonful of the seeds boiled in a glassful of *cow's milk* for ten minutes is used daily as a very effective medicine to cure spermatorrhoea, pre-mature ejaculation, leucorrhoea, scanty menstruation, deficiency of breast milk, chest pain due to constant breast feeding, menopausal tension dropsy, indigestion etc[2, 6, 7].

Regular use of the carrot seeds prevents the enlargement of prostate gland in oldage[6].

Use of carrot seeds is contra indicated in early months of pregnancy, because it increases the tonicity of uterine walls and may cause abortion. Essential oil can be prepared from carrot-seeds[6].

Spiced Carrot Juice[8]

Select good quality deep pink coloured well matured carrots and wash them thoroughly in water by scrubbing with hands. Scrape off the thin covering peel of the carrots and grate them on a stainless steel grater.

Grated carrots	10	kg.	High quality vinegar	625	g.
Common salt	325	g.	Red Chillies (powdered)	3	teaspoons
Mustard (powdered)	30	g.			

Mix all the ingredients well and pack them in earthenware pitchers up to neck. Cover them with lids and seal with paraffin wax leaving a small opening on one side to let the inner gas. Store them in a cool place for about a month.

After this period, press out the juice from the mass with rubber gloved hands and strain through a clean muslin cloth.

Allow the juice to settle for a day or two and decant the clear portion of the fluid and filter again through the fine cloth. Add *Sodium Benzoate* at the rate of 300 mg. per kg. of the juice, mix well. Fill the juice in sterilized bottles and cork tightly. Store in cool dry place. When used, dilute with 2-3 times with water.

It is a very refreshing drink during summer. A teaspoon of the juice mixed with equal quantity of *honey* licked early in the morning cures, biliousness, nausea, vomiting due to early pregnancy, indigestion, excessive watering in the mouth, bitter taste, etc.

Carrot Halwa (Halwa-e-Gazar)[9].

Scrape matured pink coloured carrots. Cut into halves and remove the inner core. Grate and set aside.

Grated carrots	1	kg.	Cuddapa almonds kernel	1/4	kg.
Shelled almonds	1/4	kg.	Saffron	1	g.
Walnut kernel	1/4	kg.	Pure cow's ghee	1/4	kg.
Filbertnut kernel (charoonji)	1/4	kg.	Pure cow's milk	1	Litre
Pistachunut kernel	1/4	kg.	Sugar	1	kg.
Fresh coconut kernel	1/4	kg.			

Boil grated carrots in *milk* and when the milk begins to thicken add *ghee* and clarify until all the milk is evaporated. Add all the other ingredients which are ground into fine paste without adding any water. Clarify them until they are finely done emitting a fine aroma. Then add *sugar* and continue to cook until the mass begins to thicken.

Take the ingredients from fire and allow it to cool. Sprinkle some pure *Rose-water* and preserve in sterilized open mouth screw cap jars. A tablespoonful of this halwa taken once daily with milk is really a boon to under-weight weak children, neurotic impotents etc. It is an effective tonic in tuberculosis, asthma, kwashiorkor's disease, weakness during pregnancy and lactation, weakness of memory, insomnia etc.

REFERENCES

1. Aykroyd, W. R., '*Nutritive value of Indian Foods etc.*' (1963).
2. Muzaffar Hussain, '*Qhaust-ul-advia*', p. 402, (1965).
3. Sham Singh, *et al.*, '*Vegetable growing in Delhi State*', (1952).
4. Sadhana, J. C., Ahamed, B., '*Clinical Dietetics and Nutrition*', Antia, F. P., p. 249, (1966).
5. Prof. Mathur, R. C., '*Systematic Botany*,' p. 344, (4), (1965).
6. Hakeem Syed Sultan, '*Mere-Mujarabath*,' Urdu Mss. p. 300, (1928).
7. Pandit Chandrabhansingh, *et al.*, '*Ayurveda Chikitsa*', Kan. (1964), Mysore.
8. Shankar, J. V. *et al.*, *Home Scale Preparation of Fruits and Vegetables*, p. 36, (21), 4th Edn., C.F.T.R.I., Mysore, (1962).
9. Muzaffar Hussain, *Kitab-ul-Murakkabath* 'The book of compounds', Urdu, p. 62, (1955), Lahore.

180. COLOCASIA

Colocasia: *Colocasia antiquorum:* (B.N.); *Arvi* or *Kachalu:* (Hindi, Urdu, Dak.); *Keshave gaddey:* (Kan.); *Qhalquāsh:* (Arab.); *Sepan-kizhangu:* (Tam.); *Chama-dhumpa:* (Tel.); *Chamboo:* (Mal.); *Alvi:* (Guj.); *Saru:* (Ori.); *Guri:* (Beng.).

Family: Araceae.

Zodiac: Libra.

Food Value per 100 g. approximately

Carbohydrate	22 g.	Niacin	0.4 mg.
Protein	3 g.	Vitamin C	Trace
Fat	0.4 g.	Sodium	25 mg.
Calcium	28 mg.	Potassium	464 mg.
Phosphorus	140 mg.	Oxalic acid	133.4 mg.
Iron	2 mg.	Sulphur	
Vitamin A	40 I.U.	Digesting Time	3 Hrs.
Vitamin B_1	90 mcg.	**CALORIES**	**105**
Vitamin B_2	31 mcg.		

Constitution: Hot 1° and Wet 2°.

Essential amino acids (g./ 100 g. protein)

Arginine 6.2, Histidine 1.8, Isoleucine 5.2; *Leucine 8.9, Cystine 2.7, Lysine 6.2, Methionine 2.7, Phenylalanine 5.2, Tryptophan 1.4, Valine 6.* (Swaminathan, M. and Bhagawan, R. K., 'Our Food,' p. 158, 1966).

Physiopharmacology and Therapeutics

Colocasia vegetable is a very popular rhizome. It is a rich source of starch. Cooked vegetable contains a mucilage and found to be an effective nervine-tonic. Therefore, it is extensively used as an aphrodisiac. Its excessive use increases the consistency of semen and thickens it. It also increases body weight, prevents excessive secretion of sputum in asthematics. It is an excellent medicine for bleeding piles. Eating un-cooked vegetable is bad for mouth and throat, as it contains an irritant substance which can be made harmless by washing it and boiling it in water. Decoction of the peel is given as a folk-medicine to cure diarrhoea. Fresh root juice is used to cure scorpion sting. Excessive use of colocasia causes oxalate urinary calculi.

Leaves

An ounce of leaf-juice given thrice daily is an effective medicine for scanty urination. Leaves can also be used as a vegetable in various form. (R. C. Mathur).

181. ONION

Onion: *Allium cepa:* (B.N.); *Urganāmā* or *Iurgagandhā:* (Sans.); *Piyaz:* (Hindi, Urdu, Dak., Pers.); *Erulli:* (Kan.); *Eusul:* (Arab.); *Vangayam:* (Tam.); *Nirulli:* (Tel.); *Valuthu:* (Mal.); *Kanda:* (Mar.); *Dungli:* (Guj.); *Basar:* (Sindhi); *Ganda:* (Punjabi); *Piyaza:* (Ori.).

Family: Liliaceae.

Zodiac: Aries.

Food Value per 100 g. approximately[1]

Carbohydrate	10 g.	Vitamin B_2	4 mcg.
Protein	1.3 g.	Niacin	0.4 mg.
Fat	0.4 g.	Vitamin C	10 mg.
Calcium	180 mg.	Sodium	105 mg.
Phosphorus	50 mg.	Potassium	137 mg.
Iron	0.6 mg.	Oxalic acid	1 mg.
Sulphur	50 mg.	Digesting Time	3 Hrs.
Vitamin A	50 I.U.	**CALORIES**	**50**
Vitamin B_1	23 mcg.		

Constitution: Hot 3° and Dry 3°.

Physiopharmacology and Therapeutics

Onion is a very popular article of food used all over the world for making stews, gravies, curries, salad etc. Cultivation of onion dates back to thousands of years in *China, Egypt, India, Syriya* etc. There are number of varieties of onion but, *Prize taker, Market Gardener, Yellow Globe, The Queen, Paris Silver Skinned* etc.[3] are commonly grown all over India and Pakistan.

The chemical composition of onion is very complicated, however, *Russian Biochemists* have isolated a germicidal substance from onion. They believe that the chemical combination of *Sulphur* with *allyl propyl disulphide* the pungent smelling volatile oil has a very marked lethal effect on *Strepto* and *Staphylococci.* In ancient medical literature the medicinal use of white onion in the treatment of mumps and scabies proves that the ancient masters were aware of the antiseptic effects of onion. Also, in

olden days onion to be used immediately after food as a preventive measure from cholera, dysentery, diarrhoea caused by drinking contaminated water. This is also a proof that olden days physicians were using onion as a preventive as well as curative medicine for gastro intestinal infections. Even today, fried onion is considered as a specific medicine for bacillary dysentery in folk-medicine.

Eating few slices of raw onion with *Vinegar* immediatly after food prevents tooth decay, indigestion and food poisoning. Its regular use as a salad with *cucumber*, *tomato*, *lime juice*, *coriander leaves*, *carrots*, *salt* etc., not only prevents gastro intestinal disturbances, but also increases longevity.

It is one of the safest preventive medicinal salad during winter to prevent one from common cold. Also it is an effective prevention against cholera, colitis, typhoid, dysentery, infective diarrhoea, small-pox, chicken-pox, measles, etc., during summer.

A teaspoonful of onion juice mixed with a tablespoonful of honey given 1/3rd part of it thrice daily is an effective medicine for early stages of whooping cough, common cold, bronchitis, tonsillitis, hiccough etc.

Fresh white onion juice four teaspoonsful mixed with two teaspoonsful of *honey* and a teaspoonful of fresh *ginger juice* taken immediately after food is a very effective folk-medicine for asthma, bronchitis, difficult expectoration, emphysema, chronic dyspepsia, scanty menstruation, piles etc[5].

Fresh white onion juice 1 teaspoonful, *honey* one tablespoonful and *half boiled eggs* two, taken daily once for two to three months is a wonderful remedy for increasing sex stamina. It increases the motility of the sperms, thickens semen, tones up the nervous system and prevents premature greyness of the hair. (Care must be taken to avoid sexual indulgence while using this preparation). Equal quantity of onion juice and *honey* is heated till the watery content is evaporated. A teaspoonful of it is daily used to cure functional impotency[5].

Fresh juice of white onion $2\frac{1}{2}$ ounces, fresh *ginger juice* $1\frac{1}{4}$ ounce, pure *ghee* $1\frac{1}{2}$ ounce and pure *honey* an ounce and *tamarind seed powder* $\frac{1}{4}$ teaspoon is mixed well and used every day as a very effective but cheap sex and nerve tonic. It cures spermatorrhoea, premature ejaculation, impotency, thickens watery semen, sterility due to weak sperms, poor retentivity etc. It is advised to abstain

from *intercourse* and eating *sour things* during the use of this medicine. One should use it at least for 42 days to get the desired effect[8].

Boiled onion eaten with *vinegar*, *rock salt* and fresh *coriander leaves* daily for a fortnight cures piles, prolapse of the rectum, enlargement of spleen, liver, biliousness, catarrhal jaundice, excessive itching in the anus due to pin worm infection, constant urging to pass stool with passing much mucous, indigestion, flatulent colic strangury etc. Giving onion with *jaggery*, increases body weight due to its anabolic action. Cut onion into small bits and add some sugar, set aside for 8 to 10 hours and then collect the liquid portion. Give a teaspoonful of this linctus three times daily for a weak to cure whooping cough, bronchitis, emphysema etc.

Fresh white onion juice a teaspoonful mixed with equal quantity of fresh *lime juice*, fresh *mint leaf-juice*, and a grain of *camphor* is given with *tender coconut water* every ½ hour as a specific medicine to cure cholera in its early stage[5]. Its regular use is a preventive medicine for cholera.

Soak a clean white cloth in fresh white onion juice and dry it in shade, repeat this process thrice, then soak the same cloth in fresh leaf juice of *fennel* and repeat the soaking process thrice. Then make a wick of the cloth and dip it in pure home made *castor oil*. Light and collect the soot over a *copper plate*. Scrape the soot in a glass-jar and mix some pure cow's ghee and prepare an eye black (kajal). Use it every day as an eye-make up and as a preventive medicine for weakness of sight, burning in the eyes, excessive watering etc. Its regular use is said to have cured opacity of cornea[5].

Regular use of a teaspoonful fresh onion juice with equal quantity of *lime juice* twice daily dissolves enlarged spleen. With *honey* is a tonic for eye disorders[8].

Inhaling fresh pounded onion is a remedy for colds, rhinitis, anoxia, frontal head-ache etc. Warm onion juice 3-5 drops are put in nose to relieve epileptic fits. As ear-drops they are put to cure ear-ache caused by exposure to cold winds.

Fresh onion juice is applied over forehead as a cure for head-ache due to influenza, nasal congestion etc. Juice is applied as a cure for scorpion and bee sting. Juice mixed with little *turmeric*

powder is applied as an effective cure for scabies, chilblains, prolapsed rectum. Onion fried with *castor oil, turmeric powder, ajwan* and its hot application is a time-honoured folk-medicine to hasten pus formation, and to prevent infection from cut wounds, animal bites, stepping over nails etc. (It is warned that all such contaminated injuries in unprotected persons from **Tetanus** are very dangerous and should never be treated with home remedies and consult a physician immediately after such injuries). Fresh pounded onion is applied over chopped soles with good results.

Onion fried in *mustard oil* is used as an effective analgesic liniment to relieve painful swelling of the joints due to rheumatism, dislocations etc. Roasted onion is applied to relieve pain from protruding piles.[7] Thin roots of onion pounded with *washing soap*, and a clove of *garlic* is applied to cure guinea worm.

Excessive use of onions increases *uric acid* in the body and reduces white blood cells. This effect is a great hope for treating leukaemia and the author has found considerable remission of white blood cells by using onion-juice 1 teaspoon with the fresh leaf juice of *Vinca Rosa* 1 teaspoon three times daily for a month. Due to shortage of leukaemia patients systematic study could not be continued. Eatings onions abundantly forms urinary calculi.

Recent researches by SAGHIR, show that onions, due to allyl propyl disulphide cause goitre by inhibiting Thyroid functions or by increasing iodine excretion from the body. (Saghir, A. R., American University, Beirut, Nature, July 2, 1966).

Eating onions during tear gas shelling protects one from shedding tears and burning in the eyes.

Leaves

Tuberous leaves are rich in *vitamin A*. They contain 993 I.U. of *carotene* per 100 g. Chewing the leaves after food stops the development of bad breath due to the chemical action of antiseptic volatile oil, chlorophyl and sulphur. It increases saliva, helps digestion, cures jaundice, tones up liver, and cures piles.

Infusion of a handful of chopped leaves an ounce, taken with *sugar candy* once daily is a cure for strangury, scanty urination, night blindness, cough, pin worms, dysentery, etc.

Seeds

Onion seeds ½ a teaspoon boiled in cow's milk is taken daily at night as medicine for impotency.

Onion can be preserved for some time without allowing any damage caused by mould formation. It is found that punching V shape ½" holes numbering 16-32 per polyethylene and pliofilm bag will give a tasting protection[7].

REFERENCES

1. Aykroyd, W. R., *'Nutritive Value of Indian Foods etc.'*, (1963).
2. Muzaffar Hussain, *'Kitabul-advia'*, p. 169.
3. Sham Singh, *et al.*, *'Vegetable growing in Delhi State'*, p. 16.
4. Syed Kabeerudin, *'Tareeq-ul-advia:* (History of Medicines) Persian Mss. p. 160, (1898), Hyderabad, A.P.
5. Bakshi-Mahaboob Ali Khan, *'Random notes'*, Urdu Mss. p. 1207, Mysore, (1920).
6. Dastur, J. F., *'Medicinal plants of India & Pakistan':* p. 14:20. (1962).
7. Hardenburg, R. E., *Mod. Package.*, 28 (7), 140, (1955).
8. Pandit Shiv. Kumar, *Arogiya Darpana,* Mrutinjaya Clinic, Bangalore, 1965.

182. POTATO

Potato: *Solanum tuberosum:* (B.N.); *Alu:* (Hindi, Urdu, Dak.); *Alu gaddey:* (Kan.); *Urlu gadda:* (Tel.); *Urala-kizangu:* (Mal.); *Batata:* (Guj. Sindhi).

Family: Solanaceae.

Zodiac: Pisces.

Food Value per 100 g. approximately

Carbohydrate	22.5 g.	Vitamin B_1	100 mcg.
Protein	2.4 g.	Vitamin B_2	15 mcg.
Fat	0.1 g.	Niacin	1 mg.
Calcium	11 mg.	Vitamin C	10-53 mg.
Phosphorus	32 mg.	Sodium	18 mg.
Iron	0.7 mg.	Potassium	249 mg.
Chlorine	78.5 mg.	Oxalic acid	15 mg.
Magnesium	24.2 mg.	Digesting Time	2½ Hrs.
Copper	0.24 mg.	**CALORIES**	98
Vitamin A	5 I.U.		

Constitution: Wet and Dry 1°.

Physiopharmacology and Therapeutics

Next to rice and wheat, potato plant is extensively cultivated all over the world for its tubers in the form of potatoes. Potato was first cultivated in Peru. But *Sir Walter Raleigh* introduced potato in England in 1589 A.D. Potato came to India with Spanish sailors in seventeenth century.

Potato plant stores its nutrition in potato in the form of starch, protein, minerals and vitamins. Unlike other roots and tubers, potato can withstand the process of spoilage, therefore, it can be stored longer than other vegetables. Its cheapness, delicious taste, forming of bulk-food etc., makes it a very popular food article.

The structure of potato is divided into three distinct layers. *The outer thin covering layer, the fibro-vascular or the broader layer* and the *inner layer.*

The outer layer contains minerals, vitamins, *the second layer* is rich in proteins and a kind of pigment which alters the colour of potato when a cut slice is exposed to air; and *the inner layer* is composed of starch grains, water etc. Peeling and careless washing the potato robs all its nutrition and makes it only starchy. Therefore, nutritionists always insist to cook potato with its jacket. Potato contains the following *essential amino acids* (g./100 g. protein): *Arginine 5.2, Histidine 1.2, Isoleucine 5.2, Leucine 5.4, Lysine 6.7, Cystine 1.2, Methionine 1.3, Threonine 3.9* etc.[1]

Potato is cooked in various ways such as: boiling, roasting, frying etc. However, you eat, potato serves you as a main source of pure carbohydrate to supply energy and heat. Like other starchy grains, potato is also contra-indicated in diabetes, rheumatism, uric-acid diathesis, obesity etc. *Usmani* advises not to cook potato with tomato, as it causes indigestion. On testing this the author did not find any bad effect of such combination.

Pulp of a boiled potato mixed with pre-boiled milk is usually applied as a very soothing dressing for burns and scalds. Eating a whole potato that is roasted over charcoal is a medicine for scanty urination, lack of breast-milk, stomatitis, constipation etc.

Decoction of potato slices along with its fresh leaves mixed with honey and a pinch of salt per cup is found to be an effective medicine for common cold, bronchitis, sore throat etc.

Potatoes can be kept fresh by various methods. But the best method is to keep potatoes fresh and last long is to pack them in wooden crates[2].

Military special, Dehra Dun, Phulav, Red, K-122 and *up-to-date* varieties of U.P. potatoes are found to be highly suitable for canning. Dipping the peeled and blanched potatoes in 2 per cent *calcium chloride* solution for one hour reduces cracking and bursting[8].

A new process of producing *Instant Mash Potato* is worked out at C.F.T.R.I. Mysore[3,4,5].

Also a new process to impart a porous structure to potato is developed at the same institute.[9]

REFERENCES

1. Swaminathan, M. and Bhagawan, R. K., *Our Food*, p. 158. C.F.T.R.I., Mysore (1966).
2. Murthy, *et al.*, C.F.T.R.I., Mysore.
3. Eapen, K. E. and Ramnathan, P. K., *Process for the Production of Instant Mash Potato, J. Food Science and Technology*, Vol. III, No. 2, pp. 66-68, (July 1966).
4. F.A.O. Production Year Book, 16, (1952).
5. McG. McBean, D., *Food Preserve Quart.* 22, 1968, (1962).
6. Eapen, K. E., *et al.*, *Food Tech. Cham*, 20, 4, 191, (1966).
7. Olsen, R. L., *et al.*, *Food Tech. Cham.* 1, 177, (1953).
8. Varma, A. R., *et al.*, *Suitability of some important potato varieties of U.P. for Canning, J. Food Science*, Vol. III, No. 3, p. 125, (1966).
9. Eapen, K. E. and Ramnathan, P. K., *Vacuum puffing and dehydration of Potato, Food Tech. Cham.*, 20, (4), 190, (1966).

183. RADISH

Radish: *Raphanus Sativus:* (B.N.); *Moolka:* (Sans.); *Muli:* (Hindi, Urdu, Dak.); *Mulangi:* (Kan.); *Fujal:* (Arab.); *Turb:* (Pers.); *Moolangai:* (Tel., Tam.); *Mugari Chuvana thuram:* (Mal.); *Mula:* (Mar., Ori., Beng.); *Muri:* (Sindhi).

Family: Cruciferae.

Zodiac: Aries.

Food Value per 100 g. approximately

Carbohydrate	4.2 g.	Vitamin B_1	60 mcg.
Protein	0.7 g.	Vitamin B_2	21 mcg.
Fat	0.4 g.	Niacin	0.4 mg.
Calcium	35 mg.	Vitamin C	20 mg.
Phosphorus	22 mg.	Sodium	41 mg.
Iron	0.3 mg.	Potassium	325 mg.
Oxalic acid	9.2 mg.	Digesting Time	3 Hrs.
Vitamin A	Trace	**CALORIES**	21

Constitution: Hot and Dry 1°.

Physiopharmacology and Therapeutics

Radish plants are cultivated all over India for their nutritive tap root known as *Radish*. There are several varieties but the following are very popular: *Large crimson* (Turnip shaped), *Contai short*, *Queen of the market*, *Violet Giant*, *Chinese Rose*[5] etc.

Radish contains a pungent volatile oil that has a marked carminative action. It is therefore, eating raw radish after food is practiced from ancient times as a carminative medicine. The chemical composition of all the varieties remains more or less the same. Cooked radish though digests other foods but it remains in the stomach undigested for a longer time due to its high cellulose content and causes much wind having rancid smell. Radish should not be eaten in empty stomach.

Eating few slices of raw radish with *salt* and *pepper* and few drops of *lime juice* thrice daily is a medicine for piles, constipation, indigestion, colic, dyspepsia, enlargement of spleen, liver, jaundice, prolapse of the rectum etc.[3,6,7].

A teaspoonful of fresh radish juice mixed with equal quantity of *honey* and a little *rock salt* is given thrice daily as a valuable remedy to cure whooping cough, bronchitis etc.[7,9,10].

Leaves

Radish leaf-juice and its pods contain vitamin A and C along with more potassium. A cupful of juice given once daily for a fortnight acts as a curative medicine in dissolving gravel in urinary tract, piles, cystitis, nephritis, hypertension, etc. It is a cheap and effective diuretic medicine. Juice is given with honey in jaundice with gratifying results. Juice of fresh leaves mixed with

equal quantity leaf-juice of *Bitter Sweet*, Endive-leaf juice, honey (an ounce of each) is given thrice daily to cure stomatitis, cystitis, bladder stones, biliousness, constipation stomatitis, particularly during pregnancy etc., with very effective results[3,6,7,10].

Evaporating the leaf juice forms a hygroscopic sticky salt (Nimk-e-Turb), which is a very effective medicine for indigestion, piles, nausea and vomiting due to biliousness[7,10].

Seeds

Radish seeds contain a bleaching substance, therefore, the emulsion with water is applied over face to remove black heads and freckles. It is applied to cure ring-worm. A teaspoonful of the seeds boiled in cow's milk is given every night as a medicine to cure impotency, pre-mature ejaculation, etc. Decoction of seeds is given as a safe emetic in children suffering from whooping cough[3,8].

Waxing radish before transport prevents its loss[11].

REFERENCES

1. Prof. Mathur, R. C., *Systematic Botany*, p. 304, 3 (1965).
2. Swaminathan, M., Bhagawan, R. K., *Our Food*, (1966).
3. Muzaffar Hussain, *Kitabul advia*, pp. 485-86, (1965).
4. Dastur, J. F., *Medicinal Plants of India and Pakistan*, p. 141, (196) (1962).
5. Sham Singh, *et al.*, *Vegetable growing around Delhi State*, (1952).
6. Zakai, *Kharabadeen-e-Zakai* Pers. Mss. (1890), Lucknow.
7. Kabiruddine, *Tibbe Kabir*, Pers. Mss., Lucknow, (1908).
8. Nawab Wasiudulah, *Random Notes*, Pers. Mss., Mysore, ((1901).
9. Majeed, S. A., *Random Notes*, Urdu Mss. (1928).
10. Hakeem Syed Sultan, *Muli-kay Qhnas*, Urdu Mss. (1928).
11. Anon, *Pre-Pack-Age*, 7 (8), 372, (1954).

184. SWEET POTATO

Sweet potato: *Ipomoca batatus:* (B.N.); *Shakarqand:* (Hindi, Urdu); *Nataralu:* (Dak.); *Gensu:* (Kan.); *Dumpalu:* (Tel.); *Sakaraivalli:* (Tam.); *Chakkra-kisangu:* (Mal.); *Ratalo:* (Mar.); *Sakkaria:* (Guj.); *Lohori Gajar:* (Sindhi); *Kanda mala:* (Ori.); *Rangalu:* (Beng.).

Family: Convolvulaceae.

Zodiac: Libra.

Food Value per 100 g. approximately

Carbohydrate	27 g.	Vitamin B_1	81 mcg.
Protein	1.2 g.	Vitamin B_2	40 mcg.
Fat	0.4 g.	Niacin	0.7 mg.
Calcium	20 mg.	Vitamin C	30 mg.
Phosphorus	45 mg.	Sodium	10 mg.
Iron	0.7 mg.	Potassium	373 mg.
Magnesium	Trace	Digesting Time	3 Hrs.
Vitamin A	10 I.U.	**CALORIES**	125

Constitution: Hot 2° and Wet 2°.

Physiopharmacology and Therapeutics

Sweet potato plant is a creeper like slender trailor. It is cultivated all over India for its starchy pinkish spindle like tubers.

Sweet potato is rich in fine starch which is boiled and used in place of rice by the poor. Fresh milky juice prepared by pounding sweet potato is a rich source of vitamin C. It can be slightly heated to boil for few minutes and can be taken as a gruel in place of rice. Sweet potato is a cheap source of industrial starch and forms a food product in confectionery and bakeries (Mathur). Alcohol and molasses can also be prepared from sweet potato.

Author did not find any medicinal value in sweet potato and its excessive use may complicate heart disorders and diabetes due to the high percentage of carbohydrates in it.

Fresh leaf-juice is used as a cure for scorpion sting.

185. TAPIOCA

Tapioca: *Manihot glaziovii:* (B.N.); *Simla alu:* (Hindi) *Pindalu:* (Dak.); *Mara-gensu:* (Kan.); *Marvalli kizangi:* (Tam.) *Karapanalu:* (Tel.); *Marakzianghu:* (Mal.); *Kathakandu:* (Ori.).

Family: Euphorbiaceae.

Zodiac: Saggitlarious.

Food Value per 100 g. approximately

Carbohydrate	40 g.	Vitamin B_2	10 mg.
Protein	0.7 g.	Niacin	0.4 mg.
Fat	0.4 g.	Sodium	2 mg.
Calcium	35 mg.	Potassium	10 mg.
Phosphorus	35 mg.	Oxalic acid	17.1 mg.
Iron	0.7 mg.	Digesting Time	3 Hrs.
Magnesium	Trace	**CALORIES**	**157**
Vitamin B_1	50 mcg.		

Like sweet potato, tapioca is also extensively cultivated all over South India. The tubers are boiled and used by poor. Its excessive use causes malnutrition and cirrhosis of the liver in children due to protein deficiency. Artificial rice is made at C.F.T.R.I. Mysore from tapioca. Fresh tapioca juice is used as a medicine for ring-worm. Eating fennel seeds after eating sweet potato and tapioca counter acts the bad effects and prevents indigestion.

186. TURNIP

Turnip: *Brassica rapa*, **Var.** *Compestris:* (B.N.); *Shalgam:* (Hindi, Urdu, Dak.); *Liffat:* (Arab.); *Shaljam:* (Pers.).

Family: Cruciferae.

Zodiac: Scorpio.

Food Value per 100 g. approximately

Carbohydrate	5 g.	Vitamin B	350 mg.
Protein	3.1 g.	Vitamin C	54 mg.
Fat	0.6 g.	Sodium	12 mg.
Calcium	30 mg.	Potassium	108 mg.
Phosphorus	32 mg.	Digesting Time	2 Hrs.
Iron	0.5 mg.	**CALORIES**	**30**
Vitamin B	50 mg.		

Constitution: Hot and Wet 2°.

Turnip belongs to cabbage family and it is extensively cultivated for the sake of its leaves and roots[1]. Several varieties

are cultivated but, *Snow ball, White Dutch, Golden ball, Red Top Flat*[2] etc., are some of the very popular kinds[2].

Eating cooked turnip regularly checks the formation of phlegm, increases vitamin A content of the body, protects eyes, helps blood formation, prevents constipation and uric acid in the urine.

Seeds

Seeds are used as an aphrodisiac digestant and diuretic. Applying emulsion of seeds with milk, bleaches the facial complexion, prevents one from pimples[3].

REFERENCES

1. Mathur, R. C., *Systematic Botany*, p. 304, (b) 1965.
2. Sham Singh, *Vegetable Growing in Delhi State*, (1952).
3. Muzaffar Hussain, *Ahuas-ul-advia* Urdu, p. 321, (1965).

187. YAM

Yam: *Amorphophallus campanulatus:* (B.N.); *Zaminghand:* (Hindi, Urdu); *Hati-alu:* (Dak.); *Doda sauran gaddey:* (Kan.); *Saseen kand:* (Pers.); *Sure-kanda:* (Tel.); *Senai kizanghu:* (Tam.); *Marakizhangu chenna:* (Mal.); *Suran:* (Mar. Guj.); *Hatli-khojaya alu:* (Ori.); *Oul:* (Beng.).

Family: Araceae or Aroideae.

Zodiac: Leo.

Food Value per 100 g. approximately

Carbohydrate	18 g.	Vitamin B_1	60 mcg.
Protein	2.2 g.	Vitamin B_2	70 mcg.
Fat	0.4 g.	Niacin	0.7 mg.
Calcium	35 mg.	Vitamin C	5 mg.
Phosphorus	22 mg.	Sodium	22 mg.
Iron	0.7 mg.	Potassium	422 mg.
Magnesium	Trace	Digesting Time	2½ Hrs.
Vitamin A	422 I.U.	CALORIES	159

Constitution: Hot 2° and Wet 2°.

Physiopharmacology and Therapeutics

Yam plant is cultivated for its giant sized nutritive tubers. There are several poisonous varieties of yam which cause gastro-intestinal irritation after eating them. Even the edible yam contains an irritant substance *Dioscorin* a bitter poisonous substance which has a similar neurotoxic action like *picrotoxin* that causes paralysis. It can however be removed by boiling it in *tamarind leaf-juice* and *paddy husk*. Yam cooked accordingly is given with *curds* or *butter-milk* as a specific medicine for dysentery, diarrhoea, piles, syphilis etc.

Dry powder of fresh yam 2 teaspoonfuls is taken with *sugar-candy*, and *butter-milk* thrice daily as a specific medicine for filariasis, piles, general edema etc. Persons who eat yam regularly are said to immune against filariasis, but once there is lyphatic derangement, it is doubted whether it has any effect in dislodging the filariasis worm (wucheria boncraft). Eating properly washed yam kills hunger by its sedative action and thereby helps as a food in obesity.

Fresh yam with *old jaggery* and *salt* in 4:1:1 proportion is put in an earthen pot and sealed with mud (gile-hikmat). Then the contents are burnt with ½ mond wild cow dung cakes. After cooling, the contents are finely powdered, two grains of this powder with *betel leaf* is given daily once for 2 months to cure asthma, chronic bronchitis, rheumatism etc., (Muzaffar Hussain).

Eating cooked yam with alocasia or calocia reduces rheumatic pains, increases sexual feelings, eases difficult breathing in asthmatics and imparts a feeling of well being. This clinical improvement is similar to that of *prednesolone*, *Delta cortisone* or *dexamethesone*. Therefore it is suggested to analyse yam and search if there is any possibility of synthesising corticosteroids and sex hormones from it.

Fresh yam juice is applied to cure chronic ulcers. Fresh pieces of yam are used as fish bait.

Excessive use of yam increases hyperacidity, therefore it is contra indicated in leprosy, scabies and other chronic skin diseases.

PART VI

NUTS AND OIL SEEDS

The various types of nuts that we eat every day are found to be highly nutritious and they are compacked with concentrated food-components like: protein, fat, cellulose, minerals, carbohydrates of high solubility and vitamins. Since the nuts are concentrated in these food-components, they are required in lesser quantity and need proper mastication before swallowing them. Among the various nuts the following nuts are usually consumed all over the world for nutrition and health:

Almond	Brazil nut
Butter nut	Cashew nut
Chest nut	Coconut
Cudpah nut	Fibert nut
Hazel nut	Hickory nut
Pea nut	Pistachio nut
Walnut	Water chest nut

188. ALMOND

Almond: *Prunus amygdalus:* (B.N.); *Madhur vatad:* (Sans.); *Badam:* (In all principal Indian languages); *Lauzul halu:* (Arab.).

Family: Rosaceae.

Zodiac: Cancer.

Food Value per 100 g. approximately

Carbohydrate	11 g.	Vitamin B_2	0.6 mcg.
Protein	20.6 g.	Niacin	2.5 mcg.
Fat	58.24 g.	Vitamin C	386 I.U.
Calcium	247 mg.	Sodium	5.8 mg.
Phosphorus	442 mg.	Potassium	856 mg.
Iron	4.23 mg.	Chlorine	1.7 mg.
Magnesium	257 mg.	Oxalic acid	403.3 mg.
Copper	1.15 mg.	Digesting Time	2½ Hrs.
Vitamin A	Trace	**CALORIES**	651
Vitamin B_1	238 mg.		

Constitution: Hot and Wet 1°.

Physiopharmacology and Therapeutics

Almond tree is cultivated in Afganistan, Kashmir, Madras etc. Among all the nuts that are used as food, almonds are the costliest and very nutritive. They are packed with all the food components, vital to health, strength and sound body. It has been said, 'No man, need starve on a journey who will fill his waist coat pocket with shelled almonds'[2].

From time immemorial almonds are used as sacred nuts in muslim marriages and considered to be very vital in all tonic preparations of both Unani and Ayurvedic medicine. The ancient masters by their observation and clinical experience knew that almonds have a special value in guarding one's health, strength and prolong life indefinitely. Dating back to hundreds of years, the ancient scriptures clearly prove that almonds were mostly used by wrestlers, and men of great wisdom. It is interesting to know about a sage who was treated by me for dislocation of his knee about ten years ago. The sage being kind, showed me a palm-leaf on which certain strange inscription in Sanskrit were written. The sage explained to me that from hundreds of years that palm leaf is passed from one sage to another and it speaks of a secret of longevity. Being thrilled of the truth and on seeing the old man still fit to read, eat any food, walk miles together in his ripe age of nearing a century I requested him to read the secret, and its translation is given below:

> 'The secret of man's longevity does not lie in his strong muscles, sturdy body, but it is hidden in his string like objects that emerge from the head, pass through neck and run to all the parts of the body. These strings of God's musical instrument, "the human body" can be kept strong and fit to vibrate and keep on tuning the most enchanting music *The Life* by eating plenty of *Sweet almonds, Divine thinking, frequent fasting* and *abstaining from woman*, and *Wine*'. (Sadhu Narayan, of Varanasi 1958).

Today we are told by physiologists about the same old truth that *sound nerves lead to longevity.*

Let us see how almonds play a major role in prolonging life.

If you compare the food value of any other food described in this book, you will be amazed to know that there is no other food having such concentrated food components as you find in almonds particularly COPPER that is one of the most vital key mineral that is abundantly found at the rate of 1.15 mg. per 100 g. of almonds along with Iron, vitamin B_1, except *Pistachu-nut* which has 1.06 mg. of copper per 100g.[3]

What is the function of copper in the body?

Copper has a very important function in our body; that is the synthesis of Blood-haemoglobin by aiding proper absorption of food-iron.

The adult human body contains about 100 to 150 mg. of copper. About 64 mg. of which is found in *muscles*, 23 mg. in *bones* and 18 mg. in the *liver* which is the highest concentration among all the organs. It is found that the foetal liver contains five to ten times more copper than the adults[4].

In the blood, copper is found as a protein named as *Erythro-cuperin*. It is a colourless protein containing 2 atoms of copper per molecule and has got about 33,000 molecular weight. In a normal healthy adult 30 to 36 mg. of *Erythrocuperin* is found per 100 ml. blood packed cells. The copper content of such packed cells is 93 to 114 mcg. per 100 ml. Since *Erythrocuperin* contains about 3.2 mcg. of copper per mg. protein. This protein accounts for most if not all of the copper in the red cell. Blood-plasma also contains copper in the form of *Ceruloplasmin* that is light blue in colour[5]. The copper concentration in red blood is constant, but, serum copper is variable averaging about 90 mcg. per 100 ml.[4] The molecular weight of *Ceruloplasmin* is about 151,000 and contains about 8 atoms per molecule. Normal plasma contains also about 30 mg. of *Ceruloplasmin* per 100 ml. Copper acts as an enzyme-a-*polyphenol oxidase*, which has a control over oxidation—reduction enzymes of the tissues, such as *Cystochrome* system[6]. It helps the metabolism of iron and controls its movement from the tissues to plasma. Deficiency of copper checks the absorption of iron from gastrointestinal tract and causes *hypofer-remia*[4].

Copper is detected in the *brain* in the form of *Cerebrocuperin*. It is a protein different from *Erythrocuperin* and *Ceruloplasmin*. It reacts directly with *diethyldithiocarbamate*. *Cerebrocuperin*

maintains the normal function of *Myelin* within the nervous system.

Copper plays a vital role in the development of *bones*. Its deficiency causes abnormally thin cortices, deficient trabeculae and wide epiphysis. Fractures and deformities occur in animals deficient in copper. Pre-mature greyness of hair is also caused due to deficiency of copper[7,8].

The medicinal action of almonds is chiefly due to pharmacodynamic action of copper, iron, phosphorus and vitamin B_1. These chemicals exert a synergic action by taking almonds regularly and help the formation of new blood cells, haemoglobin and play a major role in maintaining the smooth physiological functions of brain, nerves, bones, heart, liver etc. It is this factor which led the ancient masters to use almonds in all ages in hope to live strong, healthy and long.

Comparative food value of almonds

Almonds (shelled) 100 g. supply as much vitamin B_1 and protein as one gets by eating any one of the following foods:

Beef	400 g.	Eggs	6
Mutton	250 g.		
Turkey roast	100 g.	Milk	2½ cups

Protein:

Brain	175 g.	Fish	100 g.
Heart roast	100 g.	Cheese	75 g.
Chicken roast	90 g.	Liver	75 g.
Buttermilk	10 cups	Eggs	5
Chicken soup	5 cups	Milk	3 cups
Mutton soup	5 cups		

Eating 12-15 almonds with *sugarcandy* and a glassful of *cow's milk* every night before going to bed is a nature's wonderful medicine to prevent, brainfag, nervous tension, insomnia, mental irritability, tired feeling after any manual or mental work, insanity, hysteria, nervous deafness etc.[10]

Eating almonds with *honey* and *rose-hips* every morning is a medicine to cure scurvy, bleeding piles, diabetic-neuritis, alcoholic neuritis, high-blood-pressure, nervous tachycardia, angina pectoris due to iron-deficiency anaemia, excessive menstrual bleeding in young anaemic girls, indigestion of carbohydrates,

constipation, cirrhosis of liver due to malnutrition in children, weakness during pregnancy and lactation functional impotency, spermatorrhoea and leucorrhoea[11,12,13].

Soak 3 to 6 shelled almonds in warm water and then remove the thin skin. Grind them into paste, and mix it with the milk. Add a teaspoonful of *honey*. Feed your baby once daily from 2nd month onwards and see how the child grows with strong bones. There is no other tonic which can excel this God's elixir of life. There is no fear of indigestion from almonds. They suit every stomach in all ages.

Soak 12 to 15 shelled almonds in hot water and remove the outer covering. Grind them into fine paste, mix it with *butter-milk* and mash a *ripe banana* in it. Strain it through a fine muslin cloth and add *honey* 4 teaspoonful per glassful of *butter-milk*. Give this '*nector of life*' twice daily during the treatment of typhoid, diarrhoea, dysentery, colitis, hepatitis, jaundice, cirrhosis of liver, burning and itching in the rectum, migraine, tuberculosis, cancer, during convalescence from acute febrile diseases, and major surgical operation, scanty urination, high acidity of urine and urinary tract infections.

Paste of shelled almonds mixed with *orange juice* and *honey* is given as a tonic-food during acute phase of congestive heart failure, cardiac ischaemia, nephritis, cystitis, toxaemia of pregnancy etc.

Almonds can be safely eaten by diabetics, obese, and other invalids. Mixing almond-cake with wheat flour is an ideal method of increasing nutritive value of flour. It is a very useful food for such persons.

10 to 15 almonds roasted with salt water and 5 to 8 taken every night is an effective medicine for bronchitis, asthma, emphysema, enlarged uvula, sore throat, pharyngitis, tonsillitis etc. In acute phase of throat infection, suitable treatment must be given to prevent toxaemia.

Almond Syrup

Soak ½ kg. of shelled almonds in hot water and remove the outer thin skin. Grind them into fine paste and strain the mixture by adding little water. Then grind again and take the milk and repeat this process once more.

Put 2 cups of water in a stainless steel vessel, add sugar 1 kg. and heat. When the mixture begins to boil, add little cow's milk or tartaric acid to purify the syrup. Remove the scum. Add ½ a teaspoonful of *citric* or *tartaric acid* and then pour almond milk and heat it for half an hour.

Take the mixture from fire, add about ¼ teaspoonful of *Sodium Benzoate* (*I.C.I.*) by dissolving it in a teaspoonful of hot water and after stirring well, fill the syrup in sterilized bottles, cork air tight. It is a very nutritive and cooling syrup for all.

Paste of almonds with milk cream and *fresh rose bud's paste* is daily applied over face as a very effective beauty aid. It softens the skin, bleaches, nourishes it with the choicest skin-food. Its regular application prevents from early appearance of wrinkles black heads, dryness of the skin, pimples and keeps one's face flower fresh.

Almond oil: (*Oleum amygdale B.P.*)

Sweet almond oil is nutritive, cooling laxative, bland and demulcent.

A teaspoonful of almond oil taken every night with *honey* and *milk* is a nutritive tonic and laxative medicine.

A teaspoonful of the oil given with fresh *white onion juice* 10 drops *ginger juice* 10 drops daily thrice for a fortnight to cure whooping cough, bronchitis, asthma etc.

Almond oil one teaspoonful with a teaspoonful of *amla juice* is massaged over scalp every night to cure hairfall, thinness of hair, dandruff, premature greyness, dryness of nose, burning in the eyes, insomnia, headache due to heat etc.

Almond oil one teaspoonful with two teaspoonful of *glycerine* and a teaspoonful of *lime juice* is mixed well. This medicine is applied over chapped hands, dry skin, burning sensation caused by exposure to sun and itching due to cold winds, with very gratifying results. It is an excellent cosmetic too.

Few drops of almond oil is put in eyes every night to cure burning sensation and excessive watering them.

Massaging almond oil mixed with juice of a tender *pomegranate* or *guava*, develops the underdeveloped breasts in young girls and

makes them firm. Its regular massage during breast feeding prevents the sagging of the breasts.

Mixing almond oil with equal quantity of *lime water* (Calcium hydroxide) and one-eighth part of its bulk of *glycerine* with some suitable perfume, makes it an ideal hair lotion. Its regular use is an effective hair dressing to prevent hair fall.

Almond Shell

Charcoal of almond shell ground with equal quantity of *neem charcoal* (Margosa) $\frac{1}{8}$th part *alum*, $\frac{1}{8}$th part *common salt*, $\frac{1}{4}$th part *cooking soda* (Sodium bicarbonate) and *thymol* $\frac{1}{16}$th part forms a very useful dentifrice. Its regular use prevents from dental caries pyorrhoea, gum diseases etc. It whitens the teeth, and kills all the harmful germs in the mouth. It controls the bleeding from gums and hardens them.

Considering the high cost of almonds, the author recommends the use of *pistachio*, *walnut* and *groundnuts* as a substitute for almonds.

Bitter almond: *Amygdala amara:* (B.N.); *Katvatad:* (Sans.); *Kadva badam:* (Urdu, Hindi, Dakni etc.); *Kahi-badami:* (Kan.); *Louzul murru:* (Arab.); *Badam-e-talq:* (Pers.); *Takta badam:* (Beng.).

Family: Rosaceae.

Zodiac: Libra.

Bitter almonds are poisonous, though they resemble like sweet almonds, they contain a chemical and volatile essential oil which, on coming in contact with water, turns into *prussic, hydrocyanic acid* and *benzoldehyde cyanahydrin.* However, for flavouring purpose, *hydrocyanic acid free oil* can be used[10,11].

External application of 2 to 5 bitter almonds with *neem leaves* (margosa leaves) in the form of paste is found to be effective medicine for chronic itching of the body, scabies, blood boils etc. Care must be taken to use this preparation if one is allergic to bitter almonds.

Instilling bitter almond oil 2 to 5 drops in the ears cures ringing and roaring sensation in them due to impact ear wax.

It is equally effective for chronic otitis media, nerve deafness, itching in the ears etc. Oil mixed with *sulphur* and ground into a paste, is a specific medicine for scabies, dry itching, itching due to oldage and exposure to cold winds. (one part of almond oil 4 parts of sulphur 8 parts of vaselin is a proper formula for this medicine).

REFERENCES

1. McCance and Widdowson, Med. Res. Council Report No. 235 (1942). *Hutchison's Food and Principles of Dietetics*, p. 348, 10th Ed. (1948).
2. Hutchison's *Food and Principles of Dietetics*, p. 350, (1948).
3. Choudhury, S. C. and Basu, U. P. *On copper content of Indian foods Indian F. Med. Res.*, 26, 929 (1939). Antia, F. P., *Clinical Dietetics and Nutrition*, pp. 184-85.
4. Harper, Harold A., *Review of Physiological Chemistry*, p. 324, 8th Edn. (1961) Lange Publications, California. (Los. Altos.).
5. Markowitz, H., *et al.*, *J. Bio. Chem.*, 234, 40, (1959).
6. Holmberg, C. G. and Laurell, C. B., Acta. Chem. Scandinav. 2. 550, (1948).
7. Porter, H. and Folch, J., *J. Neurochem*, 1:260, (1957).
8. Baxtor, J. H., *et al.*, *Bull.* John Hopkins Hospital, 93, 1, 25, (1953).
9. Muzaffar Hussain, *Kitabul advia*, p. 111, (Urdu).
10. British Pharmaceutical Codex, p. 115, (1911).
11. Gulam Jeelani, *Magzanul advia Doctari*, (Urdu), pp. 708-12, (1912).
12. Swaminathan, M. *et al.*, *Our Food*, p. 155, (1966).

189. BRAZIL NUT

Brazil nut: (Shelled). *Bertholletia excelisa.*

Family: Myrtaceae.

Food Value per 100 g. approximately[1]

Carbohydrate	3.7 g.	Potassium	760 mg.
Protein	13.8 g.	Magnesium	411 mg.
Fat	61.5 g.	Copper	1.10 mg.
Calcium	176 mg.	Chlorine	61 mg.
Phosphorus	592 mg.	Digesting Time	3 Hrs.
Iron	2.82 mg.	CALORIES	600
Sodium	1.5 mg.		

Brazil nuts are extensively grown in Brazil. The lofty tree also grows throughout tropical America. In India Brazil nuts

are grown in southern parts of Kon kan[3]. The fruit is spherical and measures about 6 to 7 inches in diameter, having very hard shell. Inside the hard shell there are about 18 to 24 triangular wrinkled seeds. These seeds are known as Brazil nuts.

Brazil nuts are rich in fat, protein and phosphorus. Nuts are laxative, and are useful in constipation, piles. They are used in confectionery.

REFERENCES

1. McCance and Widdowson, *Med. Res. Council* Report No. 235, (1942).
2. Annadale, C., *Concise Dictionary*, p. 80, (1897).
3. Nadkarni, K. M., *Indian Materia Medica*, p. 196, (1954).

190. BUTTER-NUTS

Food Value per 15 g. approximately*

Carbohydrate	4.1	g.	Fat	7.2	g.
Protein	3.5	g.	CALORIES	88	

Butter-nuts are native of North America and Guiana.

*Antia, F. P. 'Clinical Dietetics and Nutrition,' p. 520, (1966).

191. CASHEW NUT

Cashew nuts: *Anacardium Occidentale:* (B.N.); *Sophar:* (Sans.); *Kaju:* (Hindi, Urdu, Dak.); *Geru-pappu:* (Kan.); *Badam-e-farangi:* (Pers.); *Jedipaka:* (Tel.); *Mundirappa-ruppu* or *Tidine:* (Tam.); *Pariyangiyandi* or *Kappalasera:* (Mal.); *Lanka-ambermangi:* (Mar.); *Khaja:* (Punjabi); *Hijli-badam:* (Beng.).

Family: Anacardiaceae.

Zodiac: Leo.

Food Value per 100 g. approximately

Carbohydrate	22 g.	Vitamin B_1	632 mcg.
Protein	18 g.	Vitamin B_2	189 mcg.
Fat	45 g.	Niacin	1.1 mg.
Calcium	49 mg.	Oxalic acid	318.4 mg.
Phosphorus	455 mg.	Digesting Time	3½ Hrs.
Iron	5 mg.	**CALORIES**	952
Vitamin A	98 I.U.		

Constitution: Hot and Wet.

Physiopharmacology and Therapeutics

(See Cashew-apple).

Roasted cashew nuts are nutritive, fattening, and aphrodisiac. Eating a handful of roasted cashew nuts with *jaggery* is a cheap source of proteins and minerals. Cashew-nuts are used as snacks in foreign countries. Nuts can be salted and made tasty by smearing red chilli powder. Excessive use of cashew nuts causes indigestion due to high fatty acids, elevates oxalic acid, and cholesterol in blood, hence care must be taken by persons who are suffering from diabetes, high-blood pressure, liver disorders, gastric ulcer, obesity, uric acid diathesis and urinary stones etc. It is noted that eating roasted cashew along with 2-3 cloves of *fresh garlic* once daily for 8-14 months regularly produces remarkable changes in leprosy, particularly the nodules become small. This effect needs further research to find the relationship of cashew and *garlic* in *Hansen's disease*. Eating cashew nuts with *honey* early in the morning increases memory, thickens semen and increases its retentivity. Nuts can be packed in cellophane bags or vacuum tins[9,10,11].

A kind of acrid irritant oil can be extracted from the shell of the nuts. It is used externally to cure leprosy, warts, corns, ulcers, psoriasis and ringworm.

Cashew nut oil is bland and edible. Its application to skin allays itching and burning sensation, alleviates pain and irritation caused by dry skin and exposure to cold winds.

Bark

Cashew-bark is irritant therefore, its fresh juice can be applied as a rubefacient to cure leprosy, ringworm, chronic ulcers, corns etc. Cashew-root is used as a purgative[1,8].

REFERENCES

1. Dastur, J. F., *Medicinal Plants of India and Pakistan*, p. 19: (27), (1962).
2. Shankar, J. V., *et al.*, *Home Scale Preparations of Fruits and Vegetables*, C.F.T.R.I. Mysore, 4th Edn. (1962).
3. Pandit Ganga Parshad, *Anubhoo Chikitsa*, Ajmeer, (1908).
4. Raj Nighāntoo, Sans. Mss. Oriental Library, Mysore.
5. Shree Bhavoo, *Bhavaprakash*, Sans. Mss. Pandit Gulabsing, Mandi Mohalla, Mysore.
6. Hakeem Ibn-e-Betar, *Tazkiratul davooda antakee*, (Arabic Mss.).
7. Dutt, O. C., *Hindu Materia Medica*, (1909).
8. Prof. Mathur, R. C. *Systematic Botany*, p. 236, 2 (1965).
9. Vidyasagar, K., *Studies of the Storage of Packed Rations* (Cashewnuts). *Food Science and Technology*, p. 59, Vol. III, No. 2, July (1966).
10. Pearson, D., *The Chemical Analysis of Food*, p. 408, J. and A. Churchill, London (1962).
11. Winton, A. L. and Winton, K. B., *Analysis of Food*, p. 528, John Wiely and Sons, London (1958).

192. COCONUT

Coconut: *Cocos nucifera:* (B.N.); *Tirnarāpa* or *Sadaphala:* (Sans.); *Narial:* (Hindi, Urdu, Dak.); *Thengina kai:* (Kan.); *Nargil:* (Arab.); *Joze-Hindi:* (Pers.); *Theng:* (Tam., Mal.); *Doonghi:* (Sindhi); *Narikel:* (Beng.); *Koparaha:* (Pashtu.).

Family: Palmae or Palmaceae.

Zodiac: Aries.

Food Value per 100 g. approximately

Carbohydrate	13 g.	Vitamin A	Trace
Protein	4.5 g.	Vitamin B_1	45 mcg.
Fat	41.6 g.	Vitamin B_2	100 mcg.
Calcium	11 g.	Niacin	0.8 mg.
Phosphorus	240 mg.	Vitamin C	17 mg.

Iron	2 mg.	Sodium	17 mg.
Copper	0.32 mg.	Potassium	426 mg.
Chlorine	114 mg.	Digesting Time	3½ Hrs.
Magnesium	52 mg.	**CALORIES**	**445**

Essential Amino acids (g/100 g. Protein)

Arginine	12.1	Histidine	1.7
Isoleucine	4.5	Leucine	6.7
Lysine	3.8	Cystine	1.6
Methionine	4.3	Phenylalanine	4.3
Threonine	3.2	Tryptophan	0.8
Valine	5.3		

Constitution: Hot and Dry 2°.

Mythological background of coconut tree

According to HOLY VEDAS, coconut tree is named as KALPA-VRIKSHA or *The tree of Heavens*. It is believed that LORD VISHNU, the most charming God of Hindu mythology, the protector of the entire universe, when came on this beautiful earth, He brought three protecting Gods with Him. They were: Universal Mother LAKSHMI as His beloved wife, KAMA-DHENU a wonderful Divine cow that had the boon to give anything you desire and KARPAGAVALLI or the *Coconut tree*. ~~It~~ means giver of all *health, energy, strength, tranquillity, longevity* and *peace*.

From ancient times, *Dravadians* in South India, also considered coconut tree as very sacred and auspicious. They named this tree as *Tennam-pillai*. It means that coconut tree should be carefully tended like your own son.

Coconut tree grows luxuriously along the entire coast of the sea and it thrives well in loose sandy soil. Its age varies between 120 to 200 years. Among all the trees that grow on the earth, it is believed that coconut tree is endowed with a wonderful sense of understanding human voices and it is observed that coconut tree grows better in school compounds where children play, sing and scream in their innocent shrill voice.

Coconut tree is a boon to mankind for, it supplies all the bare necessities of the man. It is interesting to read a passage from the book *Vegetable world* by *Lois Figuier*, page 304: 'Imagine a

traveller passing through one of these countries situated under a burning sky; panting and despirited, the poor traveller at length perceives a hut surrounded by some trees. He sees no cultivated lands except some coconut trees around the hut. He is soon beneath the hospitable roof. His host offers him drink and repast with various dishes. The astonishing traveller asks who in this desert country furnishes him with all these things. 'My coconut tree was the reply'. 'The drink I presented you with on your arrival was drawn from the fruit before it is ripe, and some of the nuts which contain it weigh 3 or 4 lb. This kernel so delicious and delicate in its flavour is the fruit when it is ripe. This milk which you find so agreeable is prepared from the kernel. The cabbage whose flavour is so delicate, is the top of the coconut which we rarely regale ourselves with the delicacy, for the tree from which the cabbage is cut dies soon after. The wine with which you are so satisfied is furnished by the coconut tree. The sap has supplied the sugar with which these sweet meats are made. The vessels and utensils have been made out of the shell of the nut'.

'Nor is this all: I entirely depend on these invaluable trees for my habitation. With this wood my cabin is constructed. These leaves dried placed form the roof. Made into an umbrella they shelter me in my walks. The clothes that cover me are woven out of the fibres of their leaves and fruit. These mats that serve so many useful purposes are produced by them also. The sifter which you see was ready made to my hand in that part of the tree whence the leaves issue. With these same leaves woven together we can make sails for ships: The species of fibre that envelops the nut is preferable to tow ship. It does not rot in the water and it swells in imbibing it. It makes excellent string and all sorts of cable and cordage. Finally the delicate oil that has seasoned many of our dishes, and that which burns in my lamp is expressed from fresh kernels'.

Dr Henry Wharton says, that the beautiful coconut palm benefactor of mankind has stood the test of time against many ravages of nature. He writes, 'There are some 1200 species of palms. Among them the most beautiful and most widely spread palm is coconut tree. It is true that the date palm is an important source of food to the Arabs but it has no such general

distribution'. With all these uses coconut tree is aptly called as a tree of Heavens by our wise ancestors.

The Fruit

Coconut varies in size and colour and bear in clusters in the form of bunches hanging from the top most stem. Each bunch bears about 20 to 30 fruits and there are four to five such bunches. When the fruit is tender it is yellowish pale-green and as it begins to ripe, turns into light brown and falls off its own.

The fruit is enveloped with a fibrous mass under which there is a horny shell that hosts the kernel or endosperm and water.

Since coconut is a fruit of a heavenly tree, it has held a very high place in all religious ceremonies. It is offered as a token of devotion while celebrating puja in the temple of various deities. Particularly breaking a coconut in front of the passage of *Anjaniah Swamy's* temple is considered as very auspicious. ffering a coconut to every guest during marriage ceremonies is nsidered as a sacred gift bringing heaps of blessings to the newly d.

nel

Kernel or the endosperm is found attached beneath the shell. s this fleshy portion that is largely consumed as food. Mostly .s used in the preparation of various curries and sweetmeats.

Ke Besides the various food components, kernel is chemically tified with various enzymes like: *Lignin, Investin, Oxydase, Catalase, Monitol,* (coconut sugar), *Albumin, Tartaric acid* etc.

Jelly like kernel of the tender coconut is free from fibres and get easily digested without leaving any residue. Therefore, it can be safely given to children in the form of mash with *bananas* and *milk*. It can also be safely given to persons suffering from indigestion, gastric ulcers, stomach cancer, colitis, typhoid, hepatitis, jaundice, diarrhoea, dysentery, piles and after surgical operations. It is an useful food for diabetics, because it does not contain fat and starch. Applying the tender kernel over the ulcers, imparts a cool sensation and heals them quickly. Massaging the fresh kernel over the face daily, cures pimples, prevents early appearance of wrinkles and keeps ones face flower fresh.

Ripe kernel is rich in fat but deficient in carbohydrate. Even though it is a high calorie food that supplies about 445 calories per 100 g., its moderate use in the form of desiccated coconut mixed with wheat flour from which chapaties are prepared serve as a valuable food for diabetics who are taking regular treatment. Author has been using coconut in this form in all the diabetics without any harm and complication. He usually advices them to use a handful of grated coconut once in four days.

Cancer and Coconut

Author observes that persons who chew coconut along with betel leaf and areca-nut rarely suffer from any cancerous growth in their mouth. He happens to examine one of his friends from Northern India. He is the religious head of an institution and is about 42 years old. He eats *pan supari* with *tobacco* at least 20 to 25 times daily and he is addicted to this from 30 years. After examining him carefully the author found nothing abnormal except discoloured teeth. It is confirmed that he never eat[illegible] the leaves unless the mixture is mixed with a piece of fresh coconut kernel. After this tip, author examined number of persons who either had the family history of cancer or who were addicts to tobacco and *pan supari* and found that those who regularly chewed dry or fresh coconut kernel were free from any sign of cancer in spite of excessive use of *pan supari*. This author believes that either the coconut has natural *radium* or *cobalt* which prevents the cancerous effect or the oil may protect the mucus membrane of the cheeks from constant irritation. He wonders, if some scientist doing research in cancer can try this tip and do some research and find how coconut prevents the development of cancer.

Milk of the kernel forms a very valuable food for children who are suffering from protein deficiency, rickets and abdominal tuberculosis. It can be safely given as a regular feed by mixing it with tender coconut water. It is an excellent liquid food for aged persons.

Coconut milk mixed with a tablespoonful of *poppy seed milk* and pure *honey* one tablespoonful; taken every night before going to bed is an effective medicine for dry cough due to throat irritation or due to excessive smoking, chest pain without any alarming cause, diarrhoea and dysentery.

A glassful of coconut milk taken early in the morning followed with an ounce of *castor oil* after three or four hours, is found to act excellently in eradicating the tapeworm.

Chewing a piece of fresh coconut along with *jaggery* is an excellent sweet-meat for children. It hardens the gums, prevents dental caries and halitosis.

Externally, fresh coconut milk is applied with glycerine as a cosmetic to whiten the complexion, cure chopped hands and soles.

Desicated fresh coconut is a boon in trauma. It is fried and fomented on the injured part with excellent results. It is always remembered that any injury however simple should it be, great care of a surgeon is required, therefore, after using fried grated kernel as a first aid, the patient should be moved to the nearest hospital.

ry kernel or Copra

Dry kernel is sweet and contains more fat. It contains *Sodi-30 mg.* and *Potassium 700 mg.* per 100 g.

Chewing dry kernel along with sugarcandy is an effective medicine for ulcerative stomatitis and glossitis due to B-complex deficiency with all these benefits and uses, God has provided us food and medicine in one fruit in the form of coconut.

Tender Coconut water or (Eleneer)

Chemical composition[1]

Carbohydrate	4 g.	Vitamin C	2 mg.
Protein	0.1 g.	Sodium	50 mg.
Fat	0.1 g.	Potassium	600 mg.
Calcium	20 mg.	Magnesium	80 mg.
Phosphorus	10 mg.	Chlorine	100 mg.
Iron	0.7 mg.	**CALORIES**	**17**

pH value of is 5.6 and the other nutrients present in tender coconut water[1].

Glucose	2.1 per cent	Fructose	3.8 per cent
Insulin	152 mg. per cent	Proteins	180 mg. per cent
Potassium	49 mEq. per litre	Magnesium	17 mEq. per litre
Chloride	62 mEq. per litre	Phosphate	8 mEq. per litre
Sulphate	5 mEq. per litre		

Medicinal uses of tender coconut water

In India, tender coconut water is used as a cooling medicine and as a most sacred and pure water from vedic period. Even to day, it is offered as a *Sacred water* or *Tirtha* in the temples and the water is used to bathe the Deities. Every one knows the cooling value of tender coconut and a *lemon* all over India. Tender coconut's water is drunk daily during summer as a most refreshing and cooling drink. The water is pleasantly sweetish-salt, and leaves a feeling of complete satisfaction from thirst.

Tender coconut water contains a very high concentration of potassium, and chlorine in sterilized water. Its use during the treatment of heart, liver and kidney disorders, general dropsy, scanty urination, toxaemia of pregnancy, B-coli infection, albuminuria, high acidity of urine, gonorrhoea, and as an adjuvant in the treatment with salicylates, sulphonamides and wherever sodium is contra indicated, is found effective with very gratifying results. It is the cheapest food diuretic that protects from the bad effects of excessive use of oral chlorothiazide diuretics. *In kidney failure, tender coconut water should be very carefully given under the strict supervision of a physician.*

The author is using tender coconut water in the treatment of various diseases with very effective results. Particularly, tender coconut water with fresh *lime juice* is a boon to infants, children and adults, to cure dehydration. Giving a teaspoon at a time every ten minutes not only quenches thirst but also restores the electrolyte balance in infants and children where emergency saline transfusion facilities are not available.

For vomiting in children due to ascending of a roundworm in the stomach, tender coconut water with *lime juice* is a specific medicine. Parents are afraid of giving tender coconut water to infants and children. It is assured that there is no harm in giving 4 to 6 ounces of tender coconut as a routine food to every infant after the third day of birth. Mixing tender coconut water instead of plain water in milk, not only nourishes the child, but also prevents the curdling of milk in the stomach and prevents vomiting, constipation and indigestion. Tender coconut water in which a well ripe banana is mashed can be regularly given as a perfect food instead of milk. Children grow healthier by regular use of this food.

Tender coconut water in cholera

Cholera is a very serious infectious disease in which the cholera germs enter our digestive tract along with contaminated food and drinks and cause inflammation due to which severe diarrhoea and vomiting occurs. Severe loss of water and other key minerals like potassium and sodium, due to diarrhoea and vomiting, a state of dehydration sets, and one dies of acidosis and shock.

Tender coconut water 8 to 12 ounces mixed with a teaspoonful of fresh *lime juice* administered orally is well tolerated by the patient and rectifies the electrolyte balance neutralizing the acidosis of the blood. Author has been using tender coconut water and lime juice along with *Terramycin* pfizer 250 mg. 1 capsule every four hourly as soon as the patient starts vomiting and passing ɔose stools.

During the recent outbreak of cholera Eltor epidemics in ore, in March 1968, the author treated number of acute era cases with *tender coconut water, lime juice* and *Terramycin mg. 1 capsule* every 4 hours with gratifying results. Supple- ing *Furoxsone* Smith Kline and French 100 mg. 1 Tablet tender coconut water 8 to 12 ounces four hourly, is also d to be effective in early stages of cholera. Researchers at ool of Tropical Medicine confirmed and announced: 'In view the potential hazard of the intravenous administration of ssium salts under epidemic conditions efforts were directed he school to establish a practical and economical oral potas- n repletion regimen.'

'Green coconut water is a known source of potassium rich fluid and since cholera patient can almost invariably ingest oral fluids following initial correction of *shock* and *acidosis*, the experts suggested imbibing of *coconut-water* as a *must* for cholera patients' (J. Indian Med-Assoc. 45, 343, 1965. IJ. of pharmacy, Feb. 1966. Capsule No. 9, December pp. 136-37, 1967).

Tender coconut water as a substitute for normal saline

Tender coconut water transfused directly from the nut is used by the author with excellently good results. After the intensive clinical research and careful investigation the author

claims that running the fluid at the rate of 20 to 25 drops per minute by inserting the sterilized transfusion set after painting the chopped portion with tincture iodine helps the fluid to pass through transfusion filter and reduces the risk of needle block. It is found that about ¾ part of the water is sufficient for a person who is 50 per cent dehydrated. It is advised that tender coconut water transfusion should be restricted only in emergency and should not be repeated as suggested by IQBAL, because of the probabilities of the formation of antibodies. IQBAL, EISEMAN and GOLDSMITH have also clinically tried and found that tender coconut water can be safely used as a substitute for normal saline in dehydration caused by various gastro-intestinal disorders. It is more economical and aptly said 'If all the claims made for two substitutes proves uniformly good as expected, the common man will find that he will have to pay very much less for medicine and drugs.'[2]

Tender coconut water in infections

All infectious cause fever and due to high body temper: various biochemical functions of the body get impaired. T coconut water being rich in potassium and other minerals a major role to increase the urinary output and helps the elir tion of sulpha drugs and other antibiotics that are usually adm tered during infections. Also, this mineral water aids the q absorption of the drugs and makes their peak concentratio the blood easier by its electrolytic effect. This quick disp of the drugs leaves a lethal effect on the micro organisms cures the disease earlier with low doses of drugs. Tend coconut water can be safely given in typhoid, colitis, smal pox, chicken-pox, measles, dysentery, diarrhoea, diphtheria, pneumonia, bronchitis, nephritis, cystitis, general toxaemia of pregnancy and after major surgical operations.

Tender coconut water as a cosmetic

Washing the face daily with tender coconut water is an excellent medicine to cure pimples, black heads. Its regular use prevents the early appearance of wrinkles on the face, dryness, and takes the care of complexion.

Mix a teaspoonful of *turmeric paste* in a glassful of tender coconut water and set it overnight. Then add *Red-sandal powder* 3 teaspoons, and stir the ingredients well. Leave the mixture undisturbed for 3 days. Then strain the liquid through three folded layers of fine muslin cloth. Preserve this liquid in a clean bottle and apply freely twice daily over the face and see how the lovely face blooms with beauty. It is preferable to cheap snows and other cosmetics.

Drinking tender coconut water mixed with a tablespoonful of *honey* is a very effective and cheap nerve tonic. It stimulates sex centres and prevents the bad effects of sexual indulgence. It is a medicine for chronic bronchitis, constipation and piles.

Fresh kernel is ground with a glassful of tender coconut water with *sugarcandy* and one *cardamom* is given once daily to cure chest pain, dryness in the lungs due to working in dusty atmosphere, hiccough, insomnia, gastric ulcer etc.

A handful of *raw rice* is soaked in tender coconut water in its own shell until it is fully fermented. Then the rice is ground into fine paste and applied daily for three to four days as a medicine for chopped hands, soles, pimples, dry itching, eczema, discolouration of skin etc., with excellently good results.[5]

Tender coconut water mixed with a pinch of *turmeric powder* and equal quantity of *lime water* (Calcium hydroxide) is applied as a very soothing dressing for burns, scalds and burning sensation in the soles and palms[5].

Coconut oil: (*Oleum cocois B.P.*)

Coconut oil is extracted from fresh as well as dry kernel of the fruit. It looks pearl-white when it is solid at low temperature. It melts quickly and looks pale-yellowish in colour. It contains a peculiar coconut smell, which becomes more on exposure the air. Refined coconut oil is free from any colour and smell. Such vacuum refined coconut oil like: *Cocovite* is recommended for all indications of coconut oil[6].

Pure coconut oil contains *Caprilic, lyric-myristic,* and *palmitic acid.* It also contains *trimyristin, tristerin, tripalmitin* and *triolein.* It is soluble in alcohol, ether and chloroform. It forms soaps on mixing with alkalies. *Marine soap* is prepared from coconut oil[7].

Uses of coconut oil

Refined coconut oil is mostly used in the manufacture of vegetable ghee, margarine[8]. It is an ideal cooking medium for all dishes like: chapaties, puries, bhajis, dhoklas, vegetables, sweet-meats, omlets, cutlets, salad etc. Refined coconut oil does not cause any indigestion due to the removal of indigestible free fatty acid, that is commonly found in all common edible oils. It does not fume, does not foam, does not froath, and does not lose its flavour at high temperature[6]. It has been used as a substitute for *butter* and *Cod-liver oil*[7]. It can be moderately used by high-blood pressure diabetic and obese persons.

Coconut oil is externally applied as a very emollient substance. Its daily application mixed with few drops of fresh *lime juice* and equal quantity of *lime water* (Calcium hydroxide) forms an effective beauty aid. Its application over the face every night cures pimples, bleaches and nourishes the skin, prevents dryness, early appearance of wrinkles, cleans the tiny pores, and helps the skin to breath normally. The same applied over the chopped skin, cracked nipple, napkin rash, helps them to heal quickly.

Daily application of refined coconut oil mixed with *lime-water* and *lime juice* on the hair, prevents hair fall, and lengthens the hair. It gives a brilliant look to the hair. Snow white cream can be prepared by rubbing the mixture without lime juice. It looks like *Brylcream*, and can be used instead of this noted hair dressing.

Applied over the skin, the pure coconut oil quickly absorbs into the skin, therefore, it is an ideal base for medicated ointments. Mixed with equal quantity of *pure cow's butter* is daily massaged over the body of a child and exposed to morning sun, helps him or her to grow strong and healthy. Application of coconut oil over the newly born infant, helps to remove the adherent matter from the body, prevents its body-heat and bad effects of exposure to cold winds.

A *garlic clove* and a *clove* is roasted in coconut oil until they turn brown. Few drops of this medicated oil is put in ears as a specific folk-medicine for ear-ache due to exposure to cold[9,11]. (It is advised that treating acute ear infections with home

remedies should be avoided to prevent serious infection like otitis media, mastoiditis etc.)

A piece of *onion* is roasted in coconut oil, and few drops are put in both the nostrils without inhaling air through nose, to relieve nasal congestion due to cold. Care must be taken to prevent oil inhalation. Oil in the lungs causes serious complications.

Equal quantity of fresh *jasmin leaf juice* with coconut oil, and a teaspoonful of *mustard seeds* per 2 ounces of the mixture is heated until the watery content is evaporated. Its daily application over the shaft of the penis for a couple of months, develops the under developed organ, strengthens and hardens it by letting more blood and retaining it in large quantity when it is in erection. It is warned to avoid glans manipulation with hand which develops the habit of masterbation. The oil massaged over the breasts makes them firm[9,10,11].

Burning coconut oil in lamps gives a smokeless flame, emits cool light and protects the eyes from getting refractive errors.

Application of unrefined coconut oil over the glans and internal vaginal canal before conjugal union, acts as an effective contraceptive. Addition of a pinch of *alum* or *common salt* before the application of oil increases the contraceptive effect. A tampoon dipped in coconut oil inserted in the vagina is also a more effective aid than mere oil smearing. It is about 95 per cent safe and a cheap method. Oil also helps as a lubricant for dry vagina and pain during intercourse.

Pure coconut oil mixed with a pinch of *turmeric powder* is applied to cure vaginitis, caused by mild fungus infection. (For severe fungus infection like: *trachomanas, monalia* etc. *Flagyl* (*M & B*) 1-3 tablets per day, given orally is found to be a specific medicine. *Gyno-sterosan* (Geigy) *S.V.C.* (*M & B*) are some of the potent local vaginal tablets inserted twice daily in such gynaecological disorders).

Coconut flour: Nutritive value of coconut flour is prepared by *Azotropic process* from the fresh kernel at C.F.T.R.I., Mysore. This product is found to be a very effective and a cheap substitute for A class proteins and various edible preparations

such as, *coconut meal, coconut flakes, coconut protein concentrate* can be made from coconut flour. (Rama Rao *et al., J. Food Science and Technology*, Vol. 1, No. 2, pp. 23-25, July 1964).

Coconuts can be preserved by treating them with *lime* to avoid contamination with fungus. This process helps better yield of unspoiled kernel, good quality oil and softer fibre. (Subrahmanyan, V. *J. Food Science*, p. 113, Vol. 3, No. 3, Oct. 1966).

Flower

Helping an unborn infant to make it more beautiful is really a difficult problem but one can confidently try this method and confirm how simple and effective it is.

The would be mother is advised to act as follows:

1. As soon as you know that you are blessed with a new life, thank God for having given you a most wonderful treasure in the world that one has.

2. If this bounty is the first one, you must not worry, because you may experience new feelings like: nausea, vomiting, tiredness etc., during the first three months. These are only temporary symptoms which can be controlled by taking *siquil* (squibbs) 5-10 mg. 1 to 2 tablets daily or a teaspoonful of *Pyrovin Elixir B.P.W.* 3 times daily under the guidance of a physician.

3. Have plenty of rest, eat fresh fruits, vegetables and drink *milk with honey* liberally. May be you are weak, for which take *Gevral* (Lederle) or *Netabec* (*P.D.*) 1 capsule 2 times daily during the entire months of pregnancy.

4. Regular checkup by a physician is always a safe guide during this blessed time.

5. From the beginning of the third month, *drink a glassful of unfermented juice of coconut flower Spike* (the one that is used as a sacred offering in the marriages), *with a teaspoonful of honey and lime-juice once daily until the end of 34 weeks of pregnancy.*

6. Psychologists believe that right thinking, living in beautiful surroundings, moderate exercise and regular daily prayer to God, also plays a very vital role in moulding the new infant most harmoniously.

The author has been using this medicine from several years in a number of patients with excellently good results. Some physicians[10, 11, 18] use only the plain juice of the spikes. But addition of *honey* and *lime juice* enhances the effect of this medicine.

Coir

The fibre from the husk that envelops the coconut shell is known as *coir*. It is a very useful product for making numerous useful articles like: ropes, mats, carpets, upholstery, saddles and hard boards.

Ash of coir, particularly the fine one that envelops the shell contains styptic properties. It is therefore used with *tender coconut water* and *sugarcandy* in ½ to 1 teaspoonful doses once or twice daily as a medicine to cure excessive menstrual bleeding in young girls, bleeding piles, excessive thirst during summer, bilious vomiting, excessive acidity in the stomach, gastric ulcer, hiccough etc.

A cupful decoction of the coir given with a teaspoonful of *honey* is used with gratifying results to expel round and tapeworm. Adding *lime juice*, *dry grape seeds*, *cardamom* and a pinch of *table salt* to the infusion of the coir is used as a folk-medicine in morning sickness.[5]

Shell

The shell of the coconut is hard and light brown in colour. It can be used for decorative purposes after washing it with *washing soda* and then rubbing it with coconut oil. This process gives a black shade to the shell. Shell is used as a cheap fuel for cooking and gas engines. The cup like shell is used for varieties of domestic uses, such as: bowels, ladles, hooka, etc. Painted lacquered inlay work with metal, fancy ornaments like: bangles, buttons, tea sets, spoons, rings are beautifully made from shell[12]. It is a home industrial product in Kerala.

Oil extracted by burning a coconut shell in a *copper vessel* is used as a specific medicine to cure ringworm, eczema, etc. It is daily applied over the affected part for a fortnight[9, 10, 11].

Burnt shell-powder mixed with *salt* and *pepper* is an excellent dentifrice. A teaspoonful of the fine powder taken immediately after meal with butter milk, acts as a remedy for fermentive dyspepsia and stops the excessive formation of gas, cures diarrhoea, dysentery and antidotes the poisonous effects of corrosive poisons.

Coconut Toddy

The juice drawn from the upper part of the trunk of the tree by incising a hole in it and the liquid is collected in a earthen vessel. It is fermented and known as *coconut toddy*. It contains about 5 to 8 per cent of alcohol and some B-complex factor with yeast and sugar. Like other alcoholic beverages, it causes intoxication if drunk in excess. It is a very effective digestive enzyme-tonic and causes excessive secretion of the urine, dissolves urinary gravel and flushes the kidney from harmful uric acid. The toddy mixed with rice flour and boiled to make the paste is applied over the chronic foul smelling ulcers which refuse to heal and have the tendency to become gangrenous.

The unfermented juice is an effective diuretic-tonic for acute gonorrhoea, cystitis, pyelitis, nephritis, scanty urination, congestive heart failure, loss of weight, tuberculosis, indigestion, constipation etc. The freshly drawn juice should be used before the sunrise with *sugarcandy* in the empty stomach; otherwise, it begins to ferment and becomes toddy.

Leaves

Ash of the dry leaves mixed with *coconut oil* is a very soothing dressing for all kinds of burns and scalds, but care must be taken to prevent the wounds from sepsis in all injuries however minor they are.

Stem

Ash of the stem bark contains cleansing minerals and is used as a dentifrice. It stops the bleeding from the gums, cleans the teeth, prevents the bad breath and protects the enamel of the teeth. The gauze like covering of the stem can be used as a dressing gauze after boiling it in the water or disinfecting it in Dettol. It araetes the wounds and helps to heal them quickly.[5]

Roots

Decoction of the roots is gargled in toothache. It strengthens the gums and loose teeth.

Sleeping under the coconut tree is said to prevent tuberculosis, hysteria, insomnia and mental tension.[10,11]

REFERENCES

1. Eisemar., B., *Intravenous infusion of coconut water, Arch. Surg.* (Chic.), 68, 167, (1962). Antia, F. P., *Clinical Dietetics and Nutrition*, p. 254, (1956).
2. Health. (Madras), *Coconut-water instead of glucose Saline for infusion*, p. 130, June (1966), Vol. 44, No. 6.
3. Iqbal, Q. M., and Sven Hinderaker, *Coconut-Milk infusion Capsule*, (Bombay), p. 159, Feb. (1967), Vol. V, No. 10.
4. Goldsmith, H. S., *Coconut-water for intravenous therapy, Brit. F. Surg.*, 49, 421, Antia, F. P., *Clinical Dietetics and Nutrition*, p. 256, (1966).
5. Pandit Shiva Kumar Swamy, *Arogiya Darpana* (Kan.) 3rd Edn. pp. 175-78, (1965), Bangalore.
6. Cocovite *The Bombay Oil Industries*, Bombay 10.
7. *British pharmaceutical codes*, pp. 687-88, (1911).
8. Desikachar, N., *Coconut products, Indian Coconut Journal*, 5, 101, (1952). Antia, F. P., *Clinical Dietetics and Nutrition*, p. 254, (1966).
9. Majeed, S. A., *Mujerebath-e-Majeed*, Pers. Mss. (1929), Sira.
10. Hakeem Mahaboob Ali Khan Bakshi, *Random Notes*, Urdu Mss., (1957), Mysore.
11. Hakeem Rasool Sahib, *Random Notes*, Urdu Mss., (1920), Mysore.
12. Dastur, J. F., *Useful Plants of India and Pakistan*, pp. 182-84 (97) 3rd. edn. D. B. Taraporwala, Bombay.
13. Nadkarni, K. M., *Indian Materia Medica*, (1954).

193. CHESTNUT

Chestnut: *Aesculus-hippocastanum:* (B.N.); *Chota-Akhrot:* (Hindi).

Family: Hippocastanaceae.

Zodiac: Sagittarious.

Food Value per 100 g. approximately

Carbohydrate	32.9 g.	Vitamin C	646 I.U.
Protein	2.3 g.	Sodium	10.9 mg.
Fat	2.7 g.	Potassium	497 mg.
Calcium	46 mg.	Magnesium	33 mg.
Phosphorus	74 mg.	Copper	0.23 mg.
Iron	0.89 mg.	Digesting Time	3 Hrs.
Chlorine	15 mg.	**CALORIES**	**350**
Vitamin B_1	90 I.U.		

Constitution: Hot and Dry 2°.

Physiopharmacology and Therapeutics

Chestnut tree is cultivated in N. India and its fruit is consumed as a nutritious food. Among all the nuts, chestnut is the only one that is rich in more carbohydrate. Eating chestnuts regularly cures piles by reducing the engorgement of portal vein. Extract of the leaves is used in whooping cough. (Prof. R. C. Mathur).

194. COBNUT

Cobnut

Food Value per 100 g. approximately

Carbohydrate	3.3 g.	Vitamin B_1	200 I.U.
Protein	9 g.	Vitamin C	300 I.U.
Fat	36 g.	Sodium	1.4 mg.
Calcium	44 mg.	Potassium	345 mg.
Phosphorus	229 mg.	Magnesium	56 mg.
Iron	1.06 mg.	Copper	0.21 mg.
Chlorine	5.9 mg.	**CALORIES**	**345**

Cobnut is not freely available in India.

195. CUDPAHNUTS or ALMONDS

Cudpah-Almonds: *Buchanania latifolia:* (B.N.).

Chironji: (Urdu); *Piyala:* (Hindi); *Hubulsimmna:* (Arab); *Naqāl Qhuaja:* (Pers.); *Charolee:* (Guj.); *Piyal:* (Beng.).

Family: Anacardiaceae.

Zodiac: Cancer.

Constitution: Hot and Wet 1°.

Physiopharmacology and Therapeutics

Chironji trees grows wildly in Burma and Indian jungles. The wood of the tree is hard and redish in colour and its inner core is black. *Leaves* are rough and measure six to ten inches long. *Flowers* are greenish-yellow and bear in white clusters. *Fruits* are purple like Zyzyphus Jejuba. Inside the fruits there are two portions in which the small brownish coloured seeds resembling *Tour dhal* are found.

Chironji is used instead of almonds. It is nutritive and increases body weight and stimulates sex centres. Its oil can be used as a substitute for *almond oil.* It is used in sweetmeats and betel-nut mixture.

Pulp of the fresh fruit is applied over face as a beauty aid. It bleaches skin and cures pimples. Gum of the stem is used as a medicine to cure diarrhoea (Prof. Mathur).

196. FILBERT NUT

Filbert nut: *Pinus longifolia:* (B.N.); *Chalguza:* (Urdu); *Saladhup:* (Hindi); *Habe-Sanober:* (Arab.); *Tukme-Sanobar* (Pers.).

Family: Coniferae.

Zodiac: Virgo.

Constitution: Hot and Wet 1°.

Physiopharmacology and Therapeutics

Filbert nut is the fruit of pinuslongi folia or long needled pine that wildly grows on high altitudes of Himalayas. Fruit is covered with a brownish red peel and the kernel is white. It contains more oil and rich in vitamin C. The nut resembles like the seed of Jamun. Kernel is used in sweets, Unani and Ayurvedic tonics along with other nuts. A handful of nuts taken every night regularly increases hunger, stimulates, strengthens heart and muscles, etc. Roasted nuts with *honey* and *milk* is a tonic medicine for paralysis, impotency, asthma, cough, bronchitis etc., and as a prevention against influenza and cold effects at high altitudes. Paste of the nuts with honey is used as sedative expectorant in chronic bronchitis.

A kind of gum that comes from the stem is a very popular Unani medicine known as *Gandha bahiroza.* It is used as a specific medicine to heal chronic ulcers, tuberculosis, bronchitis, asthma etc. *Turpentine* is distilled from the gum and the leaves and used in analgesic liniments.

197. GROUNDNUT or PEANUT

Groundnut: *Arachic hypogaea:* (B.N.); *Bhuchanaka:* (Sans.); *Mungphalli:* (Hindi); *Vilayethi mung ki phalli:* (Urdu, Dak.); *Gadhang kadle kai:* (Kan.); *Nilakadala:* (Mal.); *Bhimung:* (Mar., Sindhi); *Mandvi:* (Guj.); *China badam:* (Ori., Beng.).

Family: Papilionaceae.

Zodiac: Saggittarious.

Food Value per 100 g. approximately[1]

Carbohydrate	17 g.	Vitamin B_1	894 mcg.
Protein	27 g.	Vitamin B_2	297 mcg.
Fat	49 g.	Niacin	14 mg.
Calcium	61 mg.	Vitamin C	3 mg.
Phosphorus	422 mg.	Sodium	4 mg.
Iron	2 mg.	Potassium	700 mg.
Magnesium	181 mg.	Copper	0.90 mg.
Chlorine	7 mg.	Digesting Time	3½ Hrs.
Vitamin A	63 I.U.	**CALORIES**	**544**

Constitution: Hot 2° and Dry 2°.[2]

Physiopharmacology and Therapeutics

Groundnut plants are largely cultivated all over India for nuts that are one of the cheap items of food and are very valuable for groundnut oil. There are number of varieties, but in India, pods with two seeds are very common.

Essential Amino Acids (per 100g. proteins)[3]

Arginine	10.7	Histidine	2.4
Isoleucine	4.1	Leucine	5.1
Lysine	3.6	Cystine	1.5
Methionine	0.9	Phenylalanine	5.1
Threonine	2.7	Tryptophan	1.1
Valine	5.0		

If these amino acids are compared with fish, milk, eggs, beef, mutton, pork etc., groundnut proteins are more concentrated than these A class proteins which are more dearer than pea nuts.

Comparative food value of groundnuts

Eating a handful of groundnuts supplies as much *Protein* as one gets by eating any one of these foods:

Almonds	90 g.	Oranges	14
Fish	100 g.	Liver of sheep	75 g.
Mutton	80 g.	Heart roast	75 g.
Chicken	100 g.	Milk cow's	2½ cups
Apples	32	Milk goat's	3 cups
Bananas	12	Eggs	3

A handful of groundnuts will supply as much *fat* as one gets by eating any one of these foods:

Butter	7½ teaspoonfuls
Ghee	7½ „

Eating about 20 p. worth roasted groundnuts will supply as much *vitamin* B_1 as one gets by eating any one of these foods:

Almonds (shelled)	350 g.	(Worth about Rs 10)
Fish	850 g.	(Worth about Rs 4)
Mutton	500 g.	(Worth about Rs 3)
Eggs	21	(Worth about Rs 5)
Milk Cow's	8 cups	(Worth about Rs 2)

Groundnuts contain the high concentration of *niacin* and a handful of roasted groundnuts will supply as much *niacin* as one gets by eating any one of the following foods:

Almonds (shelled)	150 g.	Milk Cow's	6 cups
Cheese	100 g.	Eggs boiled	4
Chicken	100 g.		

Eating a handful of fresh raw groundnuts plucked from the plants thrice daily for 20 to 30 days, is found to be effective in lowering blood-sugar and high blood pressure. Author found that this hypoglycemic and antihypertensive effect is only transient.

Eating fresh roasted groundnuts with *jaggery* and *goat's milk* is a very nutritious food for growing children, during pregnancy and lactation. It builds resistance against all the infections particularly from tuberculosis, hepatitis etc. Those who suffer from chronic diarrhoea that is more frequent immediately after meals can be much benefited by drinking *goat's milk* in which a *lemon* is squeezed with a handful of fresh roasted groundnuts.

This type of diarrhoea is caused due to nicotinic acid deficiency and groundnuts supply the required quantity of niacin and cure the disease. It is also a medicine for cirrhosis of the liver due to malnutrition, alcoholic intoxication and other causes which damage the liver. It is the cheapest protein food to prevent protein deficiency in children and adults.

It is said that the father of Indian nation *Mahatma Gandhi* used to eat groundnuts with *goat's milk* daily. Persons living with a ripe age believe that the secret of their longevity lies in eating of groundnuts. The mature experience of the old and the scientific investigations led us to confirm that groundnuts are really a boon to humanity, to promote health and longevity. The author is optimistic about the nutritional aspect of India and believe that our people will be well nourished if they cultivate the habit of eating groundnuts instead of wasting them as a commercial crop for extracting the oil and feeding the nuts to the cattle.

Chewing fresh groundnuts with a pinch of *salt* strengthens the gums, cures stomatitis, kills the harmful bacteria and safeguards the enamel of the teeth. It is advised to rinse the mouth with water after eating groundnuts.

Excessive use of groundnuts causes high acidity in the body, spermatorrhoea and premature ejaculation.[2] Some persons are allergic to roasted groundnuts, particularly asthmatics are warned to abstain from eating groundnuts in excess. Groundnuts that are boiled in salted water are less harmful for such persons.

Eating raw groundnuts in excess causes hyperacidity of the stomach, indigestion, heart burn etc., therefore, liberal use of groundnuts in pylorospasm, gastritis, jaundice, is contraindicated.

Effects of eating groundnuts on capillary bleeding

The case of a girl No. 83821 O.P.D. 18.6.1965-66 Indo-American Hospital who was treated for haemophilia showed amazing effects when the author advised her to eat plenty of roasted or freshly plucked groundnuts. This eleven years old girl was suffering from haemophilia from eight years and used to bleed severely even due to minor injuries. On one occasion the bleeding from the nose was so bad, that she was rushed to K.R. Hospital and blood transfusion was given. She

was treated by a very able child specialist with Rutin, vitamin C and other blood coagulants. But still, she used to get many episodes of nasal bleeding. Since the girl was very anaemic and was in the grip of malnutrition and the economic condition of the parents did not permit her to buy the pre-digested proteins, the author put her on groundnuts along with her previous treatment. Though she did not eat groundnuts daily, but, it was noted that the frequency of bleeding reduced and in a couple of months the episodes became very less and her blood clotting time remained normal. Due to this phenomenon many other cases of mild haemophilia are treated with groundnuts with excellent results. Proper clinical study is in progress and the detailed report will be published soon.

Groundnuts in Obesity

Much benefit is seen in reducing weight by eating a handful of roasted groundnuts with a *strong unsugared tea* or *coffee* an hour before lunch time. It checks the desire to eat and reduces the weight gradually. Author has successfully treated many resistant types of obesity with *groundnut meal.* It is noted that it requires about five to six months to bring down 30 to 40 lb. of of extra weight.

Groundnuts in Diabetes

Dieting in diabetes is a very important problem. Most of the ignorant persons simply starve in fear of the bad complications of the disease, and usually suffer from malnutrition due to this restricted use of the foods. Majority of the diabetics are easy prey to infections notably; blood-boils, tuberculosis and they develop cardiovascular disorders associated with eye complications. Scientists believe that these complications are attributed to defective metabolism of *carbohydrates, avitamiosis* and *toxaemia.*

These complications can be prevented by regular use of *Insulin* and proper food as explained under Diabetes. Eating a handful of ground nuts daily by all diabetics not only prevents from malnutrition particularly the deficiency of *niacin,* but also checks the development of vascular complications, and helps one to live long with harmless diabetes.

Groundnuts in Cardiovascular disorders

Persons suffering from high blood pressure and other cardiac irregularities hesitate to eat groundnuts because of the high concentration of fat. Researchers confirm that moderate use of groundnuts have no influence over blood cholesterol and cause no harm.

Preparation of Groundnut milk

Roast fresh and good quality groundnuts in a pan and remove the shell. Remove the thin red skin covering from the beans by rubbing them and the kernels are separated.

Soak the kernel (one pound) in water for about 3 hours. Then drain off the water and grind the kernel into a fine paste. The paste is mixed with 15 cups of cold water and a cupful of clear *lime water* (calcium hydroxide). Quarter teaspoon of *Sodium bicarbonate* is also added by dissolving it in a little water to stabilise the milk. The groundnut milk is strained through a thin cloth and boiled for about five minutes. Sugar can be added to taste if desired.

Chemical composition of groundnut milk*

Food components/100g.	Cows milk	Groundnut milk
Protein g.	3.2	3.0
Fat g.	4.9	5.2
Carbohydrate g.	4.6	3.1
Calcium g.	0.11	0.11
Phosphorus g.	0.07	0.102
Iron mg.	0.2	1.47
Vitamin B_1 mg.	0.045	0.085
Vitamin B_2 mg.	0.17	0.03
Niacin mg.	0.1	1.11
Calories	75	71

* Swaminathan, M. *et al.*, 'Our Food', page 51, Table 15, (1966).

Uses of Groundnut milk

Groundnut milk can be safely used as a substitute for cow's milk in infants over 6 month's age and persons who are allergic to cow's milk. This milk is particularly useful in infants who are suffering from infantile eczema, gastro-entritis, etc. Groundnut milk is used in gastric ulcer with great benefit.

Preparation of curds*

To the freshly prepared groundnut milk add two spoonfuls of invert sugar or honey per every 4 cups of milk. Cool the milk and add a little curd and allow it to remain overnight to set. This curd can be used as cow's curd with the same nutritive benefits.

Food Value of groundnut curds per 100 g.[10]

Carbohydrate	3.1 g.	Vitamin A		140 I.U.
Fat	5.2 g.	Vitamin B_1		0.09 mg.
Protein	3 g.	Vitamin B_2		1.23 mg.
Calcium	0.11 g.	Vitamin D		20 I.U.
Phosphorus	0.10 g.	Niacin		1.1 mg.
Iron	1.7 mg.	**CALORIES**		**71**

Fear of cancer by eating groundnuts

Various reports are received that *Aflatoxin* is the most active agent that causes cancer in Liver cells in ducks, mice, trouts and rats. *Aflatoxin* is a metabolite of certain strains of *Aspergilus flavus*, which gain entry into the kernel of groundnuts during harvesting and develop rapidly due to inadequate drying. The fungus is very stable and remains unaltered even during the processing of kernels[4, 5, 6, 8].

In the light of the above statement extensive clinical trials are carried and the results are published that administration of refined groundnut oil through cutaneous, subcutaneous, intraperitoneal and oral routes did not produce any malignancy either at the site of treatment or in the remote organs of the hybrid mice. No gross lesions in livers of wistar strain rats were observed by feeding the oil[9].

PARPIA *et al.*, have formulated a cheap but effective *protein food* from groundnuts and they recommend *groundnut protein food for protein-poor countries*[10]. If liberal use of groundnut causes cancer, these responsible scientists would have not recommended the use of groundnuts. Therefore, there is no harm in eating good quality roasted nuts.

Groundnut butter

Groundnut butter is being manufactured in large scale in many Western countries as a substitute for fresh butter. It is

found to be quite effective in the treatment of *kwashiorkor disease* in children[10, 11].

Groundnut candies

Candies prepared from roasted groundnut kernels with *sugar* or *jaggery* are very common in India as cheap sweetmeats. They supply protein, calories and are used in the treatment of kwashiorkor in children. The shelf life of the candies can be extended by using antioxidants and by suitable packing[10, 12, 13, 14].

Groundnut biscuits

Groundnut biscuits prepared by adding 8 to 15 per cent of *Skim milk powder* supply 4 to 4.5 g. protein per kg. body weight have proved effective in the treatment of *kwashiorkor* in children[15, 16, 17, 18, 19, 20].

Groundnut oil (oleum Arachis B.P.C.)[7]

Groundnut oil is extracted from the groundnuts in oil expeller mills and is refined by removing the pale colouring matter and its typical smell.

Groundnut oil contains *olein, sterine, glycerides of palmitin, linolic, lignoceric, hypogaic, orchidic* acids. It melts at 28° to 30° and solidifies at 5°. It becomes rancid on exposure for a long time.

Groundnut oil is largely used in the manufacture of hydrogenated cooking medium, salad oil, margarine, soaps etc. It is used as a substitute for olive oil in gastric ulcer, constipation, etc. A teaspoonful of refined groundnut oil is given daily with gratifying results in toxaemia of pregnancy, nephritis, and other conditions associated with albuminorrhea.

A teaspoon of the refined groundnut oil mixed with equal quantity of *lime juice* is applied daily once before going to bed as a beauty aid to keep the face flower fresh. Its regular use nourishes the skin and prevents acne.

Groundnut Cake

Groundnut cake is used as a fodder. Purified groundnut cake is a nutritive substitute for rice, particularly for diabetic

persons. Its flour is the cheapest substitute for costly proteins. If persons living in poor countries eat the groundnut cake flour, malnutrition can certainly be prevented and the infections, particularly of respiratory and digestive system will be mitigated. Eating fresh green leafy vegetables, roots and tubers along with groundnut flour prevents the deficiency of vitamin A and other vitamins. It supplies iron, which also plays a major role in increasing the natural resistance against infections.

REFERENCES

1. Aykroyd, W. R., *Nutritive value of Indian Foods and Planning of Satisfactory diets*, (1963).
2. Muzaffar Hussain, *Kitabul Mufaradath*, (Urdu) pp. 488-89.
3. Swaminathan, M., and Bhagawan, R. K., *Our Food*, pp. 160-61, (1966) C.F.T.R.I., (Mysore).
4. B. M. J. *Toxic products in Groundnuts*, p. 309, (1961), Probe, Himco Bombay, p. 236, Vol. 1, No. 6, Aug., (1962).
5. Sargent, K., *et al., Toxicity associated with certain samples of Groundnut*, Nature (London), pp. 192, 1096, (1961), *Clinical Dietetics and Nutrition* by Antia, F. P.
6. Antia, F. P., *Clinical Dietetics and Nutrition*, p. 255, (1966).
7. B. P. C., (1911), p. 675.
8. B. M. J., *Carcinogen in Groundnuts*, 2, 204, (1964).
9. Gothoskar, S. V. *et al., Testing Carcinogenecity of Peanut oil*, Indian J. Med. Res. **53** (10), 975 (1965).
10. Parpia, H. A. B., *et al., Peanut Protein foods for protein—Poor countries.* J. Food Science and Technology, Vol. 11, No. 1, pp. 17-33. April, (1965).
11. Baily, K. U., *J. Trop. Paediatrics*. 9, 35, 1960.
12. Iyengar, J. R., *et al., Food Science*, 9, 43 (1960).
13. Woodroof, J. G., *et al., Food Ind.*, 22, 1356 (1950).
14. Jayalakshmi, V. T., *et al., Indian J. Med. Res.*, 49, 1130, (1960).
15. Dean, R. F. A., *Plant proteins in Child Feeding*, N.R.C. Special report, No. 279, H.M.S.O., London (1953).
16. Dean, R. F. A., *J. of Pediatrics*, 56, 575 (1960).
17. Bhagawan, R. K., *et al., Am. J. Clin. Nut.*, 11, 127 (1962).
18. Subrahmanyan, V., *et al., Ann. Biochem, Exper. Med.*, 19, 147 (1959).
19. Tasker, P. K., *et al., J. Nutr. Dietet.*, 1, 1, (1964).
20. Korula, S., *Food Science*, 11, 18 (1962).

198. PISTACHIONUT

Pistachionut: *Pistacia Vera:* (B.N.); *Pista:* (Hindi, Urdu, Dak.); *Pistasi audi:* (Mal.); *Pishta:* (Guj., Beng., Ori.).

Family: Anacardiaceae.

Zodiac: Libra.

Food Value per 100 g. approximately

Carbohydrate	160 g.	Vitamin A	238 I.U.
Protein	18 g.	Vitamin B_1	665 mcg.
Fat	43 g.	Niacin	1.5 mg.
Calcium	161 mg.	Copper	1.06 mg.
Phosphorus	430 mg.	Digesting Time	3½ Hrs.
Iron	13.4 mg.	CALORIES	623

Constitution: Hot and Dry 1°.

Physiopharmacology and Therapeutics

Pistachio tree is grown in Iran, Syria, Afghanistan etc.

Nuts are covered with a brown paper like skin and the kernel is yellowish green. Nuts are sweet nutritive, and have all the medicinal value of almonds. They are indeed a cheap substitute for almonds.

Eating nuts with *Cow's milk* and *honey* is a very effective nervine tonic. It increases memory, tones up heart muscles, builds resistance against infections. It is a very effective medicine for those who want to remain sexually virile in their oldage.

Flowers of pistachio nut are used as an expectorant in chronic bronchitis, emphysema etc. The covering of the nut is also used as a medicine to cure vomiting, stomatitis, hiccough, and constipation. It tones up the digestive system.

Nut oil is used as a medicine to expel tapeworm and the infusion of the gals is used as a gargle to cure sorethroat.

199. WALNUT

Walnut: *Juglans regia:* (B.N.); *Akhroot:* (In all the Indian languages); *Joz:* (Arab.); *Girdgan:* (Pers.).

Family: Juglandaceae.

Zodiac: Libra.

Food Value per 100 g. approximately

Carbohydrate	11 g.	Vitamin B_1	448 mcg.
Protein	15 4 g.	Niacin	1.8 mg.
Fat	64 g.	Vitamin C	600 mg.
Calcium	105 mg.	Sodium	2.7 mg.
Phosphorus	510 mg.	Potassium	687 mg.
Iron	5 mg.	Copper	0.31 mg.
Magnesium	131 mg.	Digesting Time	3½ Hrs.
Chlorine	23 mg.	**CALORIES**	658
Vitamin A	10.5 I.U.		

Constitution: Hot and Dry.

Physiopharmacology and Therapeutics

Walnuts are imported in India from Afganistan, Iran etc.

Walnuts contain a very high concentration of vitamin B_1, C, Iron and Phosphorus. Eating walnuts with *honey* prevents one from tuberculosis, insanity, impotency and sterility. Eating few walnuts after eating cheese, fish, meat and other fatty foods, prevents their indigestion. *Walnut-oil* is also used to expel tapeworm. It is applied to cure eruption caused by excoriated irritation of *anacardium oil,* (Khaliq, M. A.)

Leaves

Leaves contain astringent chemicals. Therefore, the decoction of the fresh leaves is used as a douche to cure leucorrhoea, vaginitis, pruritus etc.

Bark

Bark contains an alkaloid which is found to excite the secretion of ovarian hormones. Decoction of the bark in 1:22 dilution can

be used as a medicine to reduce the excessive secretion of breast milk, painful menstruation, primary amenorrhoea etc. It should not be used in patients who are suffering from breast or uterine cancer.

200. WATER CHESTNUT

Water chestnut: *Trapa bispinosa Roxb:* (B.N.); *Singhara:* (Hindi, Urdu); *Paniphal:* (Bengali).

Family: Pedaliaceae.

Zodiac: Aquarious.

Physiochemical characteristics of water chestnut[1]

Particulars	Under mature	Mature	Over mature
A. Physical			
(*a*) *Whole nut*			
1. Average weight of one nut (g)	9.3	11.7	13.0
2. Average volume (ml.)	9.3	11.1	12.0
3. Specific gravity	1.008	1.047	1.179
(*b*) *Peeled nut*			
1. Specific gravity	1.117	1.121	1.129
2. Total soluble Solids (%)	7	6.5	5
3. pH	6.6	6.5	6.5
B. Chemical			
Peeled nut			
1. Moisture (%)	87.9 -89.7	81.5 -84.7	66.4 -71.4
2. Ash (%)	0.4 - 0.6	0.4 - 0.7	0.5 - 0.7
3. Sugars—reducing as invert (%)	3.3 - 4.1	2.2 - 2.2	1.3 - 1.3
4. Sugars—total as invert (%)	4.0 - 4.9	3.1 - 3.4	1.8 - 2.7
5. Acidity as anhydrous citric acid (%)	0.05- 0.06	0.07- 0.08	0.07- 0.08
6. Starch (%)	2.7 - 2.7	4.8 - 5.4	8.2 -10.6
7. Alcohol insoluble solids (%)	6.7 - 7.8	10.32-14.7	18.8 -26.1
8. Ascorbic acid (vt. c) (mg. per 100 g.)	17.7 -19.8	16.3 -17.5	15.5 -16.5

Constitution: Cold and Wet 1°.

Physiopharmacology and Therapeutics

Indian water chestnut is found largely in the lakes and ponds. It is cultivated as a food-fruit all over Bengal, Bihar, U.P., Jammu and Kashmir and in some parts of Maharashtra.[2]

Angiosperm or the kernel of the nut is white in colour that is crisp and sweet. Recent researches at C.F.T.R.I. Mysore and Lucknow confirm that the kernel of the water chestnut is a valuable source of nutrition and can be canned in Brine and Tomato sauce.[1] The researches found that boiling the nut in 2 per cent *Sodium hydroxide* for ½ to 2 minutes depending on the maturity of the nut, helps the easy peeling of the hard covering of the membrane.[1]

Eating the fresh kernel of water chestnut along with *honey* twice daily, cures scurvy, bleeding piles, spermatorrhoea impotency, thinness of semen, diarrhoea with passing of blood per rectum etc. Its excessive use cause colic, therefore should be eaten moderately.

REFERENCES

1. Rodigues, R., *et al.*, *Canning of water chestnut, Food Science and Technology*, pp. 28-31. Vol. 1, No. 2, (1964).
2. Srivastawa, G. D., *et al.*, *Proc. nat. Acad. Sci.*, India, 21, (2/6), 57 (1951).

PART VI

OIL SEEDS

201. CASTOR SEED

or: *Ricinus communis:* (B.N.); *Eranda:* (Sans.); *Arandi:* li, Dak.); *Haralu:* (Kan.); *Ahuru:* (Arab.); *Bedanjeer:* .); *Amanakku:* (Tam.); *Eramudapu:* (Tel.); *Chittamanakku:* .); *Erandi:* (Mar.); *Diveli:* (Guj.); *Aranda:* (Punj.); *Verenda:* ng.).

mily: Euphorbiaceae.

ysiopharmacology and Therapeutics

Castor plant is largely cultivated in two varieties all over dia from Vedic times for the sake of the oil obtained from the eds. *Sussruta* used castor oil, ancient *Romans* and *Greek* ere also aware of medicinal value of castor oil[2]. Though castor lant or its oil is not a food, but still it is one of the most ommonly used oils all over the world as a safe purgative and emollient.

Castor Oil (*oleum Ricini* B.P.)

Castor oil is obtained by the compression of castor seeds either by heat treatment or is cold drawn.

Heat drawn oil is thick, honey coloured and contains impurities. It emits an unpleasant smell and becomes rancid on exposure to air for a long time. It can be refined by mixing the oil with powdered animal charcoal and exposed to sunlight for about 20 days. The impurities are absorbed by the charcoal and sunlight bleaches the colour. After straining through a clean cloth pure refined oil is obtained.

Cold drawn castor oil is colourless, transparent and free from smell and other impurities. In India *Swastic castor oil* manufactured by *Swastic oil mills, Bombay* has become very popular and has got equal standard of the best imported castor oil.

Chemistry of Castor oil

Castor oil is a fixed oil that dries slowly. Its specific g is 0.958 to 0.970 (B.P.). It solidifies at 10° to 18°. It is s in alcohol (1:3.5), ether, turpentine, and *insoluble* in petr ether.[1]

Chemical Composition

Castor oil contains *ricinolein* a mixture of glycerides *ric* and *iso ricinoleic acids*. Glycerides of *dihydrostearic acid tristearin* are also present.[1]

Castor oil exerts its purgative influence after it saponifies i *alkaliricinoleate* in the small intestines. It causes watery dia hoea without causing gripping or other complications, therefo castor oil is one of the safest purgatives that is used all o the world during infancy and childhood, during pregnancy a oldage. For this purpose *cold drawn castor oil* 1 to 8 teaspoc according to age is given mixed with warm milk. Adults c take castor oil early in the morning with *lime juice* to preve nausea and vomiting. A teaspoon of the castor oil mixed wi *tea decoction* given once in the beginning of dysentery is found be a very effective medicine. Repeated use of castor oil as laxative should be avoided as it causes secondary constipation. Persons suffering from kidney infections such as pyelitis, shou d never take castor oil as a purgative. Castor oil should also be never used when there is abdominal pain or intestinal infections, such as: appendicitis, enteritis, peritonitis, etc. Using large doses of castor oil during early months of pregnancy causes abortion therefore, it should not be used carelessly but castor oil purgative taken a week earlier than the expected delivery time helps one to go through the natural ordeal safely. Castor oil enema is commonly used in constipation with excellent results.

Externally, castor oil is applied as a liniment and massaged over painful joints. Its regular application over the warts cures them completely. Castor oil mixed with *turmeric powder, pounded onion, Ajwan seeds* and the warm poultice is applied to ripen the abscess. Few drops of oil are instilled in eyes to cure conjunctivitis and soreness after removal of foreign body from the eyes. Warm oil in which a *garlic clove* is fried is put in the nose

ılly without drawing the oil in the lungs, to cure rhinitis. dia castor oil is massaged over the body before taking bath .t is commonly practiced from centuries. It is said that taking ı oil bath once weekly keeps one's skin healthy, and imparts ıd sleep. Application of castor oil over the piles twice daily a fortnight is found to be very effective. It is applied r nipples to prevent fissures, and its regular application heals tal fissure. Applying castor oil over the hands and feet before ıng to bed keeps them silky soft. Its regular use as hair oil, lps the luxurious growth of the hair, cures dandruff. Its gular application over the eye-brows and eye-lashes, keeps them im and makes them look beautiful. Castor oil mixed with *ucaliptus oil* and *turpentine* (1:4) is massaged over the back and hest before going to bed helps one to sleep soundly in chest olds, bronchitis, asthma etc.[3] Castor oil massaged over the breast after child-birth increases the flow of milk by stimulating the milk producing mamary glands. It is used as a lubricant in painful intercourse due to narrowness of the vaginal orifice. Its liberal use mixed with a pinch of *alum* acts as a safe and handy *contraceptive*. It also acts as an astringent and checks the excessive vaginal discharges that cause the relaxation of the vaginal walls.

Castor Leaves

Castor leaves are used to foment the breast after child-birth increase breast milk. Fomenting the leaves smeared with ıstor oil reduces swelling of the joints, and the same applied ›ver the abdomen of the screaming infants due to flatulent colic, expels the gas. Leaves are also fomented over lower abdomen to relieve pain and free flow of menstrual blood. Leaves are covered over the head during summer to prevent sun's heat.

Juice of the fresh leaves one ounce is given as an emetic in narcotic poisoning[4].

Roots

Paste of the Castor roots is applied to stop toothache. Decoction of the roots is used as a purgative[4].

Oil cake of castor seeds is a very good manure[5].

REFERENCES

1. *British Pharmaceutical Codex*, pp. 720 to 722, (1911).
2. Jeelani Gulam, *Magzanul advia*, Vol. 11, pp. 2019-2024, (1916).
3. Jarvis, D. C., *Folk medicine*, pp. 146-48, (1958).
4. Dastur, J. F., *Medicinal Plants of India and Pakistan*, pp. 142-143, (1
5. Nadkarni, K. M., *Indian Materia Medica*, pp. 1065-1071, Vol. 1, (195

202. COTTON SEED

Cotton Plant: *Gossypium indicum* or *herbaccum:* (B.N.); *Karp* or *Anagnika:* (Sans.); *Kapas:* (Hindi, Urdu); *Rui:* (Dak. Mar.) *Panba:* (Pers.); *Hatli:* (Kan.); *Patti:* (Tel.); *Paruthi:* (Tam.); *Karu-paruthi:* (Mal.); *Vona:* (Guj.); *Karpas:* (Beng.).

Family: Malvaceae.

Zodiac: Cancer.

Constitution: Hot and Dry 1°.

Physiopharmacology and Therapeutics

Cotton plant is grown from Vedic times in India. Perhaps Indians were the first civilized race that cultivated cotton pla for the sake of its pods that yield cotton[1].

Cotton plant is largely cultivated in black soil of Deccan two varieties namely: *Long Staple* and *Short Staple.* These varieties are used in the manufacture of superior quality cotton cloth. Absorbent cotton is extensively used in dressing of wounds and surgery. Burnt wool is dusted over foul smelling ulcers.

Cotton seeds

Cotton seeds are found to be fit for human consumption, but in India about 1.9 million tons of the cotton seeds are used as fodder for cattle feeding. Cotton seeds contain about 45 per cent hulls and linters and 55 per cent meats. The meats contain 30 per cent crude *protein* and 30 per cent *oil*[2].

ill recently cotton seed flour was not used for human mption because of the presence of *gossypol pigments* which chiefly found in free state in cotton seed. These pigments toxic to human beings[2].

Gossypol is a polyphenolic compound with an acidic character, the aldehyde groups in the molecule have a great affinity the free amino groups of *lysine* that make it biologically unlable. *Gossypol* can be extracted by using direct solvent hod employing *Hexane* and *Aqueous acetone*. In U.S.A. ving of gossypol free cotton seed has given excellent encouragresults. Addition of iron along with cotton seed meal is to prevent absorption of free gossypol.

Processed gossypol free cotton seed flour is becoming very opular in Western countries particularly in North and South America. It is a rich source of protein of high biological value nd can be used as a substitute for other animal proteins. Cotton seed flour contains high concentration of amino acids like: *lysine, methionine, tryptophan* etc. These amino acids are used successfully in the treatment of various protein deficiency diseases at the *Institute of Nutrition for Central America and Panama* (I.N.C.A.P.). Cotton seed flour formulated by this institute is commercially available in those countries[2]. C.F.T.R.I., Mysore also has formulated various food products like: *Multipurpose food* (M.P.F.) *Balahar* and *biscuits* based on cotton seed flour[2].

A handful of cotton seeds are soaked in water for a night and are ground into a paste in the morning. The milk is strained through a fine mull cloth. It is boiled with addition of some *cow's milk, sugar, a cardamom, two cloves* and a teaspoonful of *ghee*. Drinking it daily after it is cooled, is an excellent medicine to lessen the attacks of epilepsy, hysteria, insomnia. Taking it along with *sodium gardinal* 1 gr. two times daily is an specific treatment for the above said diseases, and prevents the toxic effects of *phenobarbitone*. It must be borne in mind that this drug causes *drug addiction*, therefore, it must be used carefully under the supervision of a physician.

Cotton seed milk a cupful is given with sugar thrice daily to cure malaria, kwashiorkor, dysentery, lack of breast milk, nervous weakness, snake-bite etc.

Cotton seed oil (Oleum Gossypii seminis, B.P.)[5]

Cotton seeds are cooked and the oil is expressed by hydraulic or expeller process.[2] The oil contains of glyceride *palmitic, stearic, oleic* and *linolic acid.* It is soluble in alcol and readily soluble in chloroform, ether and carbon di sulphid *Gossypol* free cotton seed oil is used in the manufacture of *sa oil, margarine, perfumed hair oil* etc. It can be used interna as a substitute for *olive oil.* Being rich in *vitamin E,* two te spoonfuls of cotton seed oil taken every night along with war milk is indicated as a medicine for functional sterility, habitua abortion, tachycardia, etc. It is externally used as an emollient analgesic liniment in the painful conditions of the joints, burns and scalds. Its regular use as a hair oil, cures dandruff, helps growth of the hair and imparts a cool feeling in the head.

Leaves

Fresh leaf-juice two teaspoonfuls mixed with equal quantity of *fresh lime juice* is given twice daily to cure dysentery, diarrhoea, piles, strangury and urinary calculi. Poultice of the leaves with seeds is applied to reduce swelling and pain due to dislocation, burns and scalds. The infusion of the leaves is used as hip bath in dysmenorrhoea[3]. Paste of the leaves with *mustard* is applied as a cure for scorpion sting[4]. Warm leaves are smeared with *castor oil* and fomented over abdomen in colic in children.

Flowers

Cotton flowers contain colouring matter a glucoside named *gossypetin,* which when fused with *caustic potash,* decomposes into a crystalline substance *phloroglucinol* and *protocatechuic acid*[4]. Flower juice 1 teaspoon taken twice daily with *honey* is a medicine for chronic bronchitis and impotency.

Bark

Bark contains *starch* and *chromogen* which gradually changes into bright brownish red colour. The root bark contains *dihydroxy benzoic acid* and *phenols*[4].

Infusion of the bark one ounce given 3 to 4 times daily acts an effective medicine for dysmenorrhoea, amenorrhoea due to posure to cold etc. It acts like *ergot* when given after child-rth. It expels the placenta and controls bleeding by contracting terine walls. Paste of the root bark with a handful of *sugar-ne roots* with honey is given regularly to increase breast milk. xtract of the bark mixed with *white of an egg* is applied to reduce ain in orchitis.

REFERENCES

1. Gulam Jeelani, *Materia Medica*, (Urdu), pp. 1416-18, (1916).
2. Subramanian, N., *Utilization of Cotton seed flour*, C.F.T.R.I., Mysore, *Food Science*, p. 71, Vol. 3, No. 2, July (1966).
3. Dastur, J. F., *Medicinal Plants of India and Pakistan*, pp. 90-91, (1962).
4. Nadkarni, K. M., *Indian Materia Medica*, Vol. 1, pp. 587-90, 3rd Edn. (1954).
5. *British Pharmaceutical Codex*, pp. 679-80, (1911).

203. GINGELLY SEEDS

Gingelly seeds: *Sesanum indicum:* (B.N.); *Tila:* (Sans.); *Ram til:* (Hindi, Urdu, Dak.); *Ellu:* (Kan.); *Simsim:* (Arab); *Kunjad:* (Pers.); *Guvvulu:* (Tam.); *Nuvvulu:* (Tel.); *Ellu cheddie:* (Mal.); *Tal:* (Guj.); *Thirr:* (Sindhi); *Til:* (Punj.); *Tir:* (Beng.).

Family: Pedaliaceae.

Zodiac: Aries.

Food Value per 100 g. approximately

Carbohydrate	24.8 g.	Vitamin B_7	100 mcg.
Protein	18.2 g.	Niacin	4.5 mg.
Fat	42.1 g.	Oxalic acid	1908 mg.
Calcium	1435 mg.	,, (without husk)	105 mg.
Phosphorus	560 mg.	Digesting Time	3½ Hrs.
Iron	7.3 mg.	**CALORIES**	560
Vitamin A	98 I.U.		

Essential Amino Acids (g. per 100 g. protein)[1]

Arginine	8.8	Methionine	2.8
Histidine	1.9	Phenylalanine	6.4
Isoleucine	4.1	Threonine	3.1
Leucine	7.7	Tryptophan	1.5
Lysine	3.6*	Valine	3.9
Cystine	2.2		

*(Limiting amino acid)

Constitution: Hot and Wet 2°.

Physiopharmacology and Therapeutics

Gingelly plant is extensively cultivated all over India during rainy season for its valuable seeds. The plant grows up to 1 to 4 feet, and branched profusely from the base. The stem is erect, have the leaves that are oblong or ovate, 3 to 5 inches long. The lower leaves are opposite, lobbed with serrate margins, the upper leaves are alternate, narrowly oblong, entire glabrous and puberlous below. The flowers are shortly pedicellate, purplish or pink usually marked with yellow bith emitting an unpleasant smell.[2]

Gingelly plant is believed to have brought into India from *Malaya Archipelago*. Many consider that this plant grows wildly in India. Ancient medical books described the medicinal use of black variety of gingelly. Even today, among the other varieties of gingelly such as: *brown*, and *white* the *black sesame* is considered to be the best for nutritive and medicinal value[3].

Gingelly seeds (black) are a cheap source of amino acids. The emulsion of the seeds prepared in the form of milk by grinding and straining them after soaking a cupful of the seeds in the warm water for a couple of hours and mixed with a cupful of milk sweetened with *jaggery* the author recommends it in the treatment of kwashiorkor, cirrhosis of the liver due to malnutrition, anaemia, during convalescence from upper respiratory infections particularly diphtheria, tonsillitis, rhinitis etc. Plain emulsion of the seeds one cup is used once at night as an excellent remedy for checking excessive micturation in non-diabetics.

Til seeds 2 tablespoonfuls are lightly roasted on a frying pan. Then they are ground into fine powder and mixed with pure *cow's ghee* 1 tablespoon the mass is divided in three parts. Each

part is used with boiled *goat's milk* thrice daily for six days as an excellent medicine in the treatment of chronic dysentery, diarrhoea, rickets, bleeding piles, constipation, etc. Til seeds one tablespoon ground with equal quantity of *palm jaggery* is used twice daily as a medicine to cause abortion in early months of pregnancy. It excites the uterine contractions and thus expells the fertilized ovum.

Infusion of the til seeds mixed with that of *linseed* 1 tablespoonful, a pinch of common salt (NaCl) and a desertspoonful of *honey* is given once at night as an effective remedy for acute and chronic bronchitis, pneumonia, asthma, etc. It acts an expectorant and the author advises to supplement suitable treatment consisting of antibiotics and other drugs along with this medicine. Because simply easing the expectoration does not act on the pathogenic organisms and cure the diseases. Lung infection should be treated promptly and carefully, otherwise, serious complications occur endangering the life.

Powder of til seeds half a teaspoonful taken with hot water twice daily acts excellently in reducing spasmodic pain during menstruation in young unmarried anaemic girls. Its regular use two days prior to the expected time cures scanty menstruation. Warm hip bath containing a handful of bruised til seeds should simultaneously be taken along with this recipe.

Gingelly oil (Oleum Sesami B.P.C.)

Gingelly or til oil is obtained by the expression of til seeds. It is pale yellow in colour, having an agreeable smell and a bland taste. The specific gravity of the oil is 0.921 to 0.924.

It contains glycerides of *oleic* and *linoleic acids* with small proportions of *stearin*. Gingelly oil is also rich in *Sesamin* (C_{18} H_{18} O_5) which may be obtained in long needle like crystalls that is insoluble in water, petroleum ether and other mineral acids and alkalies. But it is soluble in chloroform, benzene and glacial acetic acid. Oil is rich in solid fatty acids upto 12-14 per cent and liquid fatty acids about 70 per cent. It does not become rancid if carefully preserved[8].

Til oil is extensively used in the manufacture of margarine, vanaspathi, in the preparation of additive compounds of iodine, and bromine. Til oil is a cheap and best substitute for *olive oil*

and it is used as a base for all the analgesic liniments from ancient times. Very useful floral hair oil can be prepared by spreading flowers particularly *Jasmine* on the gingelly seeds in layers and the flowers are daily changed for 21 days. Then the seeds are compressed and the fragrant oil is obtained. It retains the fragrance due to its fixing character. Excessive use of this oil causes pre-mature greyness of the hair. Pure til oil is applied over the body and massaged before taking bath. It is applied over ulcers burns, scalds, bee sting with excellent results. Oil is put in eyes to prevent sun glare, conjunctivitis etc.

Internally, til oil 3 teaspoonfuls once daily is used with warm milk in gastric ulcer, constipation, piles, gonorrhoea etc.

Leaves

Sesame leaves contain a mucilage and the infusion is used in constipation, cystitis dysentery, cholera infantum. It is used as an excellent shampoo. Its regular use keeps the hair black even in fifties. Poultice of the leaf paste is applied over carbuncles, blood-boils etc.

REFERENCES

1. Swaminathan, M. and Bhagwan, R. K., *Our Food*, pp. 160-161, (1966).
2. Mathur, R. C., *Systematic Botany*, p. 267, (1965).
3. *British Pharmaceutical Codex*, pp. 730-31, (1911).

204. OLIVE OIL

Olive Oil: *Olea europaea:* (B.N.); *Rogane-zaitoon:* (Urdu, Hindi, Pers.); *Duhunuzait:* (Arab).

Family: Oleaceae.

Zodiac: Cancer.

Constitution: Hot and Wet 1°.

Physiopharmacology and Therapeutics

Olive tree is a small evergreen tree, that grows in all parts of Southern Europe and Asia minor. It is extensively cultivated

on the shores of Mediterranean, Spain; also in California, Australia and other parts of the world.

Olive is believed to be a heavenly tree and its medicinal value is praised in *Holy Torah*, *Bible* and *Quran*.

Olive oil is extracted from the ripe Olive fruits. It is a pale yellow or greenish yellow liquid having a peculiar nut-like smell. It is slightly acrid in taste. Its specific gravity is 0.914 to 0.919. Iodine value is 79 to 88. It can be easily adulterated with *cotton seed* oil[1]. It is soluble in ether, alcohol.

Chemical composition

The Chief chemical constituent of olive oil is *olein*. It also contains glycerides of *linolic*, *palmitic* and *arachidic acids*. Poor quality, old or rancid oil releases free fatty acid which is harmful for health.

Olive oil 4 to 8 fluid ounces is mostly used in the treatment of habitual constipation, gastric ulcer, gall-stones, piles, etc. It is administered freely as an antidote for poisoning by corrosive substances. Externally the oil is massaged over the painful conditions of the joints and as a cure for rickets in children. Oil mixed with equal quantity of *lime water* (calcium hydroxide) is applied as an effective liniment in eczema, psoriasis, chopped feet and hands, dry skin which causes itching etc. Olive oil 5 to 15 fluid ounces is used as an enema for removing dry and impact stool. Use of olive oil is very useful for good health.

REFERENCES

1. *British Pharmaceutical Codex*, pp. 714-15, (1911).
2. Muzaffar Hussain, *Kitabul Mufaradath*, p. 268, (1965).

205. SAFFLOWER SEED

Safflower or **Parrot seed:** *Carthamus tinctorius:* (B.N.); *Kusumba:* (Sans.); *Kusumbar* or *kad:* (Hindi, Urdu, Dak.); *Kusme bija:* (Kan.); *Qhurtum:* (Arab); *Tukme-masfur* or *Kashifa:* (Pers.); *Sendur kam:* (Tam.); *Sikha:* (Tel.); *Chandurakam:* (Mal.); *Kardi:* (Mar.); *Kusumbe:* (Guj.); *Kajireh:* (Beng.).

Family: Compositae.

Zodiac: Aries.

Constitution: Hot 2° and Dry 1°.

Physiopharmacology and Therapeutics

Safflower plant belongs to our garden sun-flower or Zinia family. The plant is cultivated as a decorative garden plant due to its beautiful multipetal pink coloured flowers which yield a very valuable pink dye. The seeds are rich in oil, which is commonly used as a *kardi oil.* The floral stigmas of safflower flowers is commonly used to adulterate with *saffron*[3]. The plant grows up to a height of 3-4 feet[1].

Safflower seeds are bitter in taste and look more or less like the seeds of orange. Powder of the dry seeds half a teaspoon mixed in a tablespoonful of honey is taken once or twice with great benefit during the treatment of bronchial asthma. It acts as an expectorant and reduces the spasms by liquefying the tenacious sputum. Decoction prepared by boiling two teaspoonfuls powdered seeds in four fluid ounces of water is given as remedy to cure dysmenorrhoea, flatulent colic, constipation, strangury, post-partum, endo-metritis etc. Powder of the dry seeds mixed with equal quantity of powdered root of *Indian Madder* is used twice daily as an excellent urilithitic medicine. Addition of the decoction of horse gram 1 cupful along with the powder of safflower seeds and Indian Madder increases its therapeutic value and dissolves the gravel in the bladder[2]. Kernel of the seeds 1 teaspoon

eaten with *shelled almonds* 6 and *honey* is found to be a safest laxative in young, weak and pregnant women. *Jwarishe Qhurtum* is a very popular Unani laxative medicine prepared from safflower seeds[4]. Powder of the dry seed mixed with *pistachio nuts*, *honey* and *almonds* is used with milk once before going to bed is very effective aphrodisiac. Since safflower seeds coagulate the milk, it should not be used with it[2].

Flowers

Flowers are used as a tonic, sedative expectorant, and aphrodisiac. Decoction of the petals mixed with sugar is commonly used during the acute phase of measles, smallpox, chicken-pox etc. Infusion of the flowers mixed with honey is used in asthma, haemiplegia and facial paralysis with encouraging results.[5] Dried flowers mixed with *confection of rose* (Gulqhand) is given as a medicine for jaundice, intestinal flatulence, painful menstruation, inflammation of joints due to injury etc. Ask your grandmother about the dress of the bridegroom a century ago. She will tell that in olden days the newly weds used to wear garments dyed in the flower juice of safflower. They believed that wearing such clothes (Kusumbe ka-Joda) increases sexual desire[6].

Safflower oil

Safflower oil is used in the preparation of vanaspathi. The chemical and physical properties of crude and refined safflower oil is presented along with fatty acid composition determined by gas chromatography. The refractive index of refined oil is 1.4748 ± 0.0003, specific gravity, 0.9210 ± 0.0005; iodine number, Wijs, 143 ± 4; sequalance, 7.1 mg/100 g, ± 0.4; oleic, 12.9 ± 0.6 and linoleic 77.5 ± 1.1. Minor fatty acid components detected were *myristic*, *arachidic* and *eicosenoic acid*[7] (*Food Science*, Vol. II, 1965). It is believed that safflower oil does not increase blood Cholesterol, hence it is recommended liberally in persons suffering from cardio vascular disorders. An emulsion by name *Safflоxin*—Cipla (Bombay) is used routinely during myocardial infraction, cardiac ischaemia, hypertension etc. External application of the oil is very soothing in eczema, rheumatism, chronic ulcers etc.[4]

The whole plant is boiled in til oil, and it is used as a liniment with excellent results in the treatment of rheumatism, scabies, chronic ulcers, paralysis of the limbs etc[5].

Tender leaves in 4th to 6th week are eaten as vegetable[8].

REFERENCES

1. Mathur, R. C., *Systematic Botany*, p. 355, (1965).
2. Muzaffar Hussain, *Kitabul advia*, pp. 371-72, (1965).
3. *British Pharmaceutical Codex*, p. 350, (1911).
4. Hakeem Javid Ahamed, *Mujerebath e Ahamed*, p. 82, Pers. Mss. Lucknow, (1882).
5. Dastur, J. F., *Medicinal plants of India and Pakistan*, p. 48 (67), (1952).
6. Hakeem Mohammad Musa, *Random Notes*, p. 180, Urdu Mss. Kachiguda, Hyderabad, (1901).
7. Ibrahim, W. *et al.*, *Chemical and Physical Properties and fatty acid composition of safflower oil*, J. Ass. of Agric, Chem., 47, 776, (1964).
8. Nadkarni, K. M., *Indian Materia Medica*, pp. 287-97, Vol. 1, (1954).

206. SUNFLOWER SEEDS

Sunflower: *Halianthus annus:* (B.N.); *Surajmukhi:* (Hindi, Urdu); *Azaryeen:* (Arab); *Gule aftab parast:* (Pers.).

Family: Compositae.

Zodiac: Leo.

Constitution: Hot and Dry 2°.

Physiopharmacology and Therapeutics

Sunflower plants are extremely decorative annual herbs that grow between 2 to 15 feet. The plants are not wild but it is believed to have originated from *H. lenticularis Doughlas* a wild plant habitant of Mexico. The gigantic size of the yellow flowers that always keep their face towards sun yield, a kind of yellow dye[1]. The embedded seeds in the flowers are rich in proteins

Essential Amino Acids (g. per 100 g. protein)[2]

Arginine	8.7	Methionine	0.9
Histidine	2.2	Phenylalanine	5.1
Isoleucine	4.1	Threonine	2.7
Leucine	5.1	Tryptophan	1.1
Lysine	3.6	Valine	5.0
Cystine	1.5		

Roasted and salted kernel of the seeds is used as *peanuts.* Powder of the dry seeds or the decoction of the pounded seeds is used as a remedy for bronchitis, laryngitis, tonsillitis, influenza, cough, etc. Paste of the kernel is applied as a cure for scorpion sting.[1] It is believed that growing sunflower in the home garden prevents influenza, cold, and smallpox.[3]

Sunflower seed oil is extracted from the dry seeds. It is pale yellow in colour and is used in the preparation of salad oil, margarine, bakery goods, as a preservative in canning of sardine fish, and base for certain medicines. It is used as a substitute for *olive oil.* It is used with *linseed oil* in varnishes and paints. Pure refined oil is rich in vitamins A, D and E, therefore, it can be used with some benefit in malnutrition. The oil cake is a very nutritive fodder for cattle, and poultry[1].

REFERENCES

Mathur, R. C., *Systematic Botany*, p. 354, (1965).

Swaminathan, M. and Bhagwan, R. K., *Our Food*, pp. 160-161, (1965).

Hakeem Syed Mir Mohiddine, *Random Notes*, Urdu Mss., p. 28, Golcunda, (1882).

PART VII

CEREALS OR MILLETS

Man, as we see today, has undergone various difficult ordeals during these thousands of years in all his habits. His ways of living, eating, clothing, thinking, dwelling etc., have been enormously changed.

Since we are concerned with his eating ways, let us discuss only on this. In the beginning of the civilisation, man was depending on his daily hunt of animals and on their flesh he lived. Hundreds of years passed like this without any marked change in the eating habit. Then, luckily, some strange idea of growing the grains to substitute his flesh food came to the early man. He experimentally scratched a bit of land and sowed some seeds. This experiment was a success, and the yield which he had from the crop, helped him to ease the tiresome hunting; tieing him to one place instead of a nomadic life. It is believed that barley was the first seed which the man grew as the food grain. As years passed, the great change began to take the turning point in the food habits of man and the cultivation of the food grains became prominent.

Today, the food grains or the cereals like; barley, maize, millets, oats, ragi, rice, rye, wheat etc., are extensively grown all over the world and they form 70 per cent of the major portion supply of our daily food.

These food grains are grown in different parts of the world according to the growing capability depending on the climatic influence on their cultivation.

Cereals are the cheapest source of starch which supply the heat and energy to the human body and form the major portion of the food. They are however not a complete food by themselves because, most of the cereals are covered with a rough fibrous covering which should be removed and the grains are cooked before they are used as human food. In the first process, during dehusking, the valuable vitamin layer is scraped and the grain is left purely to supply carbohydrate. Then, during the cooking process, whatever little vitamins are left, will become useless due to constant heat. However, to compensate the heavy loss of the

minerals and the vitamins, plenty of fresh green leafy and non-leafy vegetables should be eaten along with the required cereals. In our country, malnutrition is due to this reason that majority of the people eat only some refined carbohydrates in the form of boiled rice, ragi, jawar etc., without sufficient proteins, fats, vitamins and minerals.

207. BAJARA

Bajara: *Pennisetum-typhoidcum*; (B.N.); *Varjari:* (Sans.); *Pearl Millet:* (Eng.); *Bajra:* (Hindi); *Jari:* (Dak. Urdu); *Cumbu:* (Tam.); *Sajja:* (Tel.); *Bajiri:* (Mar.).

Family: Graminae.

Zodiac: Virgo.

Food Value per 100 g. approximately

Carbohydrate	66 g.	Vitamin B_1	329 mcg.
Protein	10.2 g.	Niacin	3.2 mg.
Fat	4.5 g.	Sodium	11 mg.
Calcium	50 mg.	Potassium	30 mg.
Phosphorus	350 mg.	Oxalic acid	14.4 mg.
Iron	10 mg.	Digesting Time	3.5 Hrs.
Vitamin A	219 I.U.	**CALORIES**	357

Essential Amino Acids (g. per 100 g. protein)

Arginine	8.1	Methionine	3.0
Histidine	1.7	Phenylalanine	4.4
Isoleucine	5.9	Threonine	3.5
Leucine	9.5	Tryptophan	1.6
Lysine	3.8	Valine	6.7
Cystine	2.2		

Constitution: Hot and Dry 2°.

Medicinal Value

Bajra is a wholesome grain which has high nutritive value. It is usually very popular in the states of Maharashtra as a staple

food. The chapaties made from the fine flour are eaten with various vegetables as the main dish. It has some wonderful medicinal properties when the bread made from its whole flour is eaten with honey in the morning. It is specially effective for bleeding piles, epilepsy, insomnia, neurosis, impotency, high blood pressure, tuberculosis etc. Excessive eating of this grain causes high uric acid deposits in the system, therefore, persons with rheumatic diathesis should use it with care.

208. BARLEY

Barley: *Hordeum vulgare:* (B.N.); *Jao:* (Hindi, Guj. Mar.); *Javegodhi:* (Kan.); *Parle arsi:* (Tam.); *Barley biyam:* (Tel.); *Yavan:* (Mal.); *Jaba-dhana:* (Ori.); *Job:* (Beng.).

Family: Graminae.

Zodiac: Taurus.

Food Value per 100 g. approximately

Carbohydrate	68 g.	Vitamin B_2	0.19 to 0.47 mg.
Protein	10 g.	Niacin	4.5 mg.
Fat	1.5 g.	Sodium	4 mg.
Calcium	28 mg.	Potassium	179 mg.
Phosphorus	227 mg.	Digesting Time	3 Hrs.
Iron	4 mg.	**CALORIES**	334
Vitamin B_1	470 mcg.		

Essential Amino Acids (g. per 100 g. protein)

Arginine	4.8	Glycine	1.9
Histidine	1.7	Methionine	1.3
Isoleucine	4.0	Phenylalanine	1.3
Leucine	6.5	Threonine	4.8
Lysine	3.2		

Medicinal Value

Barley was the first cereal to be cultivated by man during the stone age. It is largely grown in Sindh and other states of India where the climate is hot and moist. The decorticated grain is called 'Pearl Barley'.

Barley malt is very nutritious and a very rich source of proteins and B-complex vitamins. Each 100 g. of the malt contains:

Maltose	57.5 to 86.0 gm.	Nicotinic acid	7.5 to 13.4 gm.
Protein	1.1 to 8.9 gm.	Diastatic power	
Vitamin B_1	0.19 to 0.47 gm.	(Linter)	0 to 106.
Vitamin B_2	0.22 to 0.75 gm.		

(From Klatzen C. Norris, F. W. and Wokes, F. in Quart. J. Pharm and Pharmacal., xix (3), 1947).

Barley gruel with *butter milk* and *lime juice* is a good diuretic-carbohydrate-liquid-food suitable for all the invalids suffering from gastro-intestinal disorders, eclampsia, nephritis, gonorrhoea, cystitis, urethritis, high blood pressure, diarrhoea, dysentery, colitis, sick headache, indigestion, constipation, neuritis, and carbohydrate indigestion.

209. OATS

Oats: *Avena Sativa.*

Food value per 100 g. approximately

Carbohydrate	62.8 g.	Iron	3.8 mg.
Protein	13.6 g.	Vitamin B_1	540 mcg.
Fat	7.6 g.	Vitamin B_2	120 mcg.
Calcium	50 mg.	Niacin	1.1 mg.
Phosphorus	380 mg.	Calcium	37 mg.

Essential Amino Acids (g. per 100 g. protein)

Arginine	6	Methionine	2.4
Histidine	2.2	Threonine	3.5
Lysine	3.3	Leucine	8.3
Tyrosine	4.6	Isoleucine	5.4
Tryptophan	1.2	Valine	6.8
Phenylalanine	6.6	Choline	1290 mcg.
Cystine	1.8		

Oats is a very popular cereal which is rich in protein, fat, minerals, and vitamins. The proteins, avenalin and gliadine are soluble in water and they are bound with the other amino acids like:

Rolled oats like Quaker's oats is a very popular food for valids and persons suffering from gastric disorders.

Wheat bread mixed with half of the oats-meal is a wholesome protein food in protein deficiency and chronic constipation Due to its high cellulose content it expands the intestinal gut and increases the peristalsis and relieves constipation.

Commercially, it is used in making biscuits, wafers, flakes, dusting powders and face packs.

210. JAWAR

Jawar or **Kaffir corn** or **Great Millet:** *Sorghum vulgar Sny: Andropogon Sorghum:* (B.N.); *Jawar* or *Jawari:* (Hind Mar., Urdu, Dak.); *Jola:* (Kan.); *Cholam:* (Tam.); *Joanah* (Tel.); *Jhana:* (Ori); *Jawar:* (Beng.).

Family: Graminae.

Zodiac: Leo.

Food Value per 100 g. approximately

Carbohydrate	73 g.	Vitamin B_1	344 mcg.
Protein	10.5 g.	Vitamin B_2	363 mcg.
Fat	1.7 g.	Niacin	1.7 mg.
Calcium	28 mg.	Sodium	7 mg.
Phosphorus	286 mg.	Potassium	131 mg.
Iron	6 mg.	Digesting Time	3 Hrs.
Vitamin A	140 I.U.	**CALORIES**	**350**

Essential Amino Acids (g. per 100 g. protein)[1]

Arginine	6.8	Methionine	1.4
Histidine	1.6	Phenylalanine	5.3
Isoleucine	6.1	Threonine	2.1
Leucine	12.9	Tryptophan	1.2
Lysine	2.0	Valine	5.6
Cystine	2.0		

Constitution: Dry 2°.

Physiopharmacology and Therapeutics

Jawar is extensively used all over Maharashtra and next to wheat all over India. In some other parts of the world it is also used in the form of whole-meal flour.

Jawar is enveloped with a covering of bran that is rich in B-complex vitamins, cellulose and a large quantity of phytates. The flour of the whole grain forms a bulk nutritive food which aids easy elimination of faecal matter. Therefore, it is an excellent food for constipation. But the coarse fibre has one disadvantage of causing indigestion if the *Jawar roti* is not properly chewed. The excess of phytates interfere with the absorption of calcium and iron from other foods. To overcome this drawback, a new polishing process of milling the grain in McGill rice mill is tried with excellent results[2]. The grain retains its white colour and the flour becomes easily digestible and can be used for making *dosai* (fermented pan cake), for preparing malt and brewing[3] and it does not interfere with calcium—iron absorption.

Polished Jawar gruel with *milk* or *butter-milk* is an ideal food for bleeding piles, biliousness, and for all vitamin B_1 and B_2 deficiencies.

The dew collected over the leaves of the plant is put in the eyes as a cure for opacity of the cornea, cataract, burning in the eyes due to sun glare and excessive lachrymation.

The macerated stem-juice is sweet and is used to cure biliousness, common cold, diabetes, jaundice etc. (Dhanavanthra).

REFERENCES

1. Swaminathan, M. and Bhagwan, R. K., *Our Food*, p. 58, 5th Edn. (1966).
2. Raghavendra Rao, S. N. *J. Food Science and Technol.*, pp. 40-42, Vol. 1, No. 3, Oct. (1964).
3. Botes, D. P. *et al.*, *J. Science Fd. Agri.*, 18 (9), p. 409, (1967).

211. ITALIAN MILLET

Italian Millet: *Steria-Italica:* (B.N.); *Kangani:* (Hindi, Dak.); *Thenai:* (Tam.); *Korulu:* (Tel.); *Thuna:* (Mal.); *Ralkang:* (Guj.); *Syanadhan kanganni:* (Beng.).

Family: Graminae.

Zodiac: Gemini.

Food Value per 100 g. approximately

Carbohydrate	61 g.	Vitamin A	54 I.U.
Protein	12.3 g.	Vitamin B_1	585 mcg.
Fat	4.7 g.	Niacin	0.7 mg.
Calcium	28 mg.	Digesting Time	3 Hrs.
Phosphorus	237 mg.	**CALORIES**	**334**
Iron	6.3 mg.		

Like jawar, it is also a staple food of the poor people and unleavened bread is made from the flour which is eaten along with some vegetables. The gruel with jaggery is good for weakness during and after child-birth, liver diseases, urinary infections, underfed children etc.

The poultice of the flour is very useful for septic boils and carbuncles.

212. MAIZE

Maize or **Corn:** *Zea-mays:* (B.N.); *Yavanala:* (Sans.); *Makka-jawari:* (Hindi, Dak., Urdu); *Muskun-jola:* (Kan.); *Makka-zonallu:* (Tel.); *Makka-cholam:* (Tam.); *Patha-mula:* (Mal.); *Makai:* (Sind.).

Family: Graminae.

Zodiac: Scorpio.

Food Value per 100 g. approximately

Carbohydrate	15 g.	Vitamin B_2	100 mcg.
Protein	4.3 g.	Niacin	14 mg.
Fat	4.5 g.	Sodium	16 mg.
Calcium	11 mg.	Potassium	286 mg.
Phosphorus	340 mg.	Oxalic acid	9.9 mg.
Iron	2 mg.	Digesting Time	3 Hrs.
Vitamin A	50 I.U.	**CALORIES**	**342**
Vitamin B_1	410 mcg.		

Essential Amino Acids (g. per 100 g. protein)

Arginine	3.5	Methionine	1.9
Histidine	2.1	Threonine	4.0
Lysine	2.9	Leucine	13.0
Tyrosine	5.4	Isoleucine	4.6
Tryptophan	0.6	Valine	5.1
Phenylalanine	4.5	Glycine	4.3
Cystine	1.3		

Medicinal Value

Maize or Indian corn is a very nutritious grain mostly used in making pop-corn, corn-flakes, puffed maize, commercial starch, maida, cosmetic powders and other various food preparations like; Stirabout, Mush, Johey, Tortella etc., in several countries.

The grain is rich in fat and the yellow colour is due to the presence of a provitamin A, xanthophyll and cryptoxanthine and it contains, vitamin E, as tocopherol, 0.119 per cent.

An American writer says, 'With a diet of Indian corn bread and pork, the workmen of this country are capable of enduring the greatest fatigue and performing the greatest amount of physical labour', (U.S. Dept. of Agri. Division of Chemistry, Bull. 50, 11).

There are some other preparations of broken maize; such as; Hominy, Cerealine and Samp, which are used in making puddings and other sweets. There is another variety of the corn which is known as 'Corn on the Cob'. It contains much sugar and it is cooked while it is still green and used as a vegetable.

The silk like corn-hair is used as medicine and its decoction is used in cystitis, and other urinary infections with turbidity of the urine. Its medicinal action on the urinary tract is due to maizenic acid and a fixed oil oleum myadas.

Chewing the fresh roasted corn is a very good tonic for the gums and teeth and prevents gastric ulcer and protein deficiencies in the under fed children. Eating the pop-corn also is a cheap way of protein and fat supplement in the poor children.

Hybrid maize is cultivated in India with excellent yield.

213. RAGI

Ragi: *Elucine coracana:* (B.N.); *Ragi:* (Hindi, Urdu, Dak., Kan.); *Iragi:* (Tam.); *Ragulucholu:* (Tel.); *Nachini:* (Mar.); *Mandina:* (Ori.).

Family: Graminae.

Zodiac: Pisces.

Food Value per 100 g. approximately

Carbohydrate	72 g.	Vitamin B_1	422 mcg.
Protein	7.3 g.	Vitamin B_2	50 mcg.
Fat	1.3 g.	Nicotinic acid	1 mg.
Calcium	344 mg.	Sodium	11 mg.
Phosphorus	283 mg.	Potassium	408 mg.
Iron	17.4 mg.	Oxalic acid	45.7 mg.
Magnesium	191 mg.	Digesting Time	3 Hrs.
Vitamin A	70 I.U.	**CALORIES**	**345**

Essential Amino Acids (g. per 100 g. protein)

Arginine	5.2	Methionine	3.0
Histidine	1.3	Phenylalanine	4.4
Isoleucine	6.4	Threonine	3.5
Leucine	9.5	Tryptophan	1.6
Lysine	3.4	Valine	6.7
Cystine	2.2		

Physiopharmacology and Therapeutics

Ragi is a very popular grain that is grown all over Mysore State as a dry crop. The reddish mustard like grains are harvested during December and January.

Ragi is a staple food of the labour class that is consumed in the form of ragi-ball and unleavened bread. The flour is put in boiling water and evenly mixed, then the thick paste is rolled in the form of balls of the desired size. Ragi-ball is mixed with butter-milk and drunk as gruel or simply swallowed by dipping the swallowable pieces in the curry. Prolonged digestion of Ragi-meal helps the labourers to work longer without feeling tired and hungry, therefore it is their ideal meal.

Ragi is a poor source of protein but it is rich in calcium and iron. In fact it is the richest source of both the minerals among other cereals[1]. Refined ragi flour supplies more calcium than the whole ragi flour[2,3].

Ragi meal is an ideal food for diabetics, and obese, because its digestion is slow and due to this the carbohydrate takes longer time to get absorbed. By eating ragi-preparations, the constant desire to eat will be curbed reducing the daily caloric intake. It supplies abundant of calcium, phosphorus, iron, vitamin B_1, B_2 and prevents malnutrition in spite of restricted food.

Ragi is rich in cellulose, therefore, its regular use is an excellent medicine for chronic constipation.

A handful of Ragi with the equal quantity of *paddy*, a tablespoonful of *cotton-seeds*, a teaspoonful of *cucumber seeds*, *pumpkin seeds*, *water melon-seeds*, *musk melon seeds*, and shelled almonds 10; are soaked in an earthen pot with sufficient water for a night. Next morning all these ingredients are ground into fine paste and strained through a fine cloth. Heat a tablespoonful of pure *cow's butter* or *ghee* in a tinplated or earthen vessel. When the ghee is sufficiently hot, put few seeds of *cardamom*, 2 *cloves*, an inch long piece of *cinnamon* and fry them gently. Pour the milky extract and bring to boil by adding some *milk* and *sugar*. When it begins to thicken take the vessel from the fire and give a glassful to every one as a breakfast. It is an excellent tonic food for all. Your children grow healthy with strong bones and look rosy due to new blood formed by the additional supply of iron. If given daily during pregnancy, there is no fear of pregnancy anaemias, delayed labour due to uterine inertia, and other post-partum complications, osteomalacia etc. Clinical investigations have confirmed that this recipe has a definite health giving effect on both mother and child. It is a boon to young anaemic girls having menstrual disorders and can be safely used as a food during the treatment of many diseases.

The same can also be used as a medicine for indigestion, general weakness, insomnia, mental irritability, weakness of memory, non-specific chest pain, idiopathic stearrhoea, piles, hepatitis, etc. It is also given with excellent results in tuberculosis with *Isozone-forte* (Pfizers) one tablet once daily. It is advised to continue this treatment for at least 2 years, in spite of

feeling perfectly well. For burning sensation in the urine, scanty urination, and during the use of sulpha drugs, a glassful of ragi milk taken twice daily is an excellent medicine.

In impotency, author has found the regular administering of this ragi recipe with *Pasuma Strong* (E. Merc) or *Tentex forte* (Himco); one tablet twice daily as a harmless aphrodisiac.

This recipe can be used for any ailment without any fear, provided one is under the supervision of a physician and fat and sugar has no contra-indication. Such persons can simply drink the boiled milk without frying in ghee.

Its regular use protects from malnutrition infection, degenerative diseases, pre-mature oldage and increases longevity.

Excessive use of Ragi, increases oxalic acid, hence, it is contra-indicated in persons suffering from urinary calculi.

A new process of preparing refined white flour from ragi is evolved at C.F.T.R.I. Also, a new strain of white ragi is produced to replace the coloured grain.

Fumigation of the burnt ragi flour is specific for common colds and influenza when it is inhaled gently. It increases the blood circulation in the nasal mucosa, reduces the local congestion, and opens the stuffed nose. The poultice of the ragi flour is very effective in opening the acute boils and carbuncles.

How to prepare good quality Ragi Malt[5]

Clean the good quality ragi from mud, stones, and other contaminations by winnowing and wash it in clean water. Then, steep the grain in a tall vessel having clean soft water in such a way, that the grain is not more than one third of the height of the vessel. Change the water twice a day; preferably in the morning and evening.

After the grain is soaked for twenty four hours; it is taken out of the vessel and is spread over the gunny bag in a cool place; making sure that the depth of the grain is not more than two inches thick. Cover another wet gunny bag over the grain and leave it for another twenty four hours. Then remove the cover and the grain is piled up in the centre of the mat wet with little water. Mix the grain well and spread evenly as done before and leave it for seventy two hours.

Spread the grain in the sun until it is completely dry and rub it gently in between the dry and clean gunny bags to separate the outer cover of the grain and the husk is removed by winnowing.

The clean and white tiny grain is roasted over gentle fire in an iron pan till you get the malt flavour and smell.

Grind the roasted grain into fine flour and seive it through No. 70-80, iron mesh or a muslin cloth. Preserve this powder in air tight sealed tins and it can be used as a beverage with milk and honey. It can be kept for one month without any nutritive loss in a sealed container. If you find it difficult to make it yourself you can get the ready made malt from the sales manager C.F.T.R.I., Mysore. It is a very nutritious food for those who are suffering from the gastro-intestinal diseases, rickets, tuberculosis and neurasthenia.

Food Value of the malt per 100 g. approximately

Carbohydrate	79 g.	Vitamin A	Trace
Protein	6.2 g.	Vitamin B_1	0.36 mg.
Fat	1.2 g.	Vitamin B_2	0.11 mg.
Calcium	32 mg.	Nicotinic acid	1.8 mg.
Phosphorus	28 mg.	Digesting Time	1½ Hrs.
Iron	2.5 mg.	**CALORIES**	**150**

Take a pinch of powdered ragi-charcoal along with a teaspoonful of fresh lime juice for burning in the chest, indigestion, biliousness, excess of water in the mouth, vomiting and nausea etc., and see how quickly it stops the nasty feeling. The charcoal is a good dentifrice for bleeding gums and pyorrhoea.

Eating roasted green ragi is a tonic for high blood pressure, diabetes, liver diseases, nervousness, heart weakness, asthma and lack of milk after child-birth.

Fresh juice of the green leaves is put in the eyes as a cure for cataract, burning of the eyes due to glare, and conjunctivitis. A glassful of juice with honey is a cheap source of A class proteins in sick and growing children. The juice is applied for chronic eczema, scabies and other itching skin diseases.

.rnt ragi-hay is applied over the skin with little pure ·vinegar; for urticaria, scabies and burns with good results.

Sleeping on the pillow containing ragi husk imparts good sleep and prevents hair-fal.

REFERENCES

1. Antia, F. P., *Clinical Dietetics and Nutrition*, p. 221, (1966).
2. Kurien, P. P. *J. Nutr. and Dietetics*, 4 (2), 96 (1967).
3. Kurien, P. P. and Doraiswamy, T. R., *J. Nutr. Dietet.*, 4 (2), 102 (1967).
4. Aman, *Clinical Investigation of Ragi mixture in Paediatrics, gynaecology and obstetrics* F. No. 280. O.P.D. Indo-American Hospital, Mysore, (1965-1967).
5. Swaminathan, M. and Bhagwan, R. K., *Our Food*, p. 53, (1966).
6. Kurien, P. P. and Desikachar, H. S. R., *J. Food Science and Technology*, Vol. III, No. 2, pp. 56-58, (1966).

214. RICE

Rice: *Oryza sativa:* (B.N.); *Thandula* or *Sali:* (Sans.); *Chaval:* (Hindi, Urdu, Dak.); *Uruz:* (Arab.); *Birinj:* (Pers.); *Akki:* (Kan.); *Pari:* (Tel.); *Ari:* (Mal.); *Bhat* or *Tandool:* (Mar.); *Chanoor:* (Sindhi); *Shali dhaniya:* (Beng.).

Family: Graminae.

Zodiac: Virgo.

Food Value per 100 g. approximately

Carbohydrate	78 g.	Vitamin B_1	170 mcg.
Protein	8.5 g.	Vitamin B_2	118 mcg.
Fat	0.6 g.	Nicotinic acid	3 mg.
Calcium	14 mg.	Potassium	280 mg.
Phosphorus	18 mg.	Digesting Time	3 Hrs.
Iron	2.6 mg.	**CALORIES**	**351**
Vitamin A	4 I.U.		

Essential Amino Acids (g. per 100 g. protein)[1]

Arginine	10.3	Methionine	2.2
Histidine	1.6	Phenylalanine	4.6
Isoleucine	6.0	Threonine	3.3
Leucine	8.0	Tryptophan	1.2
Lysine	3.9	Valine	6.1
Cystine	1.8		

Constitution: Cold and Dry.

Physiopharmacology and Therapeutics

Rice is one of the most popular cereals that is extensively grown all over the Eastern world starting from India to Japan. Though rice is the poorest of all cereal in protein, fat, and other minerals, yet it is a staple food of these countries.

There are number of varieties of rice but some of them like: *Bangar sanna*, *Coimbatore sanna*, *Rata*, *Tansal*, *Ghosaval*, *Kalisal*, *Halubal*, *Mysore sanna*, *Kolamba*, *Amrithsar*, *Pankhali*, etc., are very popular. The scented varieties like: *Basmathi*, *Kamod*, *Ambemohor*, *Jirsal* and *Zeerak samba* etc., are also popular.

CHARAKA in his time honoured book *Charaka Samhita* describes about rice as follows:

'The varieties of rice known as the red rice, the big rice, the Kalama rice, the Sakunahrita, the Turnaka, the Languala .... They are sweet, slightly vata stimulant and form condensed and scanty stools. They are unctuous, roborant, seminiferous and diuretic. The red rice is the best of them. The rice grown in deep water comes next best. Virhi rice is sweet and causes acid after digestion. It stimulates pitta and heavy. The patala grain causes excessive urine and faeces, heat and tri-discordance'.[2]

This statement fortifies our belief that centuries ago our ancestors were well versed in the nutritive and curative value of rice.

Physical structure of rice

Rice with its husk is called *paddy*. The husk is loosely covered over the grain and it is dark golden in colour. It does not contain any nutrition and it is always removed by pounding or milling before the rice is consumed as food.

Below the husk there is another layer that is known as *Bran-layer*. It is rich in minerals, Vitamin B_1 and cellulose. If the whole bran is consumed it causes indigestion and checks the absorption of other foods during digestion, therefore, it is usually removed by polishing the rice. It is advised that this layer should be delicately removed by polishing moderately in a mill, however, hand pounded rice is the best for nutritive and medicinal value, because this process protects the *Aleurone layer* which

is below the bran. It is the chief source of all the nutrition in rice.

The lower part of the rice is called the *Germ* or the *Embryo* that is rich in vitamin E and other minerals. However, bran contains more phytates which prevents the absorption of calcium and phosphorus from other foods, therefore, it should be moderately removed and cooked well.

The large white portion of the grain is known as *Endosperm*. It is composed of pure highly soluble starch.

Digestibility of Rice

Digestibility of rice depends on the following factors, such as, varieties, degree of polish, the age of rice, the type of dish and intensity of mastication.

(*a*) Holubal, red sali, etc., are coarse varieties of rice, and require proper cooking for easy digestion.

(*b*) The Aleurone layer (bran) is rich in cellulose, and other nutrients. Low polishing of the rice protects this layer and keeps the grain nutritive, but the colour of the rice remains reddish and it requires a strong stomach to digest. Hand pounded rice that helped men to live more healthier and longer is an example of the past.

As science advanced, man began to subjugate the external natural forces, and new methods of doing things easily are discovered. Particulary the process of milling the rice took a tremendous change and hulling the paddy became very easy, saving the manual labour of man. Due to this invention, man, gradually lost his muscular power and he has become an unfortunate victim of modern civilisation engrossed in many delicacies. One cannot imagine and compare with his forefathers in term of strength and longevity in this scientific era. Due to delicate body structure and weak digestion, the modern man has changed his entire habits of eating and has fallen prey to refinement. This has led the high polishing and excessive washing of the rice and draining the gruel to make the life-giving grain to look snow-white and digest without much efforts. The white highly polished washed rice is the death trap and has developed innumerable miseries in present generation. The high carbohydrate diet without vitamin B_1

and Niacin causes dilation of stomach, indigestion, deposits excessive fat in the body, resulting untimely death due to cardio-vascular diseases, diabetes, obesity, nervous breakdown, beriberi etc.

(*c*) New rice due to high cellulose causes, indigestion and colic, therefore, it is usually stored for 5 to 6 months before used. A new method of curing freshly harvested rice by subjecting it to humid heat in a closed rotating drum for about 40 minutes at 90-95°C followed by overnight insulated storage has been evolved at C.F.T.R.I.[11]

(*d*) Rice fried in fats as usually done while preparing *Biriyani*, *Pallavo* etc., takes longer time to digest than ordinarily cooked rice.

(*e*) Modern ways of eating rice is entirely different from olden days. It is simply gulped, instead of chewing properly. This process deprives the chemical action of saliva on the starch and helps the rice to stay longer in the stomach undigested. The details of carbohydrate digestion is already explained in the foregoing chapters.

It is believed that rice is usually an indigestable food, but clinical research confirms that properly chewed rice-meal not-exceeding a handful at a time consumed with milk or butter-milk is easily digested and supplies quick energy without leaving any residue, hence, it is not harmful even in acute febrile diseases[3,4]. But, we eat rice with such temptation mixing it with hot curries and bolt it to the heart's content that naturally causes indigestion and gastric disorders.

Effect of par-boiling Paddy

Par-boiling paddy, is an ancient art of dietetics in South India, particularly in Kerala. There are various methods that are employed crudely, but recent discovery at C.F.T.R.I., has completely changed the technique and improved the flavour of the rice, parboiled on crude methods. The new process consists in soaking the paddy in hot water at 70°-75°C for four hours and then steaming the soaked paddy. This process is completed in 5 hours, which otherwise would have taken several days in the old process.

Parboiling of paddy makes the rice more nutritive by preserving its vitamins B_1, Niacin that are usually lost during milling. Therefore, par-boiled rice is more nutritious than the raw highly polished rice.[1]

Nutritive value of fermented rice

It is mentioned that fermented rice in the form of *Idli* prepared with *black gram dal* and *rice* is a rich source of folic acid, choline and its regular consumption prevents liver damage[5,6,7]. But the extensive clinical trails at C.F.T.R.I. proved that fermentation of rice to prepare Idli has no appreciable increase in its nutritive value in relation to lipotropic agents[8,9]. However, idli is a very easily digestible rice-food with *buttermilk* that is usually recommended during convalescing period from acute febrile diseases. Since idli is usually eaten with lentil soup mixed with vegetables or curds, it also supplies some proteins. Its digestibility is attributable to the formation of yeast, dextrose during the process of fermentation and cooking it in steam.

Cooked rice mixed with *curds*, fresh *coriander leaves*, *lemon juice*, *ginger*, *onion*, *pepper-powder*, *green chillies* that are fried in ghee with mustard is a wholesome nutritious and safe food during travelling.

Rice cooked with jaggery is used at bed time as medicine for laryngitis. After this meal one is advised to drink only warm water[10].

Rice mixed with butter-milk is given once or twice daily as a curative food in dysentery, diarrhoea, piles, scanty urination, gonorrhoeal urethritis, biliousness etc.[2]

Powder of chared par-boiled rice a teaspoonful mixed with glassful of *butter-milk* is given an ounce every half an hour for diarrhoea in children with excellent results.

Thick gruel of rice mixed with a glassful of butter-milk and a well ripe banana; given twice a day is a very nutritious diet in typhoid, tuberculosis, gastric ulcer, gastritis, stomach and intestinal cancer, colitis, diarrhoea, dysentery, piles, rectal fissure, indigestion, in acute febrile diseases, hepatitis, jaundice, morning-sickness, acute dilatation of the stomach, burning and indigestion due to hiatus hernia, cystitis, nephritis, pyelitis,

congestive heart failure, cirrhosis of the liver, enlarged liver in the children and in alcoholics, hysteria, excessive accumulation of the gas in the intestines, and all the diseases where the bland diet is indicated.

Water in which rice is soak is given as a cool drink in fevers.

Fine rice-flour mixed with turmeric powder is dusted over the infected wounds, foul ulcers, measles, small-pox, itching of the skin due to excessive perspiration, prickly heat, erysipelas, burns and scalds etc. The poultice of the rice flour is effective for opening the abscesses, carbuncles and septic animal bite.

The rice polishing is rich in vitamin B-complex and it can be cheaply substituted as natural vitamin B-complex by mixing it with wheat-flour in 1:12 proportions. Burnt ash of paddy husk is mixed with some colour, sugar, menthol and salt and used as tooth powder. It cleans the teeth, but damages the fine enamel and the delicate gums. The rice polishing is used in the preparation of the rice bran oil, which is used in soap industry.

The hay of the paddy is burnt and its ash is applied over the itching of the skin and urticaria. A kind of alcoholic preparation is made from paddy in Japan which is known as *sake*.

REFERENCES

1. Swaminathan, M., Bhagwan, R. K., *Our Food*, (1966).
2. *Charaka Samhita*, Vol. 5, p. 180 (English), Published by Shree Gulabkunverba Ayurvedic Society, Jamnagar, (1949). (Popular Edn.).
3. Antia, F. P., *Clinical Dietetics and Nutrition*, p. 210, 1st Edn. (1966).
4. Hutchison's *Food and Principles of Dietetics*, p. 240, 10th Edn. (1958).
5. Khandwala, P. K., *Antia's Clinical Dietetics and Nutrition*, p. 211, (1966).
6. Khandwala, P. K., Ambegaokar, S. D., Patel, S. M. and Radha Krishna Rao, M. V., *J. Sci. Industr. Res.*, 21 C, 275, (1962).
7. Lewis, Y. S. and Johar, D. S., *Bull. C.F.T.R.I.*, 2, 288, (1952).
8. Kadkol, S. B., *Biochemical changes during Idli Fermentation, J. Tech.*, Vol. III, p. 26, No. 1, C.F.T.R.I. (1966 April), Mysore.
9. Van veen, A. G., *et al., Nutritive quality of idli, a fermented food of India, J. Fd. Sci.* 32, (3), 339, (1967).
10. Hakeem Zakaulla, *Mujerrebath-e-Zaki*. Urdu Mss., (1895), Lucknow.
11. Bhattacharia, *et al., Curing Freshly Harvested Rice by Heat Treatment Indian F. Technol.*, 2 (11), 378, (1964).

215. ROUGH CHAFF

Rough Chaff or **Prickly Chaff:** *Achyranthus aspera:* (B.N.); *Aghata, Kharamanjari, Apamarga:* (Sans.); *Charchata* or *Latigera:* (Hindi); *Safed Aghada:* (Urdu); *Qhar-vazgona:* (Pers.); *Uttranee: Uttranene,* (Kan.); *Antesha, Apamargamu:* (Tel.); *Shiru kadaladi, nayuruvi:* (Tam.); *Kadaladi:* (Mal.); *Aghada, pandara:* (Mar.); *Abatkundri:* (Sindhi); *Putkhunda* or *Kutri:* (Punj.).

Family: Amrantaceae.

Zodiac: Leo.

Food Value per cent approximately[1]

Carbohydrate	51.1 g.	Iron	0.009 g
Protein (N × 6.25)	22.5 g.	Ash	4.8 g.
Fat (ether extract)	4.7 g.	Cellulose	1.8 g.
Calcium	0.10 g.	Moisture	9.1
Phosphorus	0.46 g.	**CALORIES**	**392**

Essential Amino Acids per 16 g N (per cent)[1]

Arginine	2.1	Threonine	2.3
Histidine	4.9	Phenylalanine	6.2
Lysine	3.4	Leucine	8.6
Methionine	2.2	Isoleucine	5.8
Cystine	2.7	Valine	5.6
Tryptophan	1.8		

Constitution: Hot and Dry 2°.

Physiopharmacology and Therapeutics

Rough chaff plant grows wildly upto 3 to 4 feet with stiff stem having few thick bicular or elliptic leaves that are round at the apex. The plant has numerous greenish white flowers with elongated terminal spikes. The inflorescence is of raceme which shoots up from the leaves with flowers on the lateral side. The seeds are reddish brown or white, having bitter taste. They are

subcylindric, truncate at the apex and rounded at the base and resemble like cumin seeds.

Aghada plant is extensively used in medicine from ancient times in India. Decoction of the whole plant is given as a specific medicine for ascitis, dropsy, anaemia, piles, boils, skin eruption, scanty urination, etc. The plant is supposed to have a paralysing effect on scorpions and snakes. Therefore, the application of the fresh plant juice is used as an antidote for the poison of bees, spiders, snakes and scorpions[2,3,4,5,6]. The salt (*Nimake Charchata*) prepared by dissolving the ash of the plant in four times of its weight of water and the same is collected by evaporating the watery part. Five grains of this salt mixed with *Camel's milk* is given with excellently good results in dropsy, asthma, bronchitis etc. It is also used for making *Bhasmas* of Arsenic and Red-oxide of mercury (*Shangraff*).[4] Ash mixed with coconut oil in which a clove of garlic is boiled is used as a specific medicine for chronic ulcers, warts etc., and heals them quickly. Decoction of the fresh plant 2 to 3 ounces given once or twice daily cures, menorrhagia, rheumatism, diarrhoea, dysentery, etc. It hastens labour pains or causes abortion. Fresh leaves taken with *2 pepper* and a clove of garlic once daily is a specific medicine for malaria. Paste of the roots is applied in eyes for opacity of cornea, ophthalmia etc. Infusion of the roots is given to cure night blindness, syphilis, colic, etc.[7]

Seeds are used as food by sages and sadhus who live in jungles. One of the sages who met the author in 1950, confirmed about the remarkable strength that he possessed was only due to the daily use of a handful of Aghada seeds boiled in water or milk. He advised the author to use the seeds that are cooked with rice and jaggery as the specific medicine for all the complaints of liver, particularly anaemic dropsy caused by malnutrition. The author used this medicine with very good results in cirrhosis of the liver, Kwashiorkor, jaundice, etc. Due to lack of facilities, chemical analysis of the seeds remained unexplored until *Dr. Satyanarayana* and his associates did the chemical analysis of *Aghada seeds* at Defence Food Research Laboratories, Mysore and published their opinion[1]. After their investigations they confirmed that *Aghada seeds* are rich in essential amino acids that are higher in concentration than most pulses[6]. They recommend

the supplement of these wildly grown seeds as a food along with our daily menu. This scientific statement clearly points that our ancient medicine is a treasure house of wealth that needs honest research without any prejudice. There may be many more herbs which can be used as food but we are ignorant of them. I pray to God, to let us to shed off the garment of laziness and go ahead in research with the ancient torch that is burning idly.

REFERENCES

1. Satyanarayana, M. S., *et al.*, *The proximate composition and Essential Amino Acid content of Aghada Seeds, J. Food Science and Technology*, pp. 26-27, Vol. 1, No. 2, July (1964).
2. Mathur, R. C., *Systematic Botany*, p. 330 (3), (1965).
3. Nadkarni, K. M., *Indian Materia Medica*, pp. 1, 21, (1954).
4. Muzaffar Hussain, *Kitabul advia*, p. 312, (1965).
5. Kirtikar, K. R. and Basu, B. D., *Indian Medical plants*, 2nd Edn., III 2066. Lalitmohan Basu, Allahabad.
6. Aykroyd, W. R., *et al.*, *Nutrition value of Indian foods and Planning Satisfactory Diets, Bull.* No. 23, (1951). Govt. of India Press, Simla.
7. Dastur, J. F., *Medicinal Plants of India and Pakistan*, p. 7, (1962).

216. WHEAT

Wheat: *Triticum-sativum:* (B.N.); *Godhuma:* (Sans.); *Gehun:* (Hindi, Urdu, Dak.); *Jauo:* (Urdu); *Hinta:* (Arab); *Gandum:* (Persian); *Godhi:* (Kan.); *Godumlu:* (Tel.); *Godomay:* (Tam.); *Ghau:* (Guj. Mar.); *Kotampum:* (Mal.); *Ghama:* (Ori.).

Family: Graminae.

Zodiac: Leo.

Food Value per 100 g. approximately

Carbohydrate	71 g.	Vitamin A	08 I.U.
Protein	18 g.	Vitamin B_1	534 mcg.
Fat	1.5 g.	Vitamin B_2	119 mcg.
Calcium	50 mg.	Nicotinic acid	5 mg.
Phosphorus	318 mg.	Digesting Time	3 Hrs.
Iron	6 mg.	**CALORIES**	**348**

Essential Amino Acids (g. per 100 g. protein)[1]

Arginine	5.2	Methionine	2.2
Histidine	1.9	Phenylalanine	4.6
Isoleucine	6.0	Threonine	3.3
Leucine	8.0	Tryptophan	1.2
Lysine	3.9	Valine	6.1
Cystine	1.8		

Constitution: Hot and moderately dry.

Physiopharmacology and Therapeutics

Wheat is one of the most commonly consumed cererals in the world providing about 70 per cent of the caloric intake in the form of staple food[1]. There are number of varieties but, *T. vulgare*, *T. aestivum*, etc., are very popular.

Wheat is used as an article of food from time immemorial in India and other parts of the world. Indians knew its nutritional and medicinal value even before Jesus Christ. CHARAKA mentions the wheat as unctuous, heavy, nourishing, aphrodisiac and cordial. He described *Dhana*, *Arpatha*, *Papupa* etc., as the wheat flour preparations[2].

Physical Structure of Wheat

Wheat is divided into (*a*) *Endosperm*, (*b*) *Aleurone layer*, (*c*) *Pericap*, (*d*) *Scutellum and* (*e*) *Embryo* or *Germ*.

(a) Endosperm

The endosperm is the spongy structure of the wheat that is filled with starch, and micro particles of protein in the form of *Gliadin* and *glutenin* that are singularly known as *Gluten* which is about 12 per cent in the grain. It is noted that *Gliadin* has an effect of causing malabsorption syndrome in adults and *Coeliac disease* in children. These patients usually respond well on substituting milk-bread or exclusion wheat or wheat preparations and improve remarkably[1,13]. The elastic structure of the wheat dough is attributable to *Gluten* in wheat flour. Except *Rye*, wheat is the only known grain that contains *Gluten*. Gluten being poor in *Lysine*, it requires an addition of non-fat-dry milk powder, soya-bean-flour, ground nut-cake etc.,

to improve the nutritive value of the wheat preparations; notably the bread.[1,4,5,6] But there are various reports, that increasing the baking time from 10 to 50 minutes decreases the protein efficiency of the white bread containing 4 g. of non-fat dry milk per 100 g. of flour; from 1.3 to 0.3 and that of bread supplemented with 0.3 4 *Lysine hydrochloride* per 100 g. of flour from 2.3 to 1.0. During baking 30 minutes at 450°F 30 per cent of the added *Lysine hydrochloride* became nutritionally unavailable[6]. This *Lysine* loss in the bread during baking is attributable to *Lactose Lysine* reaction of milk[6]. However, the use of oxidised non-fat dry milk 6 per cent and whole acid casein that was preheated before baking and heating the milk in alkaline pH is found to be effective in preventing the Lysine loss in wheat bread.[7,8]

The hard Indian wheat contains more gluten than the Western variety. However, the gluten content of the wheat can be reduced to 3 or 4 per cent by infestation with weevils.[9]

Endosperm contains about 72 per cent of Carbohydrate.

Chemical composition of Endosperm per 100 g. approximately[10]

Carbohydrate	1.6 g.	Iron	8 mg.
Protein	13.1 g.	Water	13 g.
Fat	1.2 g.	Vitamin B_1	69 mg.
Calcium	13 mg.	Cellulose	0.7 g.

(b) Aleurone layer

Aleurone layer envelops the endosperm, but it is under the branny layer. It is rich in protein, but usually lost along with bran during milling the grain, because it is firmly attached to the outer layer.

(c) Pericap or the bran

Above the aleurone layer, there is another covering which is again divided in two cellular layers: *The outer layer* and *The inner layer*. The outer layer chiefly consists of cellulose impregnated with iron, calcium, phosphorus, magnesium, silica etc. It is removed while the wheat is decorticated. *The inner layer* contains a pigment that gives the colour to the wheat. It is poor in cellulose and minerals.

Bran is a very useful part of the wheat which prevents constipation due to its high concentration of cellulose that forms a bulk-mass in the intestines, and helps an easy evacuation due to increased peristalsis.[1] It is also rich in albumin, globulin and alcohol soluble protein.[11] It is rich in phosphorus in the form of phytate, therefore, excessive consumption of whole wheat flour interferes with the absorption of iron and calcium.

Chemical composition of bran per 100 g. approximately[10]

Carbohydrate	54.5	g.	Calcium	98	mg.
Protein	10.9	g.	Iron	12.9	mg.
Fat	4.2	g.	Cellulose	18.0	g.
Water	8	g.			

(d) Scutellum

Scutellum is a thin layer at the base that divides the grain from endosperm and the germ or embryo. It consists of high concentration of vitamin B_1 (59 per cent).[12] Therefore, whole wheat flour is recommended to get the full benefit.

(e) Embryo or Germ

Germ is situated at the base of the grain. It is rich in vitamin B_1 and E, protein, fats etc. It is removed while milling, because it spoils the wheat-flour due to its fatty contents. It forms about $1\frac{1}{2}$ per cent of the whole grain.

Chemical composition of germ per 100 g. approximately[10]

Carbohydrate	37.8	g.	Iron	9.7	mg.
Protein	32	g.	Vitamin B_1	2100	mg.
Fat	7.7	g.	Cellulose	1.8	g.
Calcium	58	mg.	Water	8	g.

Wheat products

Various wheat products are prepared from the *whole-wheat flour, white wheat flour and semolina* in the form of *bread, chapaties, Macaroni, spagatti* etc.

Whole wheat flour

Chemical composition per 100 g.[14]

Carbohydrate	71.2	g.	Iron	5.3	mg.
Protein	11.8	g.	Cellulose	1.2	g.
Fat	1.5	g.	Vitamin B_1	0.54	mg.
Calcium	0.050	g.	Niacin	5	mg.
Phosphorus	0.320	g.			

Whole wheat flour is obtained by grinding the grain in a flour mill or in a stone grinder (*chakki*). It is rich in bran, germ and vitamins. It is suitable for preparing chapaties. Bread prepared from whole-wheat flour is mostly used as a medicine for constipation, because it causes indigestion in weak persons.

White wheat flour

Chemical composition per 100 g.[14]

Carbohydrate	74.8	g.	Iron	1.5	mg.
Protein	10.2	g.	Cellulose	0.1	g.
Fat	0.8	g.	Vitamin B_1	0.12	mg.
Calcium	0.016	g.	Niacin	1.2	mg.
Phosphorus	0.016	g.			

White wheat flour is obtained by milling the whole grain; the bran and the germ is removed by sieveing the flour. It is known as *Maida flour*. One can compare the nutritive value of the whole wheat flour and the maida and note the enormous deficiency in its nutritive value. It chiefly consists of endosperm minus minerals and vitamins. It is mostly used in the preparation of white bread for its whiteness and delicacy.

Peeling grain without milling is accomplished by loosening the bran by strong *lye* which is removed by washing with water. The grain is rinsed for 5 minutes with 1 per cent *acetic acid* solution followed by washing in water. This process makes the grain white. Drying the grain yields a white unmilled nutritive product retaining the germ and aleurone layers. It is a very cheap process too.[15]

Semolina (Soji or Rava)

Chemical composition per 100 g.[14]

Carbohydrate	78.8 g.	Iron	1.6 mg.
Protein	10.4 g.	Cellulose	0.2 g.
Fat	0.8 g.	Vitamin B_1	012 mg.
Calcium	0.016 g.	Niacin	1.2 mg.
Phosphorus	01.02 g.		

Semolina is obtained by coarsely milling the wheat in granular form. It chiefly consists of endosperm and has got the similar nutritive value of white flour.

Brown Bread (whole wheat flour)

Chemical composition per 100 g.[14]

Carbohydrate	49 g.	Cellulose	1.2 g.
Protein	8.8 g.	Vitamin B_1	0.21 mg.
Fat	1.4 g.	Niacin	2.5 mg.
Calcium	0.018 g.	**CALORIES**	244
Iron	2.2 mg.		

White Bread

Carbohydrate	51.9 g.	Cellulose	0.2 g.
Protein	7.8 g.	Vitamin B_1	0.04 g.
Fat	0.7 g.	Niacin	0.7 mg.
Calcium	0.011 g.	**CALORIES**	245
Iron	1.1 mg.		

Bread is usually prepared in bakeries. The dough, fortified with milk, iron, niacin, yeast is prepared and the measured quantity is put in the moulds and passed on in the oven and baked at 400°-450°F for about 4 hours.

The heat that is applied to the fermented dough forms carbon-di-oxide and rises it in the porous form coagulating the proteins in the flour. The starch is converted into dextrin and forms the crest.

Bread making industry is very popular in Western countries, because bread is the chief staple food to them as rice and chapaties are to Indians. However, in India also, it is gaining popularity after its introduction during British rule and people are realising its nutritive value in health and sickness.

Digestibility of bread

Bread is an easily digestible food. It leaves the stomach before 2½ hours. The carbohydrates and proteins of the white bread get completely absorbed except those inorganic elements that are excreted unabsorbed. The digestibility of the new bread is lesser than that of stale bread. The fact is due to hardness of the bread and one requires more mastication which partially converts the starch into maltose due to the action of saliva.

How to select a good quality bread

In India, A quality bread is rarely available in towns except large cities. However, Govt. of India has taken a bold step in baking good quality bread and supplies in various parts of the country. One can safely buy this bread which is packed in sterile oil paper. Bread prepared by *Koshi* or *Nilligris* in Bangalore has an equal standard of *Hovis* of England and it is fortified with extra Iron, Niacin and milk. In other places, where there is no stock of standard bread one must remember that the bread should be light cream, soft, having uniform texture without large holes. It should have a sweet nutty flavour. It should not give a raw flour taste. When you think that the bread is exposed to dust, make sure to toast it on live charcoal or in a toaster before it is used.

Chapaties

Chapaties are unleavened bread that are commonly eaten all over India. They are prepared by mixing the wheat-flour with some water and the dough is left for an hour. Then, small portion of dough is mixed with oil or ghee and rolled over wooden planks with a wooden roller called *Belan* and round chapaties are made. They are toasted over hot iron pan with or without ghee and are consumed with vegetable or non-vegetable curries, eggs etc. One of the Italian cancer specialists said that eating Indian chapaties causes stomach cancer. After conducting extensive research, the author confirms that this statement is wrong. On the other hand, consuming chapaties, prevents gastric ulcer and cancer due to the protective action of saliva in the stomach. *Punjabis*, *Sikhs*, and others who eat chapaties prove with their

wonderful set of teeth radiant strong bodies and higher percentage of longevity that is attributable to wheat eating.

Usually, chapaties are prepared freshly and consumed. Stale chapaties become hard and get easily decomposed. This can be prevented by adding *Sorbic acid* (0.3 per cent on the weight of wheat flour) and salt 1 per cent and packed in polyethylene or aluminium foil. This process has proved worth trying in defence to provide ready to eat chapaties to our Jawans[16,17].

Macaroni

Macaroni is a very popular food in Italy. It is believed that Chinese were the first to prepare macaroni, then it spread to Germany. Italians learned the art of preparing macaroni from Germans. Macaroni is a cheap wheat product that is nutritious and digestible. It is therefore a suitable diet for all; irrespective of age.

Macaroni is prepared from *Durum wheat*—semolina, eggs, cheese, casein, soya flour, vegetables, salt, spices etc. Groundnut flour, vitamin B_1, Niacin, calcium, phosphorus, lecithin can also be mixed during the process of preparing macaroni. Recently, tapioca, and rice flour is also tried at C.F.T.R.I., Mysore with very good results in the process of the preparation of macaroni[18]. *Nutro macaroni* which consists of all the essential proteins, minerals, vitamins is formulated with excellently good results[19].

The colour of the macaroni should be yellow and it should cook without too much swelling. There are various technical tips in the preparation of good quality macaroni which can be learnt by writing to the Director, C.F.T.R.I., Mysore City.

Wheat flakes, grape nuts, etc., can also be prepared by wheat[20, 21].

Unleavened wheat bread or chapaties eaten daily with *honey,* and *half boiled eggs* is an excellent nerve tonic to retain sex power and vigour. It is a good medicine for Bell's palsy, anaemia, kwashiorkor, cirrhosis of the liver, stomatitis, and general debility during pregnancy and lactation. A cupful of the emulsion of the wheat that is soaked in butter-milk is an excellent medicine for piles, rectal fissure, and jaundice.

REFERENCES

1. Antia, F. P., *Clinical Dietetics and Nutrition*, pp. 201-207, (33), (1966).
2. Charaka, *Charaka Samhita*, pp. 204, 271-72, Vol. 5.
3. Murphy, J. C., *et al., F. biol. Chem.*, 69, 85 (Antia).
4. Rosenberg, *et al., Arch. Biochem.* 49, 263 (Antia).
5. Phansalkar, S. V., *et al., Indian F. Med. Research*, 44, 1, (Antia).
6. Jansen, G. R., *et al., Food Tech.*, 18, (13) 109-114.
   J. Food Sci., p. 34, Vol. 1, July (1964).
7. Patel, R. B., *et al., Cereal Science Today*, 12, (9), 377, (1967).
8. Swanson, A. M., *Cereal Science Today*, 12, (9), 363, (1967).
9. Wheat and Wheat products as human food, *Indian Council of Medical Research*, New Delhi, Special Report Series No. 23, p. 34. (1952) (Antia).
10. Hutchison's *The Food and The Principles of Dietetics*, p. 304, 10th Edn. (1948).
11. Jones, D. B., and Gresdroff, C. E. F., *J. biol. chem.*, 58, 117, (Antia).
12. Hinton, J. J. C., *Bio-chem. J.* 38, 214, (Antia).
13. Alvey, C., *et al., Arch. Dis. Child health*, 434, (p. 335).
14. Swaminathan, M., Bhagwan, R. K., *Our Food*, p. 58, 5th Edn. (1966).
15. Morgan, Jr., A. I. *et al., Peeling grain Fd. Technol.*, 18, (8), 40, (1964).
16. Rao, G. K., *Preservation of Chapaties*, Defence Food Research Laboratory, Mysore, (1967).
17. Kanur, S. B., *et al., Defence Food Research Laboratory, Mysore*, 14 Nov. (1967) *J. Food Science*, p. 17, Vol. 5, No. 1, April (1968).
18. Bhatia, D. S., *Macaroni and Related Products Reviews in Food Technology*, pp. 91-108, Vol. 3, (1961).
19. Doraiswamy, T. R. *et al.*, Ibid., 10, 393 (1961).
20. Nutritive value of wartime foods (1945).
21. McCance and Widdowson, *Chemical composition of foods*, (1942).

217. FAREX

Farex is a cereal baby food formulated by Glaxo-Laboratories of England. It is prepared from the flours of wheat, oats, rye, with added iron, salt, bone meal, wheat-germ, dried yeast and vitamin A, B_1, B_2, D and it contains 15 per cent protein.

The flours of the various cereals are slurried with water in a steel tank. Then the slurry is pumped to a holding tank overhead and run to the drying machine. Bertram Twin rollers fitted with accelerating speed gear and scraper knives are used at a steam pressure of 60 lb. per sq. inch. The powder is

conveyed to a brush sifter and a Christy Norris disintegrator unit is used to bring the bulk density within specific limits. The product is once again put through a brush sifter. The *Farex* powder is then filled in paper bags that are put in tins and hermatically sealed.

Farex is an excellent baby-food which is suitable during weaning time. Most of the babies like the taste of *Farex* and thrive well on it.

PART VIII

PULSES

In India, Pulses like: *Bengal-gram, Black-gram, Cow-gram, Field-beans, Green-gram, Horse-gram, Khesri-dal, Lentil, Red-gram,* etc., are largely consumed next to cereals. Pulses are indeed a good and cheap source of *bulk-food*, that supplies *energy, proteins, minerals* and *vitamins.*

Pulses absorb plenty of water when they are cooked and form the bulk food. It is this reason that they are not readily digested in the stomach. *Gelen* aptly said 'They are harder to digest than other foods and give bad dreams'. The digesting time of the pulses varies between 3 to 4 hours, but they become easy digestible and more nutritive if they are germinated.

The energy that is supplied by pulses is due to carbohydrate in the form of starch. It is estimated that each pound of pulses supplies about 1,500 calories. Since starch is harmful if eaten uncooked, pulses should be properly cooked before they are consumed. Germination of the pulses converts the starch into dextrose and maltose, therefore, eating such uncooked pulses does not cause any digestive disturbances. Germinated pulses are suitable for weak persons too. Carbohydrate of the pulses can be safely consumed along with other fatty foods, because, pulses do not contain fat. The bitter principle in the starch of pulses can be removed by soaking them in water containing a small amount of *soda bicarb.*

The proteins in pulses are usually *globulins* that are insoluble in water, but they contain some water-soluble proteins in the form of *albumin.* Though the globulin proteins have more *glutamic acid* in their molecules and are rich in *arginine;* their content of sulphur containing *amino-acids* is low. The other essential amino-acids like: *histidine, lysine, cystine, tyrosine, tryptophane* and *phenylalanine* are present in pulses in various concentrations. The absence of sulphur containing amino-acids can be rectified and the pulse-proteins can be converted into tissue-building high quality proteins by consuming plenty of fishes, eggs, poultry, meat and milk[1].

Pulses supply *Phosphorus, Calcium, Iron, Potassium, Sodium* etc., but the absorption of free calcium is impeded due to the

presence of phosphorus in the form of phytates. It is unfortunate that the man is deprived of the power of converting the phytates into phosphate as the other rodents and herbivorous animals do. It is this reason, that excessive use of pulses and cereals in calcium deficiency proves useless. However, pulses can be strongly recommended as a cheap source of nitrogen-rich protein food for vegetarians and healthy ones.

REFERENCE

1. Hutchison's *Food and the Principles of Dieteties*, pp. 342-347, 10th Edn., (1948).

218. BENGAL GRAM

Bengal Gram or **Chick-Pea:** *Cicer arietinum:* (B.N.); *Chanaka:* (Sans.); *Chana:* (Hindi, Urdu, Dak.); *Kadle:* (Kan.); *Himmoz:* (Arab); *Nuqood:* (Pers.); *Kadalai:* (Tam.); *Senagulu:* (Tel.); *Katala:* (Mal.); *Harbara:* (Mar.); *Chaniya:* (Guj.); *Bhogadi:* (Sind.); *Choley:* (Punj.); *Bhuta:* (Ori.); *Chota-but:* (Beng.).

Family: Papilionaceae.

Zodiac: Cancer.

Food Value per 100 g. approximately

Carbohydrate	61.2 g.	Vitamin A	270 I.U.
Protein	17.1 g.	Vitamin B_1	98 mg.
Fat	3.5 g.	Vitamin B_2	507 mg.
Calcium	189 mg.	Niacin	2.4 mg.
Phosphorus	238 mg.	Oxalic acid (with husk)	2.4 mg.
Iron	9.1 mg.	Digesting Time	31 Hrs.
Potassium	322 mg.	**CALORIES**	**361**
Sodium	71 mg.		

Essential Amino Acids (g. per 100 g. protein)[1]

Arginine	6.9	Methionine	1.7
Histidine	2.3	Phenylalanine	5.0
Isoleucine	6.0	Threonine	4.8
Leucine	8.0	Tryptophan	6.0
Lysine	4.4	Valine	5.4
Cystine	0.8		

Constitution: Hot and Dry 1°.

Physiopharmacology and Therapeutics

Chick-pea plants are largely cultivated in the Punjab, U.P., A.P. etc., during winter months. The plants are viscid and profusely branched. They grow up to 20 inches having pinnate $\frac{1}{4}$ inch long toothed leaves that are ovate-oblong or obviate and sour in taste.

The flowers are solitary axillary and are pink, blue or white depending on the variety of gram. The fruit is a pod $\frac{3}{4}$ to 1 inch long in which one or two green seeds that are encased in the pod and become reddish-brown on drying. The seeds of other varieties of Bengal gram such as: *Kabuli channa*, *black* and *white channa* are bigger in size[2].

Bengal gram is the chief food for poor people and domestic animals, particularly the horses.

Flour of the puffed Bengal gram (*phutaney ka-ata*) is a chief constituent of Multipurpose Food of C.F.T.R.I., Mysore.

Flour of the puffed Bengal gram 2 tablespoons mixed with *sugar*, *powdered dates* and *skimmed milk powder* is a very nutritive food in the treatment of kwashiorkor in children, impotency, premature ejaculation, hardness of liver, under weight, etc. It can be packed in air tight tins and used as an emergency food during travelling. It is nutritious and a safe food than the contaminated food available during the journey.

Flour of the unroasted gram (*Besen*) is used in the preparation of various sweet meats. It is the base of *Mysore Pak*, a very popular sweet meat of Mysore State. Other culinary preparations like: *Vadai*, *Besen roti*, *Chaklee* etc., are also prepared from the flour of Bengal gram. The flour is a very effective cleansing agent, and its regular use as a cosmetic, bleaches the skin and prevents its natural oil if used in place of soaps. In allergic skin diseases like eczema, contact dermatitis, scabies, washing with Bengal gram flour is highly recommended. The flour mixed with *full-cream milk* in which few drops of fresh *lime juice* is added is applied over the face as a very useful cosmetic to cure

pimples, and dry skin. Washing the hair with the flour keeps them clean, soft and free from hair diseases.

Sprouted Bengal gram supply plenty of vitamin B-complex and C. Cooked germinated gram is a wholesome food for children and invalids. Water in which sprouting Bengal gram is soaked in a new earthen pot is used as a very cooling medicine during small-pox, measles, diarrhoea, dysentery, cholera, typhoid excessive thirst due to diabetes, summer heat, etc. Putting the water in the eyes during these infectious diseases prevents the eye infections and imparts a cooling sensation. This treatment is prevalent in India from ancient times.

Excessive use of Bengal gram causes indigestion, rancid flatus and may precipitate urinary calcium due to high concentration of oxalic acid and form urinary calculi.

Dry pods and the husk of the Bengal gram are used as an excellent fodder.

Leaves: (see Bengal gram leaves).

219. BLACK GRAM

Black Gram: *Phaseolus radiatus:* (B.N.); *Makh masha:* (Sans.); *Urud:* (Hindi, Urdu, Dak.); *Uddu:* (Kan.); *Mash hindi:* (Arab); *Mash* or *Banu siyah:* (Pers.); *Ulluthum parapu:* (Tam.); *Minnum:* (Tel.); *Ulunu:* (Mal.); *Manjdhal:* (Sindhi); *Kulay masha:* (Beng.).

Family: Papilionaceae.

Zodiac: Libra.

Food Value per 100 g. approximately

Carbohydrate	60 g.	Vitamin B_1	417 mcg.
Protein	24 g.	Vitamin B_2	387 mcg.
Fat	1.4 g.	Niacin	2.1 mg.
Calcium	210 mg.	Potassium (with husk)	523 mg.
Phosphorus	350 mg.	Potassium (without husk)	643 mg.
Iron	9.8 mg.	Sodium (with husk)	80 mg.
Oxalic acid	27.8 mg.	Sodium (without husk)	78 mg.
Vitamin A	63 I.U.	**CALORIES**	**350**

Essential Amino Acids (g. per 100 g. protein)[1]

Arginine	5.7	Methionine	0.8
Histidine	3.0	Phenylalanine	8.5
Isoleucine	6.7	Threonine	3.8
Leucine	7.9	Tryptophan	0.6
Lysine	8.3	Valine	5.4
Cystine	1.3		

Constitution: Hot and Wet 2°.

Physiopharmacology and Therapeutics

Black gram plants are largely cultivated all over India. There are two varieties of the pulse namely, the black or dark brown seeds, which ripen in August-September and the other with smaller greenish seeds that ripen in October-November. Many authors have written *P. mungo* is *urud* and *P. radiatus* is *Mung*. Perhaps they might have followed the adoption of *Duthi* and *Linnaeus* who unfortunately applied the name to a variety of Urud.[2]

Black gram is extensively used in the preparations of various culinary preparations like *idli*, *papad*, *curries*. It is also used in the preparation of various Unani aphrodisiac halwas.

Black gram dal that is soaked in water for about six hours and after draining the water the dal is fried in pure cow's ghee. It is used with wheat bread and honey with excellent results in functional impotency, pre-mature ejaculation, thinness of the semen, facial paralysis, lumbago, etc. The same eaten with half boiled eggs is an ideal tonic for nervous weakness, weakness of memory, schizophernia, hysteria, nervous tachycardia, diabetes, corneal ulcers, stomatitis, cirrhosis of the liver in children due to malnutrition, kwashiorkor, marasmus, rickets, and increases breast milk.

Soak a handful of *mash* in cow's milk overnight along with the equal quantity of dry seeds of *tamarind*. Then drain the milk and dry the ingredients. Powder them and take two teaspoons of the powder every night with a glassful of milk sweetened with honey. It acts like a very expensive aphrodisiac, and cures spermatorrhoea[3].

Mix a handful of blackgram flour in a cupful of milk and knead well. Then prepare *roti* and cook on a frying pan on only one side. Smear some til oil over the uncooked side and foment on the head of a person suffering from meningitis. Twice or thrice daily. It increases the circulation of the brain and reduces inflammation of the meninges[5,6]. (Note: Meningitis is a very serious infection of the coverings of the brain. It may be caused due to various pathogenic organisms of tuberculosis, influenza, typhoid etc. Experience teaches that it requires a very high skilled physician to treat the case after microscopic examination of the cerebro spinal fluid. Since the after effects of this disease are many and the prognosis is alarming, only external treatment as mentioned above is not advised. However, there is no harm in fomenting the head. But we usually apply ice cap to the scalp in such cases and I have not tried this method).

Washing the hair with the paste of cooked black gram dal and *fenugreek* (methi) lengthens the hair, keeps them black and cures dandruff. Paste of the black gram mixed with *asafoetida* (hingu), *dil seeds*, *mustard seeds* ¼ teaspoon of each is applied over the painful part in renal colic, flatulent colic, rheumatism, gout, and the part is fomented.

Soak a handful of black gram with an equal quantity of *methi* in a new earthen pot having filled with *tender coconut water* for about four hours. Then use a cupful of it thrice daily as an excellent diuretic in gonorrhoeal urethritis, cystitis, nephritis, pyetilis, toxaemia of pregnancy, etc.

Germinated black gram with fresh *bitter gourd* juice half a cupful and a teaspoonful of *honey* is used once daily for three to four months with restriction of carbohydrates, is an effective medicine to cure mild type of diabetes mellitus. Even in severe types of diabetes, regular use of this combination along with other oral antidiabetic drugs and the time honoured Insulin is recommended as a health giving food to prevent all the complications that arise due to malnutrition in diabetic patients.

How to prepare good quality papad (Black gram dal wafers)

There are various methods of preparing papads but this recipe is found to be very delicious.

Recipe*

Black gram dal	1 kg.	Onion	25 g.
Puffed Bengal gram	50 g. (½ cup)	Salt	To taste
		Soda bicarb	1 table-spoonful
Bengal gram dal	200 g.		
Sesame (white gingelly seeds)	50 g.	White of an egg (if desired)	
Cumin	50 g.	Coarse Red chilli powder (as per taste and if desired hot papads)	
Pepper	50 g.		
Garlic	50 g.		
Ginger	50 g.		

* (Miss Suriya Begum, Mysore)

Method of preparation

Clean the ingredients and dry them in the sun for about three hours, then grind them in stone grinders (Chakkee). Sieve the flour in a fine siever. Boil 3 cupful of water and add about two handful of good quality salt and add soda when the water is boiling. Take the vessel off from the fire. Pound *cumin* and *pepper* coarsely and mix them in the flour along with gingelly seeds throughly. Grind *ginger*, *garlic*, and *onion* and mix them in the flour *white of an egg* can also be mixed if desired. Pour the clear portion of the water in which salt and soda is previously added and knead the flour throughly. After forming a dough, beat it smearing with little, *til oil* until it becomes soft and elastic. It is found that simply mixing the dough without beating does not improve the elasticity.

Then take the desired quantity of the dough and roll them into thin wafers as you prepare *chapaties*. It should be remembered that papads should be dried indoors by spreading them on a mat in cool place. Otherwise discolouration of papads takes place and they become unpalatable. After papads are dried, they must be packed in cellophane bags or air-tight tins to last long. For commercial manufacturing of papads; special beaters and low temperature driers are available. If you are interested in knowing other technical details write to the Director, C.F.T.R.I., Mysore City.

Leaves

Decoction of the fresh black gram leaves is used as a diuretic in general dropsy, scanty urination due to excessive perspiration etc. Dry leaves and pods are used as a fodder.

Roots

Paste of the fresh root is applied on the traumatic affections, rheumatic pains, etc.[6]

Note: Excessive use of blackgram causes flatulence which can however be prevented by adding little *asafoetida*, *pepper* and *ginger* in the culinary preparations. It is contra-indicated in rheumatic diathesis and urinary calculi predisposition, as it contains oxalic acid in high concentration.

220. COW-GRAM

Cow-gram or **Chinese Dolicas:** *Vinga cylindrica:* (B.N.); *Raja masha:* (Sans.); *Lobia:* (Hindi, Urdu, Dak.); *Fareeqa:* (Arab); *Halasinde kalu:* (Kan.); *Karamani:* (Tam.); *Alachandalu:* (Tel.); *Mochhak koti:* (Mal.); *Kuleeth:* (Mar.); *Chunala:* (Guj.); *Chinula:* (Marvadi); *Chunra:* (Sindhi); *Arvan:* (Punj.); *Chani:* (Ori.); *Barbeti:* (Beng.).

Family: Papilionaceae.

Zodiac: Libra.

Food Value per 100 g. approximately

Carbohydrate	55.7 g.	Vitamin B_1	500 mcg.
Protein	24.6 g.	Vitamin B_2	477 mcg.
Fat	0.7 g.	Niacin	1.3 mg.
Calcium	70 mg.	Potassium	323 mg.
Phosphorus	490 mg.	Sodium	95 mg.
Iron	3.8 mg.	Digesting Time	3 Hrs.
Vitamin A	60 I.U.	**CALORIES**	327

Essential Amino Acids (g. per 100 g. protein)[1]

Arginine	6.9	Methionine	1.0
Histidine	3.1	Phenylalanine	5.2
Isoleucine	4.9	Threonine	3.2
Leucine	7.5	Tryptophan	0.6
Lysine	6.2	Valine	6.3
Cystine	0.7		

Constitution: Hot 1° and Wet 2°.

Physiopharmacology and Therapeutics

The plants are suberect creepers that are extensively cultivated during the rainy season for its grain. The grain resembles like kidney, therefore, it is also called *kidney bean.* Green pods are eaten like vegetable and the seeds are cooked in various culinary preparations. Eating a handful of roasted green seeds daily, is a medicine for neuritis, insomnia, weakness of memory, indigestion, dyspepsia, sensation of pins and needles in the limbs, periodic palpitation, congestive cardiac failure, etc.

Eating the fresh green seeds with *jaggery* or *egg yolk* once daily is an excellent medicine for stomatitis, corneal ulcers, sprue, seborrhoic dermatitis, coeliac disease, kwashiorkor, rickets, constant desire to sleep etc.

Decoction of the dry seeds a glassful, drunk every day cures hyperacidity, scanty urination, nausea and vomiting due to presence of roundworms, etc. Eating the boiled grains with cooked leaves of *drumstick* increases strength, improves digestion and acts as a very effective aphrodisiac. Excessive use of the beans causes wind in the intestines and mild colic. Infusion of the leaves is applied over the face to cure pimples. It is fomented to reduce swelling due to mild injuries.

221. FIELD BEAN

Field bean: *Dolichos lablab:* (B.N.); *Simbi:* (Sans.); *Ballar* or *Val:* (Hindi, Urdu, Dak.); *Avre-kalu:* (Kan.); *Avarai:* (Tam.); *Avarichickddu:* (Tel.); *Unangiyathu:* (Mal.); *Bara-gudi:* (Ori.); *Sukha sim:* (Beng.).

Family: Papilionaceae.

Zodiac: Libra.

Food Value per 100 g. approximately

Carbohydrate	60.1 g.	Vitamin B_1	520 mcg.
Protein	24.9 g.	Niacin	1.8 mg.
Fat	0.8 g.	Potassium	402 mg.
Calcium	70 mg.	Sodium	89 mg.
Phosphorus	455 mg.	Digesting Time	3 Hrs.
Iron	2 mg.	CALORIES]	347
Vitamin A	Trace		

Essential Amino Acids (g. per 100 g. protein)

Arginine	9.2	Methionine	0.7
Histidine	2.8	Phenylalanine	5.3
Isoleucine	6.0	Threonine	3.3
Leucine	8.9	Tryptophan	0.5
Lysine	8.1	Valine	5.6
Cystine	1.0		

Constitution: Hot and Wet 2°.

Physiopharmacology and Therapeutics

Field bean plants are suberect and are largely cultivated during winter for the sake of field beans. Green field beans are very popular during the season and are largely consumed. Since the beans are rich in vitamin B_1, phosphorus, and protein, they enrich the blood, tone the nerves and form a wholesome nutritious food for persons suffering from high blood-pressure, neuritis, impotency, etc. Soup of the green beans mixed with *buttermilk* is a very effective liquid-food for invalids, children, and during the treatment and convalescence of typhoid. Eating the beans with the covering is always recommended, because, its cellulose content cures constipation and prevents the acid forming characteristics of the peeled bean. The pods contain an oil which contains certain irritable chemicals and its application to the skin causes allergic dermatitis. It contains a peculiar smell due to this volatile oil.

Paste of the dry bean prepared in ones own saliva and the paste of *Murraya koenigh* (kariya path) leaf stalk is applied over styes and pimples with excellent results.

Dry beans contain two *haemagglutinins*, A (yield 0.6 per cent; insoluble in water) and 5B (yield 0.8 per cent; soluble in water) that are isolated by SINDHU *et al.*, A is electrophoretically

homogeneous and negatively charged. The sugar content in A is 9.9 per cent and in B, 13.9 per cent. B exhibits antipyretic activity. A is devoid of it. With human erythrocytes, A exhibits an activity of 1500 haemagglutinating units (H.U.) and B of 1200 H.U. per mg. of nitrogen. Excessive use of the beans causes flatulence.

Juice of the leaves is applied as a medicine to cure eczema and scabies.

222. GREEN GRAM

Green gram: *Phaseolus mungo:* (B.N.); *Madag:* (Sans.); *Mung:* (Hindi, Urdu, Dak, Beng.); *Mash muj:* (Arab); *Banu mash:* (Pers.); *Hesru kalu:* (Kan.); *Pachhipayaru:* (Tam.); *Pachhai-pesulu:* (Tel.); *Cherupayar:* (Mal.); *Magleela:* (Guj.).

Family: Papilionaceae.

Zodiac: Aquarious.

Food Value per 100 g. approximately

Carbohydrate	57.3 g.	Vitamin B_2	387 mcg.
Protein	24 g.	Niacin	2 mg.
Fat	57.3 g.	Potassium (with husk)	583 mg.
Calcium	140 mg.	,, (without husk)	643 mg.
Phosphorus	280 mg.	Sodium (with husk)	59 mg.
Iron	8.4 mg.	,, (without husk)	49 mg.
Vitamin A	158 I.U.	Digesting Time	2 Hrs.
Vitamin B_1	465 mcg.	**CALORIES**	**334**

Essential Amino Acids (g. per 100 g. protein)

Arginine	6.3	Methionine	0.6
Histidine	2.7	Phenylalanine	5.9
Isoleucine	6.3	Threonine	3.5
Leucine	7.7	Tryptophan	0.4
Lysine	7.0	Valine	6.4
Cystine	0.6		

Constitution: Cold and Wet 2°.

Physiopharmacology and Therapeutics

Green gram plants are creeping suberect and are extensively cultivated all over India. There are number of varieties of the gram, but the one with green colour is very popular. Green gram is a very nutritious food that is rich in high grade vitamin B_1, B_2, iron, and proteins. Particularly the germinated gram is very rich in vitamin C. From bygone days, the use of green gram in various religious ceremonies indicate that our forefathers were well aware of the nutritious value of this pulse. *Kosumbiri* or the salad of green gram dal soaked in water and mixed with scraped *coconut*, *coriander-leaves*, *lime juice*, *salt*, *green chillies* is one of the most delicious side dish that is largely consumed during summer. It gives a cooling sensation during this season and supplies the body with all the necessary minerals and vitamins. It increases the tolerance to sun's heat and prevents its bad effects. It increases urinary output due to high potassium and prevents the extra loss of sodium chloride during excessive perspiration. It quenches thirst and makes one feel exhilarating.

Water in which green gram is soaked can be given instead of plain water in almost all diseases where water is liberally advised. Even it can be given in small quantities during acute phase of appendicitis. But it is an excellent medicine during cholera, measles, chicken-pox, small-pox, typhoid and all types of fevers, cystitis, urethritis, nephritis etc.

Cooked dal of green gram is a very digestible food for all invalids. Its regular use during childhood, pregnancy, lactation etc., helps one to get the required nutrition, promotes health and safeguards eye sight.

Cooked dal with bread is an excellent food for gastritis, hyperacidity, jaundice, piles, constipation, indigestion, etc.

Flour of the green gram is an excellent detergent that can be used as a substitute for soap. It does not remove the skin oil, but removes the dirt and does not cause any skin irritation. Therefore, it is recommended to wash eczema, contact dermatitis etc. Its application over the face bleaches the colour and blooms the complexion. Unleavend bread cooked on one side is applied over the head to cure meningitis. Black gram flour is also used for washing the hair with green gram paste to prevent dandruff

and lengthen hair. Application of the soaked green gram paste ground with *tender guava leaves* is an excellent medicine for scabies and bad smell in the body. Apply half an hour before taking bath.

223. HORSE GRAM

Horse gram: *Dolichos biflorus:* (B.N.); *Kultha:* (Sans.); *Kulthi:* (Hindi, Urdu, Dak., Guj.); *Habul Qhillat:* (Arab); *Sangshikan:* (Pers.); *Hurli:* (Kan.); *Kollu:* (Tam.); *Ulavalu:* (Tel.); *Kolu muthira:* (Mal.); *Kulluth:* (Mar.); *Kulli:* (Beng.).

Family: Papilionaceae.

Zodiac: Aries.

Food Value per 100 g. approximately

Carbohydrate	57.3 g.	Vitamin B_1	218 mg.
Protein	22 g.	Vitamin B_2	192 mg.
Fat	0.5 g.	Niacin	1.3 mg.
Calcium	280 mg.	Potassium	322 mg.
Phosphorus	385 mg.	Sodium	46 mg.
Iron	7.6 mg.	Digesting Time	2½ Hrs.
Vitamin A	129 I.U.	CALORIES	322

Essential Amino Acids (g. per 100 g. protein)[1]

Arginine	5.4	Methionine	0.8
Histidine	3.0	Phenylalanine	8.5
Isoleucine	6.7	Threonine	3.8
Leucine	7.9	Tryptophan	0.6
Lysine	8.3	Valine	5.4
Cystine	1.3		

Constitution: Hot and Dry 2°.

Physiopharmacology and Therapeutics

The plants of horse gram are extensively grown during winter all over Deccan and Mysore State as a dry crop. It is a nitrogenous crop which increases the fertility of the soil due to

the nitrogen nodules found on the roots. Fresh and the dry leaves and pods are used as fodder.

Horse gram is mostly used as a fodder for cattle and horses. Boiled gram and its decoction is used as food. But, it is not so commonly used as other pulses.

Horse gram in the treatment of Urinary calculi

Grandmothers usually advice the young boys to avoid eating small bits of stones along with the food, so as to avoid their passage in the urinary tract. However, there is no relationship between swallowing stones and their appearance in the urinary tract, because any solid matter will not enter the blood stream through the intestinal wall. The formation of the stones in the urinary tract is entirely a different subject, and perhaps the urinary stone has affected mankind from primitive times.

How urinary stones are formed has baffled the medical science in spite of various theories, but there is one definite factor that plays a major part in the formation of urinary stones is eating wrong type of *food*, either too much or too less!

How urinary stones are formed

What actually happens in the urine that leads to the formation of stones is the supersaturation of certain chemicals like; *calcium*, *phosphorus*, *oxalates*, *magnesium*, *uric acid*, *ammonium* and *cystine* that are daily excreted in the urine. These chemicals are kept soluble in the urine due to the presence of colloids and the proper pH value of urine. The alteration of pH value of the urine due to excessive secretion of one or more of these chemical constituents making the urine either too acid or too alkaline[1]. MEYER[2], describes that the phosphates are more soluble in acid urine, while the alkaline urine keeps the uric acid in solution. MEDES[3] demonstrated that calcium oxalate is kept in solution in the urine due to the presence of high concentration of urea in it. Saturation of sodium chloride in the urine also plays a major role in the solubility of calcium oxalate. NORTON *et al.*,[4] and HAMMARSTEN[5] showed by experiments that the presence of magnesium and citrates in the urine also plays a major role in controlling the solubility of calcium oxalate. When magnesium is administered in adequate

amounts the calcium excretion in the urine diminishes and comes out of the body through the bowel. SCOTT *et al.*,[6] demonstrated that the presence of high concentration of citrates in the urine binds with calcium forming non-ionizable soluble complex. It is this reason that women who secrete more citrates in the urine under the influence of oestrogen hormone, remain greatly immune against the formation of urinary stones.

If any one of the foregoing physiological factors that keep the chemical constituents of the urine in solution get disturbed, one or more of these chemicals depending on the pH value of urine begin to precipitate, and the nucleus of a stone takes place. MEYER[3] showed that uric acid precipitated at pH 5.0 and calcium phosphate and oxalate at pH 6.0. Phosphate and carbonate of calcium, phosphate of ammonium get precipitated if the urine is more alkaline[6].

According to LICHTWITZ[7], the formation of nucleus and development of the stones usually commences only in the presence of deranged urinary tract epithelium either due to infection or due to hypertrophy caused by vitamin A deficiency and hyperparathyroidism. Under these favourable conditions the nidation of the precipitated chemicals takes place and continue to grow and fail to get washed away in the urine. The author is doubtful about this theory as he has seen urinary calculi in some of the patients who never suffered from any urinary tract infection. Even PYRAH[8] and HARRISON[9] report of such cases, however, the formation of urinary calculi and its definite aetiological factor is still not fully known.

Kinds of Urinary Stones or Calculi

There are about six kinds of urinary stones namely: *Phosphatic calculi, Uric acid calculi, Oxalate calculi, Cystine calculi, Xanthine calculi* and *Staghorn calculi*.[10]

1. Phosphatic calculi

Of all the other types of urinary stones the formation of calcium, magnesium and ammonium phosphate stones is very common. The formation of these stones is often associated with *hypercalciuria*. Normally, males excrete 300 mg. of calcium and females about 275 mg. of calcium daily. If higher excretion of

calcium in the urine due to high intake of calcium rich foods such as; milk, cheese, egg yolk, excessive use of vitamin D, hyperparathyroidism, bone diseases, renal tubular acidosis and certain other unknown factors; precipitate the chemicals and form *phosphatic calculi* in alkaline or neutral urine. The stones are white, soft and chalky and may sometimes be deposited on the urate or oxalate stone (secondary stone).

2. Uric acid calculi

Uric acid stones are composed of urates and sometimes with oxalates. They are usually hard, brittle and highly polished. They are brown in colour with projection like appearance[11]. About 10 per cent of all urinary stones are composed of uric acid. One third to one half of these stones occur in infants and children[10]. They are not visible in X-rays.

HEILIG describes that uric acid stones are commonly caused by eating foods rich in uric acid such as: liver, kidney, brain sweet-bread, fish-roe, mushrooms pulses, and spinach. He advises to avoid such foods in persons who are predisposed to uric acid calculi. Drinking water and fruit juices except pomegranate juice is recommended, to keep the urine pH value normally in such persons[12].

3. Oxalate calculi

Oxalate stones are formed by excessive excretion of oxalates. These stones are composed of calcium oxalate and generally less than 2 cm. in diameter. They are extremely hard with rough surface. Due to this roughness they cause intense pain and pass through the ureter with great difficulty[10].

KAUL and VARMA confirmed that excessive consumption of foods rich in oxalates such as; almond, lady's finger, spinach, dandelions, walnuts, milk, cheese, egg yolk, cabbage, onions, lentils, etc. They proved that renal lithiasis is generally common in Kashmiris which is attributable to these foods that are commonly eaten by them[13]. Excessive use of chocolate, analgesics, like A.P.C. etc., may also cause the formation of calculi.

Congenital defect of oxalate metabolism which exceeds the normal limits of 24 mg. in 24 hours urine also plays a major

role in forming oxalate calculi and nephrocalcinosis in children and adolescents[14, 15]. Heredity is proved to have an influence in forming calculi in dogs[16]. Excessive use of alkalies in gastric ulcer also precipitates stone forming chemicals.

4. Cystine calculi

Cystine stones are usually small, and ovoid, and have a smooth waxy surface similar to hard soap. These stones form only in acid urine and may be dissolved in alkanizing the urine[10].

5. Xanthine calculi

Xanthine stones only form in acid urine, and are usually not over 1 cm., in diameter. They are smooth and hard. These stones are commonly found in the bladders of children[10].

6. Staghorn calculi

Staghorn stones are usually found in the renal pelvis, therefore, they impart its staghorn shape. These stones are chemically composed of phosphate, oxalate and urate, and are commonly found in urinary infection[10].

Signs and Symptoms of Urinary Stones

Stones in the urinary tract produce variety of symptoms related to their location, size, variety, obstruction and infections. Stones in the pelvis of the kidney may not cause any alarming symptom in the beginning, but if the stone is big enough to cause obstruction in the flow of the urine, vomiting, nausea, back pain, severe bleeding in urine etc. are some of the most striking symptoms attributable to back pressure.

If the stone passes down the ureter and gets impacted there either due to muscular exercise or constant joltings, while riding in a bus, one often experiences severe excruciating and episodic pain that radiates to the lower part of the abdomen and the testes. In case of women, the pain localises around labia majora. There may be severe sweating and the patient tosses from side to side due to unbearable stabbing pain. If there is infection, the pain accompanies with fever, haematuria, nausea and vomiting with a constant desire to pass scanty urine. The

pain lasts for several minutes or hours. It may disappear suddenly if the stone is small and passes quickly in the bladder[11, 14].

On examining the patient one commonly finds the severity of hyperaesthesia over the renal area. The pressure over ureter, kidney or bladder may increase the colic. Gentle tapping the costovertebral angle characteristically produces pain. If there is acute obstruction the enlarged kidney may be palpated[14, 17]. The pain due to stone in the kidney is called RENAL COLIC.

For diagnosis, plain X-ray will show the stones and the position in most cases. Pure uric acid stones are not radiopaque therefore, pyleography during IVP will reveal the function and the obstruction in the kidney or in the ureter.

Management of Renal colic

(*a*) *Medical*

The first and the foremost duty of a physician is to relieve the pain for which, if the intensity of the pain is mild; by giving a hot hip-bath along with antispasmodics like: *Baralgan* (Hoechst) or *Neo-octinun* (*Knoll*) either orally or by injection depending on the intensity of the pain should be continued every 4th hourly along with a glassful of plain decoction of *horse-gram* with Tincture Belladona 10 to 15 mins. If the stone is less than 4 mm. in diameter, it generally passes through the urinary tract spontaneously. Stone with 4 to 6 mm. in diameter usually passes down with difficulty.

In severe painful conditions, the time honoured Inj. Morphine ¼ gr.+Atropine 1/100 gr. should be given along with the above mentioned antispasmodics. In the presence of infection, *Chloromycetin 500 mg.* (Parke-Davis) twice daily for 5 days with *tender coconut water* is recommended.

Once the acute attack subsides, a through examination of the patient should be made. About 15 per cent of the patients who have passed a stone will develop another and it is calculated that the reoccurrence chances go more than 47 per cent who require surgical removal[18, 23].

To prevent the reformation of stones, the exact nature of the stone should be confirmed by chemical analysis and the exciting causes that are already described in the foregoing pages should be checked by adjusting the proper diet. Author has found

administering horse gram decoction mixed with a *lime juice*, with a teaspoonful of *fresh coriander leaf juice*, a tablespoonful of *glycerine* and CYSTONE (*Himco*) 2 tablets 3 times daily for 2 months regularly and then reducing the dose to half and the same to be continued for six months is very effective in dissolving the gravel and flushing the small stones in number of cases. This simple regime prevents the formation of stones by adjusting the pH value of the urine and prevents the precipitation of the urinary chemicals. It should be remembered to drink 5 to 6 glassfuls of plain water daily to flush the urinary chemicals, particularly the urine should be kept diluted during the night by taking more water in the evening. GOEL and HEILIG also found that CYSTONE (*Himco*) an Ayurvedic preparation is an excellent and worth trying anti-urolith in patients who refuse to undergo an operation and there is no severe infection or gross damage to the urinary system[12, 18].

(*b*) *Surgical*

Cystoscopic manipulation with catheters and extractors should be tried to remove the stone if it fails to pass spontaneously. CAMPBEL[17] prefers manipulation if the stone is less than 2 cm. and it is within the lower one third of the ureter. ALLEN[20] advises to avoid such interference in the presence of infection. However, cystoscopic removal of the stones proved successful in majority of the cases exceeding 31 per cent[21].

In cases who do not respond to aforesaid measures, surgical removal of the stone is advised. However, surgical removal of the stone does not necessarily result in permanent cure of urinary stone disease, unless the preventive measures are strictly taken, the reoccurrence of the stone formation becomes obvious after some time of the operation.

Considering the gravity of the complications such as; hydronephrosis, renal fibrosis, extravesation of the urine, malignancy, toxaemia, etc., immediate removal of the stone by a choice of six operations—*pyelolithotomy*, *nephrolithotomy*, *pyelonephrolithotomy*, *partial nephrectomy*, *nephrectomy*, *nephrostomy* is advised.[22] Due to these operations, it is obvious that the unfortunate destitutes of urinary stones ultimately lose the affected kidney due to fibrosis caused by trauma and infection. Therefore, it is worth remembering that '*prevention is better than cure*'.

A cupful of *horse gram* soup with *cucumber juice* or *tender coconut water* is an excellent diuretic for edema due to congestive heart failure, burning micturation, etc.

Leaves

Paste of the leaf juice mixed with a pinch of *turmeric powder* is applied over boils and ulcers. Fresh juice one teaspoonful mixed with *apple juice* or semiripe *banana* is used thrice daily as an effective medicine for diarrhoea and chronic dysentery.

REFERENCES

1. Melic, R. A. and Henneman, P. H., New England, *J. Med.*, 259, 307, (1958).
2. Meyer, (1929)—Quoted by prien. Antiseptic, p. 411, Vol. 54, No. 6, Pritam Das, Lucknow, (1957).
3. Medes, G., *Proc. Soc. Expt. Biol. Med.*, 30, 281 (1932).
4-5. Norton, *et al.*, Annel Chem., 26, 454, (1954).
6. Pritam Das, *Some Recent Observation on the Formation of Renal Calculi*, Antiseptic, pp. 400-411, Vol. 54, No. 6, (1957).
7. Lichtwitz, L., *Colloid chemistry*, Edited by A. Jerome, Vol. 5, 1063, Reinhold Publishing Corp. New York, (1944).
8. Pyrah, L. N., J. Royal College of Surgeons, Edinburgh, 6, 93, (1961).
9. Harrison, A. R., *Brit. J. of Urol.*, 31, 398, (1959).
10. Parke Davis & Co., *Therapeutic Notes*, pp. 32-40, No. 2, (1962).
11. Mujamdar, A. R., *Bed-side Medicine*, pp. 847-50, 9th Edn., (1953).
12. Heilig, R., *Medical Treatment of Renal Calculi*, Current Medical Practice 7, 61, Feb. (1963).
13. Kaul, S. and Verma, S. L., *Kashmiris and Urinary Stone*, Govt. Medical College, Srinagar, Science Reporter No. 6, (1967).
14. Chute, R., M. Clin, North America 42, 1427, (1958).
15. Pyrah, L. N., *et al.*, *Brit. J. Urol.* 31, 235, (1959).
16. Captain, R. M., *Urinary Calculi and Heredity*—A Study in four generation of dogs, *Probe.*, pp. 132-137, Vol. VII, No. 4, Himco, Bombay, July-Sept., (1968).
17. Campbell, M. F., *Principle of Urology Philadelphia*, W. B. Saunders Co. (1957).
18. McDonald, D. F., New York, *J. Med.*, 59, 4212, (1959).
19. Goel, K. G., *Cystone Tablets in Urolithiasis*, Probe. July-Sep., Vol. VII, No. 4, p. 147, (1968).
20. Allen, J. E., *Am. J. Surg.*, 101, 258, (1961).
21. Prince, C. L. and Scardino, P. L., *J. Urol.*, 82, 561, (1960).
22. Miss Sumariwalla, F.R.C.S., *Probe*, Vol. VII, pp. 138-146, July-Sep., (1968).
23. Sir John Weir, *Physician to Queen Elizabeth II*. Clinical Lectures at R.L.H. Hospital, London, during 1954-58.

224. KHESRI DAL

Khesri dal: *Lathyrus sativa:* (B.N.); *Mattar:* (Hindi, Urdu); *Karsana:* (Arab); *Gavoodana:* (Pers.); *Vataneen:* (Mar.).

Family: Papilionaceae.

Physiopharmacology and Therapeutics

Khesri dal is largely cultivated in U.P. Punjab, Bengal and South India. It is a rich source of calories and protein. It is believed that excessive consumption of khesri dal causes a peculiar kind of tingling sensation and cramps in the calf muscles. This is usually noticed suddenly after the exposure to cold and over exertion, and the pain is felt during sleep. The pain in the lower back continues and one finds difficulty in walking with stiffness in the legs, exaggerated knee and ankle jerks and finally ends in paralysis of both the legs in flexion.[1] The pathological changes that are recorded after postmortem examination show the thickening of the leptomeninges in the cervical and upper dorsal regions. The blood vessels in the meninges and in the grey folds are thickened and obliterate with marked sclerosis. Honeycomb like proliferation in the dorso-lumber and lumbo-sacral segments with severe reduction in Betz cells[2]. This strange phenomenon is called *Lathyrism*[3].

Recent investigations confirmed that the cause of this disease is not known, and khesri dal has nothing to do with this pyramidal tract affection. It was feared that *manganese* that is rich in khesri dal might have its influence in causing paralysis after consuming khesri dal. In a normal human blood the concentration of *manganese* is 5 to 10 mcg. per 100 ml., but 20 mcg. of manganese is found in persons who are taking diet rich in khesri dal, and 20.200 mcg. in patients suffering from *Lathyrisum*. It is noted that the *manganese* concentration drops down in dehusked and properly cooked dal. However, the investigators inform that no toxic substance is extracted from *Lathyrus Sativa*. The fungus *Aspergillus niger*, that is found on the seed has nothing

to do with *Lathyrism* and animals that fed with this dal are unaffected[1]. There is no specific cure for this disease.

REFERENCES

1. Antia, F. P., *Clinical Dietetics and Nutrition*, p. 213, 1st Edn.
2. Filiminoff, I. N., Quoted by Dastur, D. K. *Wld. Neurol.*, 3, 721, (1962).
3. Director, Indian Council of Medical Research, New Delhi by Courtesy Dr Antia, F. P.

225. LENTIL

Lentil: *Lens-escelenta:* (B.N.); *Masoor-ki-dal:* (Hindi, Urdu, Mar., Beng.); *Addas:* (Arab); *Nishak:* (Pers.); *Masoor* or *Channangi bele:* (Kan.); *Masura pappu:* (Tel.); *Masura Pyaru:* (Mal.); *Masura:* (Ori.).

Family: Papilionaceae.

Food Value per 100 g. approximately

Carbohydrate	59.7 g.	Vitamin B_2	489 mcg.
Protein	25.1 g.	Niacin	1.5 mg.
Fat	0.7 g.	Potassium	402 mg.
Calcium	130 mg.	Sodium (without husk)	23 mg.
Phosphorus	245 mg.	Oxalic acid	21.4 mg.
Iron	2 mg.	Digesting Time	2¾ Hrs.
Vitamin A	450 I.U.	**CALORIES**	**346**
Vitamin B_1	450 mcg.		

Essential Amino Acids (g. per 100 g. protein)[1]

Arginine	7.0	Methionine	0.8
Histidine	2.1	Phenylalanine	4.1
Isoleucine	5.4	Threonine	2.9
Leucine	5.4	Tryptophan	0.3
Lysine	5.8	Valine	5.4
Cystine	0.8		

Physiopharmacology and Therapeutics

Lentil plants are largely grown all over India for the most nutritious pulse among all the other pulses. Tender pods are eaten as vegetable. Dry leaves, the husk of the grains and pods are used as fodder.

Split seeds or dal is rich in proteins and supply double the quantity of wheat. Masoor dal is mistaken for khesri dal and its use is feared due to Lathyrism. Masoor dal is laxative and is rich in vitamin B_1 and B_2. It is therefore used along with rice meal to help its easy digestion due to B-Complex factors. Decoction of the dal mixed with fresh *tomato juice* is used as a medicine for malabsorption syndrome. Supplementing *Brewer's yeast* or *Marmite*, forms a specific food-medicine for this intestinal disorder. Decoction mixed with *Skimmed milk powder* and *glucose* or *sugar* is an excellent food for kwashiorkor in children. Infusion mixed with a pinch of salt is an effective gargle for sore throat, laryngitis, hoarseness of the throat due to influenza, acute tonsillitis, etc. Eating dal in excess causes indigestion.

Flour of the pulse mixed with little turmeric powder and a teaspoonful of infusion of *garlic* is used externally as an effective dressing for ulcers, boils and carbuncles. Flour, mixed with milk-cream is applied as a bleaching cosmetic. It whitens the complexion and prevents the appearance of dry wrinkles on the face.

226. RED-GRAM

Red-gram or **pigeon pea:** *Cajanus indicus:* (B.N.); *Tubrika:* (Sans.); *Arhar* or *Tor:* (Hindi, Dak., Urdu, Mar., Guj. Beng.); *Shaqul:* (Arab, Pers.); *Togri:* (Kan.); *Adagi:* (Tam.); *Tuvarum-paruppu:* (Tel.); *Thuvara:* (Mal.).

Family: Papilionaceae.

Zodiac: Cancer.

Food Value per 100 g. approximately

Carbohydrate	75.2 g.	Vitamin B_2	506 mcg.
Protein	22.3 g.	Niacin	2.4 mg.
Fat	1.7 g.	Potassium (with husk)	435 mg.
Calcium	140.1 mg.	,, (without husk)	435 mg.
Phosphorus	425.2 mg.	Sodium (with husk)]	63 mg.
Iron	8.8 mg.	,, (without husk)	66 mg.
Vitamin A	220 I.U.	Digesting Time	3½ Hrs.
Vitamin B_1	450 mcg.	**CALORIES**	**333**

Essential Amino Acids (g. per 100 g. protein)

Arginine	5.4	Methionine	0.9
Histidine	3.4	Phenylalanine	9.1
Isoleucine	5.7	Threonine	3.4
Leucine	7.0	Tryptophan	0.2
Lysine	6.4	Valine	5.1
Cystine	0.8		

Constitution: Hot and Dry 2.°

Medicinal value

Red-gram plants are extensively cultivated all over Andhra, and Mysore state as a dry crop. The tender green pods of the various varieties of Red-gram are used as vegetable. Decoction of the tender pods and fresh leaves is given internally as a cure for snake bite[8].

Green gram dal is the most commonly used pulse all over India, particularly in South. Various curries blended with fresh vegetables and its *Mullingatany:* (Rassam) are prepared from tor dal. Excessive use of the dal causes hyperacidity and causes wind in the intestine. Therefore, it is forbidden in gastric ulcer and heart patients. Decoction of the dal is given in the form of soup to invalids and children. Paste of the seeds and the leaves is applied after warming it as a medicine to stop the secretion of breast milk. Paste of the seeds mixed with a teaspoonful root powder of *Supraba gloriosa* (Kulhari) is used as a cure for *cobra bite*[5, 8]. Husk of the gram is an excellent fodder. Paste of the leaves mixed with a teaspoonful paste of *Neem* (Margosa) leaves is taken once daily for a week to cure hemorrhoids, and itching in the anus. The same paste may be applied over glandular swelling, scabies and dry itching of the skin[8].

REFERENCES

1. Swaminathan, M. and Bhagwan, R. K., *Our Food*, p. 158, 5th Edn., (1966).
2. Mathur, R. C., *Systematic Botany*, pp. 108-110, 5th Edn. (1965).
3. Muzaffar Hussain, *Kitabul Adviya*, 4th Edn., (Urdu), (1965), Lahore.
4. Hakeem Mohammad Nabi, *Mujer-e-bath e Kareemy*, Pers. Mss. (1882), Junagadh.
5. Hakeem Nawab Zafar Mohammad, *Mujere-batha-e-zafar*. Urdu Mss. (1890), Hyderabad Dist.
6. Sindhu *et al.*, *Hemagglutinins of field-bean Isolation, purification and properties of hemagglutinins Indian Jour. Biochem*, 2 (3), 193 (1965).
7. Nadkarni, K. M., *Indian Materia Medica* (1954).
8. Kirtikar, K. R., and Basu, B. D., *Indian Medicinal Plants* 2nd Edn., Lalitmohan Basu, Allahabad.

PART IX

SPICES

Indians are crowned as the poineers in the knowledge of *Spices* and have been supplying these valuable food processing agents for over 3,500 years. Traders, warriors and explorers from various parts of the world brought their valuable merchandise in the form of gold, silver, textiles and exchanged them for Indian spices. Malabar on the West Coast has been known as a *Spices Kingdom*. Condiments are processed spices and mostly used in curries etc[1].

Spices consist of the following:

Asafoetida	*Ginger*
Cardamom	*Mace and Nut-meg*
Chillies	*Mustard*
Cinnamon	*Omum*
Cloves	*Pepper*
Coriander	*Saunf*
Cumin	*Tamarind*
Garlic	*Turmeric*

Uses of Spices

Spices are mostly used as flavouring agents in number of foodstuffs, such as; curries, bakery products, pickles, processed meats, beverages, liquors etc. They prevent food spoilage due to the action of microorganisms, help quick digestion of the food, create a cooling sensation in the body due to their diaphoratic action, excite sex centres and keep the urine sterile when they are used moderately. Excessive use of spices cause irritability in gastro-intestinal and urinary tract, therefore, they are a contra-indicated in their respective diseases. Also they should not be used in gall-bladder diseases and gout[2].

Research and quality control of spices is taken up by C.F.T.R.I., Mysore, and much valuable work is being done under the leadership of the Dr H. A. B. Parpia, The Director of the Institute.

REFERENCES

1. *J. Food Science and Technology*, p. 2, Vol. II, No. 1, (1965).
2. Antia, F. P., *Clinical Dietetics and Nutrition*, pp. 258-263, (1966).

227. ASAFOETIDA

Asafoetida: *Ferula-assafoetida;* (B.N.); *Hingu:* (Sans.) *Hing:* (Hindi, Guj., Mar., Dak., Urdu, Beng.); *Halteet:* (Arab); *Agooza:* (Pers.); *Hingu:* (Kan.); *Perungayam:* (Mal.); *Perungayam:* (Tam.); *Inguva:* (Tel.); *Hingoo:* (Ori.).

Family: Umbelliferae.

Zodiac: Aries.

Food Value per 100 g. approximately

Carbohydrate	66.4 g.	Phosphorus	50 mg.
Protein	3.4 g.	Iron	22 mg.
Fat	1 g.	**CALORIES**	294
Calcium	665 mg.		

Constitution: Hot 4° and Dry 2°.

Physiopharmacology and Therapeutics

Hing plants are perennial herbs that are distributed from Mediterranean region to central Asia. There are several varieties of hing plants. Namely: *F. foetida, F. allicea, F. rubricaulis* and *F. narthex.* The plants bear massive carrot shape roots that are 5" to 6" in diameter at the crown when they are 4-5 years old. The fresh roots are incided at the top and the latex is collected in earthen vessels, dried, and packed in leather bags in the form of hing. This process is usually done before flowering the plants.

Hing is imported in India from Persia and Afghanistan. There are two varieties of hing namely, *Hira Hing* (pale green) and *Black Hing.* Hing is acrid and bitter in taste and emits a strong alliaceous odour. It is used as a flavouring agent in curries, pickles, and sauces.

In the body, hing is absorbed from intestines and due to various volatile oils it is excreted through Lungs skin and kidneys leaving a sedative effect. It excites the secretion of ovarian hormones and sex stimulating centres.

From ancient times hing is as used a medicine for hysteria, paralysis, indigestion, impotency, cough etc.[1, 2, 3].

Chemical Composition

Asafoetida contains 62% resin, 25% gum and 7% volatile oil. The resin consists of *asaresintannol*, partly free and partly combined with *ferulic acid*. Volatile oil is rich in *terpenes*, pinenes and disulphide[5] ($C_7 H_{14} S$).[6]

Hing in Gynaecology and obstetrics[4]

The author found that fried hing 2 grs. (Hira) mixed with fresh *goat's milk* 4 ounces and *honey* one tablespoonful given thrice daily for a month excites the secretion of progestrone hormone and cures functional sterility, threatend abortion, pre-mature labour, dysmenorrhoea, menorrhagia, metropathic and leucorrhoea. Supplementing a tablet of *Dhuphaston* (Dhupar) and *Viteolin* 30 mg. (Glaxo) a capsule thrice daily is a specific treatment for the above mentioned disorders. A grain of hing given with a teaspoonful of infusion of *cloves* after childbirth, thrice daily, increases lochia and breast-milk.

Fried hing one grain mixed with honey and a teaspoonful of fresh latex of Baniyan tree (Ficus Religiosa) taken once daily for 40 days before sun-rise, is a specific medicine for spermatorrhoea, impotency, pre-mature ejaculation of semen, etc. It increases sexual virility and prevents the bad effects of excessive sexual indulgence[5].

Hing half to one grain, *honey* 2 teaspoonful, *white onion juice* ½ teaspoon, and *betel leaf juice* one teaspoonful mixed together is given thrice daily as a medicine for whooping cough, asthma, bronchitis, etc.[5]

From ancient times, hing is used as a preventive medicine for infectious diseases. In by gone days, it used to be tied in a cloth and left hanging in one of the corners of the house. It was believed that the smell that emitted from the stuff was responsible for preventing the diseases. Perhaps the volatile oils and the smell might have any influence on micro-organisms. It requires a research to confirm this belief.

Hing is usually stuffed in both the ears of the mother after childbirth to prevent head-cold. It is also used in buzzing sensation of the ears. It is filled in caried tooth with *clove oil* with excellent results[5] Hing 2 grs., dissolved in one tablespoonful of *coconut oil* is applied as an analgesic balm in rheumatic arthritis, mylagia, traumatic swelling, etc. It is massaged over the shaft of the penis to increase local circulation and improve the hardness during tumescence. Paste of hing prepared with *water* or *lime juice* is applied over wasp, bee, and scorpion sting.[3]

Smelling the hing, prevents hysterical attacks and cures acute rhinitis[3,5].

Adding hing to foodstuffs, helps digestion and prevents flatulence by inhibiting the gas forming germs and eases the passage of flatus. Therefore, from ancient times in certain places of India, it is compulsarily used along with every food, particularly with pickles and curries. However, excessive use of hing is not advisable due to its semitoxic effects. Particularly, the infants and children should never be given *hing* in any form, because it causes severe vomiting leading to dehydration.

REFERENCES

1. Mathur, R. C., *Systematic Botany*, p. 345, (1965).
2. Muzaffar Hussain, *Kitabul Mufaradath*, p. 539, (1965).
3. Nadkarni, K. M., *Indian Materia Medica*, pp. 537-38, Vol. 1, (1954).
4. Aman and Jayamani, C. S., *Clinical investigations of asafoetida in gynaecology and obstetrics*, I.P.D.F. No. 112. 1965-67. I.A.H. Mysore.
5. Zakaulla, M., *Mujarabath-e-zakai*, Pers. Mss. (1890), Lucknow.
6. B.P.C., p. 154, (1911).

228. CARDAMOM

Cardamom: *Elettaria cadamomum:* (B.N.); *Yela:* (Sans.); *Ilayechi:* (Hindi, Urdu, Dak., Guj., Ori.); *Qhaqhala-e-Sannar:* (Arab); *Hail buva* or *Khair buva:* (Pers.); *Eyalakki:* (Kan., Tam., Tel.); *Phutanaḍa:* (Sind.); *Chot Ilayach:* (Beng.).

Family: Scitaminae.

Zodiac: Libra.

Food Value per 100 g. approximately (Nelliampathy Estate Cardamom seeds)[1]

Carbohydrate	40 g.	Water soluble ash per cent	2-337
Protein	10.3 g.	Acid insoluble ash per cent	0.4-1.2
Fat	2.1 g.	Non-volatile ether Ext. per cent	2.5-3.5
Calcium	129 mg.	Crude fibre per cent	9.5-12.8
Phosphorus	1505 mg.	Crude protein per cent N×6.25	10.7-11.5
Iron	5.7 mg.	Starch by acid hydrolysis	43.0-46.0
Moisture	7-9 per cent	Digesting Time	2 Hrs.
Volatile oil per cent v/w	8.5-10.5	**CALORIES**	227
Total ash per cent	4.5-5.4		
Alkalinity K O/100 g.	0.7-1.3		

Constitution: Hot 2° and Dry 2°.

Physiopharmacology and Therapeutics

In India, cardamom plants are mostly cultivated in Mysore State, Coorg and Malabar. Ceylon and Indochina, also grow cardamom. Central America, particularly, Gautemala cultivate cardamom to a lesser extent. The plants are cultivated in a cool, shady and humid zones of South Indian Western ghats where the rainfal ranges between 60″ to 90″ at an altitude of 2500 to 5000 feet above sea level[5].

There are several varieties of cardamom plants such as: *Manjarabad*, *Ceylon* and *Malae*. The plants grow up to a height of 10 to 20 feet depending on the variety of cardamom. The leaves have a velvety fur underneath. The plants develop tillers with abundant panicles which creep on the surface of the soil to a length of 2 to 3 feet. The size of the plants in Manjarabad varies between 10 to 12 feet, but the pods that are triocular, pale yellow in colour after drying are larger than the other two varieties which grow up to 10-20 feet in height. The capsules measure about ½″ long and ¼″ broad. Each ripe pod contains 15 to 20 hard dark brown or redish brown seeds. The seeds are 2 to 3 mm. long irregularly angular in shape having pits on them. Each seed is covered with a thin transparent colourless membrane which becomes more prominent when moistened with water. Cardamom seeds have a pleasing aromatic smell and taste. Chewing cardamom seeds creates a tingling sensation with refreshed feeling in the mouth. The seeds contain 7 to 9 per cent volatile oil that is rich in *terpeneol* and *cineol*[2, 5].

The well ripened and fully matured capsules are picked during October and January and are dried in 'Klin', or Sun. This is called curing of cardamom. A new chemical curing method has been evolved at C.F.T.R.I., Mysore, which retains the green colour of the cardamom capsules making it to look more pleasant. According to this process the freshly picked cardamom capsules are soaked in 2 per cent *Washing Soda* (Sodium carbonate) solution for 10 minutes before they are cured[3]. Cardamoms can be easily adulterated with another kind of cardamom seeds (E. Ammomum) that have smoother surface and do not have pits. Simple methods to detect the adulteration is found at *Central Agmark Laboratory, Nagpur*[3].

Cardamom is called the 'Queen of Spices' and India exports about 90 per cent of cardamom to the other countries of the world. It is a second important spice of India that earned about Rs 2.85 crores foreign exchange in 1967[3].

Eventhough, Ceylon also produces cardamom, but Indian cardamom is prefered all over the world for its superior quality, unique flavour, rich content of oil, attractive shape and colour. Cardamom seeds are mostly used in the preparation of bakery products, in condiments, chewed along with betel leaf, in the preparation of pharmaceuticals namely: *Tincture card co. Pulvis Cretae Aromaticus, Tincture Carminate* etc.[2] Cardamom seeds are also used in the preparation of various *Unani* and *Ayurvedic* medicines. Distilled oil of cardamom is extensively used in perfumery and flavouring liquors[3].

Cardamom seeds are chewed to prevent bad smell in the mouth, indigestion, nausea and vomiting due to morning sickness, excessive watering in the mouth (Pyrosis) etc. Powdered cardamom seeds one pinch boiled in milk and sweetened with *honey* is taken every night for weakness of memory, impotency, pre-mature ejaculation etc., with excellent results. It is presumed that excessive use of cardamom causes impotency.[4]

Boil the powdered seeds of a cardamom and prepare tea in the usual way. It gives a very pleasing aroma to tea and the same can be used as a medicine for scanty urination, diarrhoea, dysentery, palpitation of the heart, great tiredness due to over work, depressed feelings etc.

Snuffing fine powder of cardamom seeds before going to bed every night, prevents hysteria, insanity, mental depression, lack of memory and rhinitis[4].

A couple of whole cardamoms are pounded and boiled in a cupful of water along with 5 leaves of *mint*. The infusion is sipped to cure hiccup, excessive acidity in the stomach and indigestion after fatty non-vegetarian food[4].

The husk of the cardamom is considered as an innert material rich in fibre, but chewing the whole cardamom along with food is supposed to prevent food putrification and constipation.

Powder of a cardamom seeds with a tablespoonful of *banana leaf* and *amla juice* is given thrice daily as an excellent diuretic during the treatment of gonorrhoea, cystitis, nephritis, burning micturation and scanty urination in congestive heart failure, high blood pressure etc.

A cardamom given with the decoction of *cuminseeds* relieves giddiness, nausea and vomiting caused by excessive biliousness. It cures the bad effects of excessive intake of tea, coffee, bananas and fatty food.

Eating a ripe banana with a cardamom once before going to bed cures indigestion, acid dyspepsia, constipation, bleeding piles, hematemesis and hemoptysis.)

Gargling with the infusion of cardamom and *cinnamon* cures pharyngitis, sore-throat, relaxed uvula, hoarseness during the infective stage of flue. Its daily gargle prevents from flue.

Eating a cardamom daily once with a tablespoonful of honey improves eye sight, strengthens the nervous system and keep one healthy.

For the details of cultivation of cardamom and pest control, write to Javare Gowda[5].

REFERENCES

1. Krishnamurthy, M. N., *et al.*, *Chemical Composition of Cardamom J. Food Science and Technology*, p. 170, Vol. 4, (1967).
2. *British Pharmaceutical Codex*, p. 262, (1961).
3. Kulkarni, B. N. and Pruthi, J. S., *A Simple and Rapid Test for the detection of Adulteration in cardamom seeds*, *Food Packer*, pp. 14-19, Vol. XXI, No. 1, (1967).
4. Hakeem Syed Akbar, *Mujerebath-e-Akberi*, (Pers. Mss.), 1916, (Jamnagar).
5. Javare Gowda, H. and Muthappa, M. C., *The Queen of Spice*, Department of Cardamom Development, Mercara, Coorg, (1968).

229. CHILLIES

Chillies: *Capsicum annum:* (B.N.); *Tekhashana* or *Katubira:* (Sans.); *Mirch:* (Hindi, Urdu, Dak., Mar.); *Filfil:* (Arab, Pers.); *Mennasina kai:* (Kan.); *Mirchakai:* (Tel.); *Mulakau:* (Mal.).

Family: Solanaceae.

Zodiac: Scorpio.

Food Value per 100 g. approximately

Carbohydrate	36.2 g.	Iron	30.8 mg.
Protein	18.2 g.	Vitamin A	864 I.U.
Fat	15.1 g.	Vitamin C	3.5 mg.
Calcium	480 mg.	Niacin	2.5 mg.
Phosphorus	390 mg.	**CALORIES**	157

Physiopharmacology and Therapeutics

Chilli plants are the native of America. Columbus in 1492 A.D. brought chilli on his first voyage back from America. Then the chilli spread along the Mediterranean coast and in India, it was introduced by Portuguese in Goa. In portuguese language chilli is called *Maris*[1].

Chilli plants are mostly cultivated in South India. There are number of varieties but the fruits of *C. minimum, C. fastigatum, Green Chillies* are some of the common varieties that are daily used in our culinary preparations. The fruits are long or oval having bright dark green colour and begin to change into beautiful crimson red on ripening. The fruits are broader at the base and conical at the tip. They grow from 1-6 inches. The pericap of the fruits consists of parenchymatous cells which contain droplets of red oil and have thin cellulose walls. The chief constituent of pericap is a crystalline colourless, pungent principle known as *Capsiacin* or *Capsicutin* (C_{18} H_{29} NO_3). 'It is secreted by the outerwalls of the fruit and occurs chiefly in the dissepiment which divides the fruit into two cavities[2]. It's melting point is 63°C. When the fruits are burnt they emit an extremely irritable vapour which causes nasal and throat irritation.

The fruits contain a fixed oil, red colouring matter which is not pungent and yield 20 to 25 per cent of alcoholic extract. The seeds are bland and contain some traces of starch[2].

Raw chillies are sold in vegetable markets and used in the preparation of curries, pickles and to impart flavour. Green chillies are rich in *Rutin.*

Rutin

The pharmaceutical value of *Rutin* is highly praised in the medical profession. *Rutin* is a chief constituent of many citrus fruits and vegetables like: cherries lemon and its peel, orange, lettuce, pepper, spinach, etc. Rutin combined with flavinols unites with cellular protein and forms the prosthetic groups of a respiratory enzyme.

Rutin does not contain any irritability or any side effect in its chemical form. Therefore, it can be administered by oral or parenteral route. Rutin is excreted through kidneys and only small amounts of metabolitics can be detected. It is rapidly eliminated and precludes any cumulative action. There is no marked evidence of toxic effects of Rutin, even if it is taken in large doses.

One of the foremost therapeutic action of Rutin is its *Cell-sealing* effect on the capillary wall, resulting in the reduction of permeability and fragility. Therefore, it is indicated in all cases having increased capillary permeability with extravasation of blood such as: various manifestation of purpura, sequelae of infections, allergic-hyperergic reactions, alimentary disturbances, diabetic retinopathy, intera-retinal haemorrhages, haemorrhages of diabetes, arteriosclerosis, apoplectic attacks or for their prevention kidney diseases, telangiectasia[3].

The administration of Rutin 300 mg. given once daily is highly praised by *Haizmann* and *Blickle* as a pre-operation and post-operative medication to prevent the capillary rupture and post-operative blood oozing.

It is discovered that regular administration of Rutin remarkably reduces the capillary oozing without affecting the blood coagulation in haemophilia.

Shanno proved that several cases of idiopathic pneumonia excellently improved after supplementing Rutin with usual

chemotherapy. He noticed great improvement with decreased capillary fragility.

Griffith and others observed that Rutin has a prophylactive effect and promotion of healing after exposure to X-ray and Radium. He recommended regular use of Rutin as a radio-protective medicine.

Prophylactic doses of Rutin should be given as a routine to prevent the harmful effects of drugs such as rhodonate or arsenic compounds on the capillary endothelium, as well as for any manifestation of hypersensitivity during antibiotic or sulphonamide treatment. Particularly Rutin is found to have excellent results in improving the healing of the lungs during P.A.S. and I.N.H. therapy in tuberculosis. Rutin also prevents the invasion of the toxins from the blood into tissues. Hence its administration as a routine, is advised during blood-transfusions and other injections which are feared to cause anaphylactic shock. This is attributed to the fact that Rutin prevents fluids from draining away into tissues.

Due to the therapeutic effect of Rutin on allergic-hyperegic irritations, favourable dermatological results were achieved under its administration in certain cases of urticarial eczema, purpura etc. Rutin also abolishes the inhibition of granulation produced by penicillin in wounds.

Rutin stimulates the rhythm of the heart by action on rising the calcium level in the blood. But it is interesting to note that this cardiac sensitisation to glycosides produced by calcium is intensified with the administration of Rutin. Rutin has a remarkable diuretic effect by dilating the blood vessels of renal plexus, hence it can be safely used along with oral diuretics notably LASIX—*Hoechst*, HYGROTON—*Giegy* etc.

Rutin with other B-complex and C vitamins has a notable tonic effect in various indications that are explained under B-complex vitamins. There are various patent preparations some like: ELIX-B-RUTIN—*Navarathna Labs.*, *Cochin*, HEMOSTAT *Beacon*, etc., are found to be equally effective.

Green chillies (*Mougali Mirch*) or *Capsicum* stuffed with minced mutton are cooked as vegetable. Ordinary chillies (C. annum) are eaten along with vegetable salads to increase hunger. Excessive use of chillies causes diarrhoea and intense pain in the

rectum, therefore, chillies should not be given to them who are not used to chilli preparations.

A green chilli is boiled in a cupful of water along with two rose buds and gargled for relaxed throat, hoarseness, chronic pharyngitis etc.

Red Chillies

Powder of dry chilles is used in the preparation of condiments, pickles, curries etc. It is also used in small quantity to increase appetite, sex vigour, etc. but is contra-indicated in stomatitis, gastric ulcer, hepatitis, rectal fissure, bleeding piles, urethritis, cystitis, nephritis etc.

Capsaicin in the chillies acts like *canthridine*, therefore, red chillies boiled in *Coconut Oil* (1 chilli per 4 ounce of oil) is applied to prevent hairfall. Its regular use increases hair growth and keeps them silky soft. Concentrated chilli oil (4 chillies per one ounce oil) prepared by roasting chillies in *castor oil* is applied as an useful analgesic balm to cure rheumatic pains, sciatica pleurodynia, bursitis etc. Its regular application causes blisters, therefore, it should be carefully used. Capsicum liniments, tinctures, plasters are officially approved by British Pharmaceutical Codex. RELAXYL—*Franco, India* ointment contains capsaicin. It is an useful analgesic balm.

Chilli powder 1 teaspoon, *Arabic-gum* 1 tablespoon, *sugar* 4 tablespoons are finely ground into a paste in fresh *mint-juice.* Pills of a pea size are made and dried in shade. Chewing a pill thrice daily is an excellent medicine for hoarseness caused by shouting, singing loudly or due to cold[4].

(A pinch of chilli powder mixed with water is applied as a first aid measure in dog and snake bite[4, 6]. (It is warned about the serious consequences of negligence of dog and snake bite, depending on such first-aid medicines).)

A pinch of chilli powder is ground with equal quantity of *asafoetida* and *camphor.* 20 pills are made from this paste and a pill is given thrice daily in diarrhoea, caused by indigestion and early stage of cholera[4, 5]. Chillies are used in yellow-fever[6].

Chillies have a similar effect of ergot, but of no use in obstetrics due to the pungent nature. A pinch of powder dissolved

in a cupful of water is given once daily to prevent the desire for alcoholic drinks[7].

REFERENCES

1. Ubiquitous Chilli, *Med. News*, 15-7-66, Health, Vol. 44, No. 8, p. 177, (1966).
2. B.P.C. pp. 255-258, (1911).
3. Elix-B-Complex Literature Navarathna Labs., Cochin.
4. Muzaffar Hussain, *Kitab ul advia*, p. 467.
5. Majeed, S. A. *Mere-mujarebath*, (1928).
6. Mathur, R. C. *Systematic Botany*, p. 363, (1945).
7. Gulam Jeelani, *Materia Medica* (Urdu), p. 31, Vol. 2, (1916).

230. CINNAMON

Cinnamon: *Cinnamomum zeylanicum:* (B.N.); *Tovach* or *Savadootvak:* (Sans.); *Taj* or *Gudaturach:* (Hindi); *Dalchini:* (Dak.); *Darchini:* (Urdu, Pers.); *Khirfatul-darchini:* (Arab); *Dalchini-Chakkay:* (Kan.).

Family: Laurineae.

Zodiac: Aries.

Constitution: Hot and Dry 3°.

Physiopharmacology and Therapeutics

Cinnamon tree was known to ancient physicians even before 2700 B.C. Chinese used cinnamon bark as a medicine. Romans also knew about the medicinal value of this bark. *Galen, Dioscoredes, Sasaferas* described various uses of cinnamon. Even Indians knew about the therapeutics of cinnamon long before 8th century. The oldest record that is available about the description of cinnamon is *Torah.* Ceylonese began to collect the bark of cinnamon for its medicinal use in 12th century. However, *Khizvenee* was the first person to describe the detail therapeutic [illegible]lue of cinnamon in 13th century.[1] Today, Ceylon exports [illegible]mon to all parts of the world and the cinnamon grown there [illegible]d to be the best and it is recognised as an official

drug in B.P.C. *Aqua cinnamoni, Pulvis Aromaticus compositus, Tincture cinnamoni etc.*, are some of the outstanding preparations of *British Pharmaceutical Codex.*

The shoots of the two year old cinnamon tree are cut and the bark is peeled after the branches are exposed to air for about twenty four hours. Then the bark is packed inside one another and dried. Cinnamon occurs in long cylindrical dry bark of brown colour. The bark is thin and brittle. It gives a sweetish tingling warm feeling when chewed. It is astringent in taste.[2]

Cinnomon is considered as a specific medicine for the prevention of common cold. It is therefore given in the form c spirit cinnamon along with Quinine and Spirit Ammonia Aromatic: in the form of C.A.Q. mixture.

A two inches piece of cinnamon is coarsely powdered and boiled in a glassful of water along with a pinch of *pepper powder* and *honey* is given thrice daily as a medicine to cure sorethroat, flue, rhinitis, pharyngitis, indigestion and malaria. Its regular use during rainy season prevents the frequent attacks of flue.

Chewing a bit of cinnamon immediately after food, prevents tooth decay and bad breath due to putrification of the food particles. It stops the scraping feeling in the throat due to pharyngitis, enlarged uvula and sore throat.

Cinnamon powder 5-10 grs. (one pinch) taken mixed with honey once every night regularly, prevents nervous tension, brainfag, increases complexion and memory. It acts as an expectorant in bronchitis, and asthma. It controls the increased frequency of urine due to weakness of sphincter muscles in oldage.[3]

Cinnamon has a remarkable effect on cheeking the early release of ova after child-birth. Therefore, an inch piece of cinnamon taken every night after a month of child-birth, delays the appearance of menstruation for more than 15 to 20 months and prevents early conception. It indirectly helps the secretion of breast milk and it is proved that prolonged breast feeding checks the appearance of menstruation after child-birth. Hence it is a new method of planning the family and control child-bir Cinnamon tea is used with excellent results to over com after pains of child-birth.[4]

Paste of cinnamon prepared with few drops of fresh *lime juice* is applied over pimples and black heads. Paste prepared with *sandal paste* is applied over the face as a cosmetic. It prevents the early appearance of the wrinkles and dryness of the skin. The paste is applied over the temples to cure congestive headache.

Cinnamon Oil (*Oleum cinnamomi, B.P.*)

Cinnamon oil is obtained by distillation from cinnamon bark. The oil is light yellow in colour when freshly distilled, but gradually becomes reddish as it becomes old. It has the similar taste of cinnamon bark. The flavour of the cinnamon oil is due to *non-aldehydic* bodies. Its specific gravity is 1.000 to 1.580. It is soluble in alcohol.

Chemical Composition

The chief chemical constituents of cinnamon oil are *cinnamic aldehyde, eugenol, phellandrene* and other *terpenes.*

Cinnamon oil 1 to 2 drops taken on a lump of sugar thrice daily acts as a carminative-antiseptic medicine for indigestion, diarrhoea, flatulent colic, dyspepsia etc. Taking 5 to 10 drops of cinnamon oil in honey once or twice daily gives an immense relief from cold. Cinnamon oil with Quinine and Spirit Ammonia is also used as C.A.Q. mixture in sealed gelatine capsules.

Cinnamon oil 10 drops mixed with castor oil 2 ounces is applied over piles, boils and ulcers. Pure oil in cotton is plugged in dental caries.

Few drops of cinnamon oil mixed with *Eucalyptus oil* are inhaled by putting the drops on a hanky in cold, with excellent result. Cinnamon oil is used in *castor oil mixture* too.

Cinnamon oil is found to be excellent food preservative.[5]

REFERENCES

1. Gulam Jeelani, *Materia Medica*, Urdu, pp. 1135-1140, Vol. 2, (1916).
2. B.P.C. pp. 305-306 and 686-87, (1911).
3. Muzaffar Hussain, *Kitabul Adviya*, p. 240.
4. Aman and Seethalakshmi, F.R.C.S. (Eng.), *Effect of cinnamon in prolonging the early appearance of menstruation after child-birth*, R.F. No. 381: 1964-1967. Indo American Hospital, Mysore.
5. Brain M. Lawrance, *Pref. essen. oil. Rec.*, 58, (4), 236 (1966).

231. CLOVE

Clove: *Eugenia caryophyllata:* (B.N.); *Lavang* or *Devakusum.* (Sans.); *Loung:* (Hindi, Urdu, Dak.); *Qharanful:* (Arab); *Miqak* (Pers.); *Lavanga:* (Kan.); *Kirambu:* (Tam.); *Endulavangalu:* (Tel.); *Karambu:* (Mal.); *Royeng:* (Guj.); *Suka-lavanga:* (Beng.).

Family: Myrtaceae.

Zodiac: Sagittarious.

Food Value per 100 g. approximately

Carbohydrate	47 g.	Phosphorus	105 mg.
Protein	5.2 g.	Iron	4.9 mg.
Fat	9.7 g.	**CALORIES**	290
Calcium	435 mg.		

Constitution: Hot and Dry 3°.

Physiopharmacology and Therapeutics

Clove trees belong to the family of *Eugenia Jambulam* and they grow to a height of 25 to 40 feet. The trees are evergreen and cultivated in Malaya, Pennang, but Zangibar Island is famous for cloves and it supplies all the clove requirement of various countries. Cloves are the dried buds of the tree *Eugenia caryophyllata.* When the buds develop a crimson colour they are collected and the dry buds change into dark reddish-brown colour. Each bud measures about ½ inch long. It consists of a fleshy cylindrical part. The top or the crown of the bud contains a toothed thick calyx having four stamens and a short thick style.

Cloves contain a volatile aromatic oil that is distributed in the oil glands of the fleshy cylinder. The taste of the cloves is pungent, and tingling due to the presence of *Caryophyllin, Gallotannic acid* (13 per cent) and *phytosterol.*[1]

Cloves were known to Chinese even before 266 B.C. It is told that ancient Chinese used to chew a clove before entering the Darbar of the king to prevent the emitance of bad smell

from the mouth. *Charaka* has mentioned the carminative value of cloves. Ancient Egyptians also knew about the cloves.[7] In ndia cloves are used in spices and chewed with betel-leaf from ncient times.

The medicinal value of cloves is due to the volatile oil that cts as carminative, stimulant, antiseptic, expectorant and ntispasmodic.

Chewing a clove immediately after food, stops the bad breath caused by food decay in the mouth. Chewing a clove with a crystal of common salt eases expectoration, and relieves the irritation in the throat and stops cough in pharyngitis. Chewing a burnt clove is also an effective medicine for cough caused by relaxed throat and pharyngitis.

A teaspoonful of decoction prepared by boiling 6 cloves in an ounce of water is given thrice daily after food as a carminative medicine for indigestion, flatulent colic, sprue, diarrhoea in idiopathic stetorrhoea, etc. The same decoction given with honey thrice daily acts as an expectorant in bronchitis and asthma.

Put six cloves in a glass of water and allow it stand for about 12 hours. Then add a tablespoonful of *Malt vinegar* (Mohan's) and a pinch of *table salt* and stir it well. Give one teaspoonful every half an hour during the acute phase of diarrhoea and vomiting caused by food poisoning, indigestion, early stages of cholera. It is also given to quench thirst in fevers and diabetes.

Make a hole in the trunk of a *moringa tree* and insert as many cloves as possible and close the hole with wax. Remove the cloves after 40 days, dry them in shade and keep them in air tight bottles. Holding a clove under the tongue after eating one during the conjugal union, prolongs the act by controlling the ejaculatory centers in the brain. It gives immense pleasure during the ejaculation. Eating such cloves daily once with a half *boiled egg* and a tablespoonful of *honey* regularly, increases strength and potency. Eating the same clove immediately after sexual intercourse prevents menstural irregularities and conception. However, using some mechanical barrier like NIRODH by men puts power of controlling childbirth in their hands and helps them to live healthy, wealthy and happy.

A clove is roasted in a teaspoon of *til oil* and the warm oil 3 to 5 drops is put to cure earache. (Care must be taken in acute

ear infection which causes grave consequences if it is not treate properly in time).

Clove Oil (*Oleum caryophylli B.P.*)

Clove oil is distilled from the unexpanded flower heads o. cloves. Clove oil is colourless or looks pale yellow in colour when it is freshly distilled. It becomes reddish brown when it becomes older. Clove-oil is typically fragrant like cloves and tastes like cloves causing hot, tingling burning sensation in the mouth. Specific gravity of the clove oil is 1.040 to 1.060 at 25°[2].

Chemical composition

Clove oil is rich in *eugenol* (C_{10} H_{12} O_2) which is a phenol. Being the most valuable constituent of the clove oil, about 85 to 90 per cent is present in it. *Caryophyllene* (C_{15} H_{25}), *Furfurol* (C_5 H_4 O_2) which causes the discolouration of the oil *Methyl-amyl-ketone* (C_6 H_{11} $COCH_3$) which gives fruity odour to the oil. *Vanillin, Methyl salicylate* and about 2 per cent of *acetyl eugenol* is also present[2].

Clove oil is antiseptic, antispasmodic, antiputrescent and preservative. Hence a drop or two on a lump of sugar and a pinch of soda-bicarb is given thrice daily after food in indigestion, flatulent colic, acid dyspepsia, etc. Oil is rubefacient, therefore, 5 drops mixed in an ounce of *olive oil* is applied as a liniment in painful condition of the joints, neuralgia, migraine, etc. Mixed with a little turpentine, the oil is massaged over chest in bronchitis, pneumonia, colds, whooping cough etc.[2] Plain oil is applied over scorpion and wasp sting. Applying little oil over the bare parts of the body acts as a mosquito-repellent[1].

Oil 3 to 5 drops mixed with *honey* and a clove of *garlic* is given once before going to bed to alleviate the spasms of painful cough in tuberculosis, asthma and bronchitis.

Cotton dipped in clove oil is plugged in the cavities caused by dental caries. It stops pain and prevents the accumulation of food particles in them.

REFERENCES

1. Gulam Jeelani, *Materia Medica*, Urdu, pp. 1038-1043, Vol. 2, (1916).
2. B.P.C. pp. 267-68 and 681-83, (1911).
3. Syed Kabiruddine, *Tibbe Kabir*, Pers. Mss. (1882).

232. CORIANDER

Coriander: *Coriandri fructus:* (B.N.); *Dhaniak* or *Tambro:* San.); *Dhaniya:* (Hindi, Urdu, Dak.); *Samar-ul-kuzbra:* (Arab); *Tukam-e-kashniz:* (Pers.); *Kothimbri bija:* (Kan.).

Family: Umbelliferae.

Zodiac: Scorpio.

Food Value as Coriander leaves. See page 336.

Physiopharmacology and Therapeutics

Coriander seeds are dried when they are ripe. Seeds consist of two firmly united mericarps and look like globular. They are brownish-yellow in colour and measure about 5 mm. in diameter. On each half of the seed there are five wavy ridges. Seeds are glabrous and are crowned with the remains of calyx teeth and styles. They have an aromatic odour and agreeable spicy taste. (B.P.C. pp. 337-38, 1911).

Powder of the roasted coriander seeds is blended with other spices to prepare condiments from ancient times in India, Rome, Iran and Arabia.

Coriander decoction is used in the preparation of various Unani medicines like *Jawarish-e-kashnize*, *Majoon-e-kashnize Itriful-e-kashmizi* etc.

Chemical composition

Coriander seeds contain a valatile oil which is rich in *coriandrol* (C_{10} H_{17} OH) and *Terpene-d-pinene* (C_{10} H_{16}) 45 to 65 and 5 per cent respectively. (B.P.C. pp. 869-70, 1911).

Coriander seeds are carminative, aromatic, antispasmodic, and stimulant. Therefore, decoction of the seeds sweetend with *honey* or *sugar* is used with excellent results in dyspepsia, flatulent colic, indigestion, biliousness, giddiness due to nervousness, etc.

Decoction mixed methi decoction is a very effective diaphoratic, diuretic and expectorant. Decoction of the seeds can also be used in the diseases described in coriander leaves.

Powder of the fresh roasted seeds ½ teaspoon mixed with honey is given once daily for a month as a specific medicine to cure spermatorrhoea, pre-mature ejaculation etc. Powder given with *Gulkhand* (confectio Rose) is a laxative and medicine for high blood pressure, insomnia, weakness of the memory, chronic rhinitis, bronchitis, nervous tachycardia, and cures the bad effects of excessive indulgence in sex.

233. CUMIN

Cumin: *Cumimum cyminum:* (B.N.); *Jeeraka:* (Sans.), *Jeera* (Hindi, Beng.); *Kamoon:* (Urdu, Arab, Pers.); *Zira:* (Dak.); *Jeergay:* (Kan.); *Jeergam:* (Tam.); *Jeelakara:* (Tel.); *Jira:* (Ori, Mar.).

Family: Umbelliferae.

Zodiac: Gemini.

Food Value per 100 g. approximately

Carbohydrate	36 g.	Vitamin A	864 I.U.
Protein	18.2 g.	Niacin	2.5 mg.
Fat	15.1 g.	Vitamin C	178 mcg.
Calcium	480 mg.	D.T.	2½ H[illegible]
Phosphorus	390 mg.	**CALORIES**	357
Iron	30.8 mg.		

Constitution: Hot and Dry.

Physiopharmacology and Therapeutics

Cumin plant belongs to coriander family. It is cultivated in Kashmir, Punjab, and other States of North India. Cumin plant is indigenous to the upper part of Nile in Egypt, Malta and Sicily. The small bushy plants are cut and threshed when the fruits ripe. 'Cumin is a brown ceromocarp about 4 to 6 mm.

long of an elongated oval shape, tapering towards both base and pex. The mericarps are sometimes united, but often free. Each as five longitudinal primary ridges running from base to apex, and lternating with them are secondary ridges which are flatter and ear short emergences. The transverse section of the mericarp hen examined under a lense exhibits an oily endosperm and six itae four of the vitae being situated on the dorsal surface and two on the commissural surface'[1].

Cumin seeds resemble like Carraway seeds (*carum carui*) except the longitudinal ridges that are nine in carraway. Carraway seeds are larger in size and have a lighter colour than the cumin seeds.

Cumin seeds are largely used in condiments, perfumery, soaps, wines, carminative medicines and cosmetics. The seeds are sweet and aromatic. They contain a volatile oil rich in *Thyme*, *Cuminol*, *Carvone*, *Cynol*, *Terpene* and *Thymol*. (R. N. Chopra. I.M.N. 1934).

Cumin seeds 1 teaspoon, boiled in a glassful of water and the infusion mixed with fresh *coriander leaf juice* one teaspoonful and a pinch of *salt* is used twice daily after food as a medicine for biliousness, morning sickness, indigestion, atonic dyspepsia, diarrhoea in malabsorption syndrome, flatulent colic, pyrosis etc.

Jeergay rassam is prepared from cumin seeds and the thin curry is highly praised as an effective carminative. It is routinely used in South Indian homes almost daily.

Decoction of the cumin seeds mixed with *milk* and *honey* used once daily during the entire period of pregnancy, helps the development of the baby, eases child-birth and increases the secretion of breast milk. It is a useful liquid-food for growing children, anaemic and nervous persons.

Powder of cumin seeds ½ teaspoon mixed in a teaspoonful of *tamarind pulp* and *honey* is licked before breakfast to cure morning sickness, jaundice, nausea and vomiting, bilious giddiness and iron deficiency anaemia.

Infusion of cumin seeds mixed with a fresh *lime juice* is used to cure bleeding from nose and lungs.

Chewing few seeds half an hour before food, increases hunger, and helps the digestion of food. Chewing the cumin seeds after

food, prevents dental caries, indigestion, fermentation of the food in the intestine and constipation.

Paste of the cumin seeds prepared with onion juice is applie over scorpion sting with excellent results. Paste with *curr leaf juice* is applied over mumps. Paste with *sandal* and *turmeri* is used once daily as a cosmetic. It keeps ones face flower fresh.

Cut a *bitter orange* into two halves and stuff each with half a teaspoon powder of cumin seeds. Expose both the parts to dew over-night by keeping them outside by covering with clean mul cloth. Suck the juice in the morning before breakfast for the elimination of excessive biliousness. It is a cure for jaundice if used regularly for 15 days. It cures chronic dyspepsia, giddiness, bitter feeling in the mouth, indigestion etc. *Jawarish-e-kamoon* is a very reknown Unani medicine used for all types of digestive disorders.

234. GARLIC

Garlic: *Allium sativum:* (B.N.); *Lasund* or *Lasuna:* (Sans.); *Lahasoon:* (Hindi, Urdu, Dak.); *Soom:* (Arab); *Siyear:* (Pers.); *Bellulli:* (Kan.); *Ullipundu:* (Tam.); *Ulluvalli:* (Tel.); *Velluvelli:* (Mal.); *Lusoon:* (Mar.); *Lason:* (Guj.); *Thoom:* (Sindhi, Punj.); *Rashun:* (Beng.).

Family: Amaryllidaceae (*Lilliaceae*)

Zodiac: Aries.

Food Value per 100 g. approximately

Carbohydrate	28.3 g.	Iron	1.8 mg.
Protein	3.5 g.	Vitamin C	14 mg.
Fat	0.5 g.	Niacin	0.4 mg.
Calcium	28 mg.	Digesting Time	2 Hrs.
Phosphorus	310 mg.	**CALORIES**	**140**

Constitution: Hot and Dry 3°.

Physiopharmacology and Therapeutics

Garlic is the most common flavouring bulb of the plant *allium sativum*. The garlic pod is covered by thin membrane

white in colour. Each pod contains 8 to 12 cloves, and each is also covered by a thin creamy white covering. In India, garlic is commonly used from centuries in the preparation of vegetarian and non-vegetarian curries, various chutnies, pickles, curried vegetables, tomato ketchup and as a medicine to cure various disorders. Taste of garlic is irritant and it emits a strong pungent smell, which is attributed to the presence of volatile oils and high organic sulphides like: *Allyl-propyl disulphide*, *Allicin* etc. *Allicin* which is formed by the interaction of the precursor *Allicin* and enzyme *Allinase*. This enzymatic action takes place emiting the pungent smell when the garlic cloves are crushed, peeled or macerated. But recently a new process of preparing odourless garlic powder is evolved at C.F.T.R.I., Mysore. The garlic powder is supplied in capsules each containing 50 mg. enzyme. It is claimed that by administering the precursor and the enzyme separately the interaction of the precursor and the enzyme takes place in the stomach forming an active principle.

Garlic contains an antibacterial effect due to *Allicin*. One milligram of this substance corresponds to 15 Oxford Units of *Penicillin*.[2]

Garlic is an excellent carminative and nerve-tonic that is successfully used from ancient times. Its regular use as a spice in the preparation of curries is our cultural heritage in the preservation of food and health. It is considered as the queen of herbs. Both onions and garlic are commonly used in combination with other spices to give flavour and taste to the food. Volatile oils of garlic are absorbed in the blood act as its cleanser and get excreted from lungs, perspiration and urine leaving the respective organs sterile. Garlic produces warmth in body during winter and due to its vasodilatory effect causes profuse perspiration during summer and keeps one fresh and cool.[14]

Volatile oil of the garlic has a counter-irritant action on the skin, therefore, macerated garlic mixed with *vaselin* or *coconut oil* is massaged over painful parts of the body. Infusion of garlic is an excellent antiseptic lotion that is successfully used in washing the foul-smelling chronic ulcers, cut wounds and carbuncles. It is a safe substitute for *carbolic acid* having a co-efficient lower than other antiseptics. (Rideal-walker co-efficient =2).[7] A clove of garlic is macerated and applied over

scorpion sting imparts immediate relief and prevents the sepsis caused by the bite of the domestic animals.

Garlic is both externally and internally used for one to tw months in the form of garlic capsules 50 mg. each or on teaspoon of fresh garlic juice mixed with honey t.d.s. to cur mild type acute leprous neuritis. But it has no effect in acut cases, and in cases of neuritis in which leproreaction has supervened. However, addition of garlic with *D.D.S.* treatmen enhances the action of sulphones and prevents the developmen of nerve damage.[2,3,4,5]

Garlic has a deleterious effect on tubercular germs. Giving one or two cloves of garlic or one capsule of garlic powder 50 mg. (C.F.T.R.I.) once daily with *Unithiben V.F.* (Unichem) one tablet and injection *Dihydrostreptomycin* 1 gm., daily is found to be very effective in preventing the relapse of the disease In such cases, after the course of injections, garlic and *Unithiben V.F.* should be contined daily for atleast 18 months with a monthly checkup; even after the lessions in the lungs ar completely healed.

Three cloves of garlic boiled in milk are used every night with excellent results in asthma. A pod of garlic is peeled and macerated and boiled in four ounces of pure *malt-vinegar* (Mohan's). After cooling, it is strained and equal quantity of honey is mixed and preserved in a clean bottle. One to two teaspoon of this syrup taken with *Fenugreek* decoction once in the evening and before going to bed is found to be effective in lessening the severity of asthmatic attacks. In our series of clinical trail the effect w quite noteworthy.[20]

The same syrup given with a teaspoon of fresh *mint juice* and half a teaspoon of *ginger juice* immediately after food twice daily acts as an effective carminative medicine to cure atomic dyspepsia, indigestion, flatulent colic, dysentery, diarrhoea, mal-absorption syndrome, amoebiasis, etc. Supplementing *Neo-viaspet* (Hoechst) or *Nivimbin* (M & B) one tablet thrice daily is an specific treatment for amoebiasis. Accelerating the dosage is left to the descretion of the attending physician.

Tie a handful of macerated garlic with a *cardamom powder* 1 teaspoon, *cloves* 10, *cinnamon* 2 *inches* two pieces in a clean muslin cloth and immerse it in *black cow's milk* 5 litres. Heat the milk

gradually and thicken it to prepare its *khowa*. Squeeze the bag nd take the extract of the tied ingredients and keep on stirring he milk. When it begins to thicken, take it from the fire and dd *honey* equal to the weight of *khowa* and mix all the ngredients by squeezing out the remaining extract in the garlic nixture. Then dissolve a teaspoon of *saffron* in a tablespoon of *pure rose water* and mix it in the *khowa*. Cool it and preserve in a jar having an air tight screw cap.

A teaspoon of this medicine taken twice daily with milk or water after food is an excellent medicine for paralysis, neuritis, impotency, nervous trembling of the hands, periodical palpitation, chronic dyspepsia, bronchitis, asthma, whooping cough, pneumonia, diphtheria, tuberculosis, etc.

Its regular use once daily even when one is healthy, imparts strength, increases longevity and keeps one fit to work in oldage. This preparation is being used from centuries in India with excellently good results[17, 18].

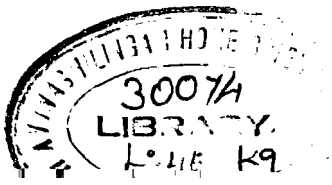
Garlic is a boon to patients of sciatica, gout rheumatism etc. Four cloves of garlic are boiled in milk and the same is drunk after straining the milk before going to bed. One clove is added every day until the number rises to ten. Afterwards the downward course should begin until it comes to the same number 4 (i.e. four). Repeat this process for 40 days. Before the end of this course, the patient is expected to be cured completely in many nervous diseases. Eating a garlic clove everyday, increases longevity[6, 11, 17, 18].

ırlic is an excellent tonic

Diallyl-sulphide of the garlic acts like *Mercuric sulphide* of *akradhwaja* the pride tonic of Ayurvedic medicine[12]. It is worth interesting to know this useful medicine that was formulated by SHRI BAHABAMISRA who lived in Northern India in the early part of 16th century. Even today, this preparation has stood the test of time as an unmatchable *Rejuvenating Ayurvedic Tonic.*[7]

Preparation of Makradhwaja

Eight parts of *purified Mercury* and one part of pure *Gold leaves* are finely mixed together to form an amalgam. To this



mixture, sixteen parts of *sublimed sulphur* are added the resultant mixture is constantly rubbed in a red stone mortar of Jaipur until the whole mass is converted into a fine lustreless powde that can float on the surface of water if a little is sprinkled. I should not contain any dirt or girt if the powder is rubbed betwee the thumb and the first finger. This is called *Kajalli* in Sans. and its chemical composition resembles like that of *Black sulphide of Mercury*[7].

This powder is filled in a narrow mouthed clean bottle and sealed tightly with a cork. It is gradually heated by placing it on the hot sand bath. When the bottle begins to get heated sufficiently, a reddish coloured fume begins to collect inside the bottle. This should be allowed for sometime and then the bottle is taken from the sand bath and allowed to cool. The sublimed powder that is collected on the inner surface of the bottle is scraped with a fine knife carefully after breaking the neck of the bottle. The reddish coloured powder is preserved in another clean and dry bottle as *Makradhwaja*.

Chemical composition

It is considered that the chemical composition of *Makradhwaja* is chiefly consists of *Red sulphide of Mercury*, but its pharmacological action is entirely different from the synthetic *Red sulphide of Mercury*.[7]

Pharmacological action

Usually, the salts of mercury are slowly absorbed from ... intact mucous membrane of the gastro-intestinal tract and produce their chemical action in the human body. Other insoluble salts of mercury are slowly liberated and absorbed. Since *Makradhwaja* contains *mercury sulphide*, and it is found that sulphide-ion is not absorbed in its crude form and exerts its systematic influence in the body. Such being the case, how *Makradhwaja* has such an excellent therapeutic effect in the system was not fully known until *Dr. Ghosh* of Calcutta, who after careful clinical and pharmacological research proved in 1931 that *Makradhwaja* is absorbed in the body after getting mixed with hydrochloric acid and gastric juice in the stomach. In this process, the sulphide of mercury

s changed into soluble chloride by the combined action of hydro-hloric acid and gastric juice and mercury chloride is absorbed a portal circulation and is stored up in the liver and other rgans. However, the absorption is so minute that it cannot be etected by ordinary chemical tests. *Makradhwaja* is excreted n stools and urine in very minute quantities.[7,8,9,10]

Therapeutics of Makradhwaja

Makradhwaja ½ to 1 gr. finely powdered is taken twice daily with honey as an excellent medicine for cardiac asthenia, nd circulatory failure. Recent experiments have shown that nercury ion in a high state of dilution has a definite stimulant effect on the heart. It is already known that absorption of mercury rom *Makradhwaja* is very minute and certainly it stimulates he heart without producing harmful drug effect on the system. articularly it is very useful in tachycardia in neurasthenics, during pregnancy, anaemia and tuberculosis. According to *R. N. Chopra*, Makradhwaja is found to be a very effective cardio-onic in myocardial disorders following with acute specific fevers. He found excellent results after using for 15 to 20 days. He considers that small doses of mercury diminishes the amount of oxidation in the tissues as seen by the variation in the interchange of gases.

Large doses of mercury salts have a definite haemoglobin reducing property, but when minute quantity of absorbable mercuric salts are administered the action is quite reverse. Therefore, *Makradhwaja* is considered as one of the best substitutes for metalic iron to increase haemoglobin by producing rich blood.[7,8]

Makradhwaja is used in typhoid and intestinal infections. It exerts its influence by its antiseptic action in the organism. Recent studies have shown that mercury is a powerful intestinal antiseptic that its higher dilutions are lethal to lower forms of life.[7]

Makradhwaja is used in various diseases and the details are available in Ayurvedic pharmacopeias. Good quality *Makradhwaja* is available from *Himalaya Drug Co., Bombay* or *Texilla-Ayurvedic Pharmacy, Chandosi, U.P.*

Roasted garlic can be used as a remedy for indigestion in children and pregnant women, leucorrhoea etc. Warm *garlic*

and *Ginger* juice 3 drops are instilled in the ears to stop buzzin and ringing in them due to cold, eustachian tube blockage et A clove of *garlic* is usually put in the ears to prevent bad effec of cold after child-birth and deafness due to exposure to cold A clove of garlic is roasted in *coconut oil* and few drops of warı oil is put in the ears to cure earache caused by exposure to cold winds. Garlic paste prepared with pepper is applied to cur relaxed throat with excellent results.

Keeping garlic flowers in the home prevents the entrance c evil spirits such as devils, vampires, ghosts etc.[17,18]

Infusion of a garlic prepared by boiling it in a glassful of water is given an ounce three times daily in dropsy, painfu menstruation, colds, scanty urination due to congestive heart failure, intermittent fevers etc.[16,17,18]

Raw garlic juice is inhaled in whooping cough, tuberculosis A garlic poultice is applied on the abdominal and pubic region in retention of urine due to atony of bladder. Giving 10 to 30 drops of garlic juice with honey expels round and pinworms.[13]

Allium ascalonicum (Ek-kanda or Ek-Pothi Lasun) is mostly used for medicinal purposes instead of ordinary garlic. It contains only one clove instead of many cloves in ordinary garli and is more pungent. The confection of this garlic is used as a aphrodisiac and to check abortion in early pregnancy. *Leek* (Allium ameloprasum) is also used as food and medicine in place of onion. The bulbs are smaller than onion and used to hasten suppuration of boils.[1,15]

Garlic cloves are fed to chicken to prevent chicken diarrhoea. A teaspoon of fresh garlic juice given once a week to your dog increases its wisdom.[19]

REFERENCES

1. Mathur, R. C. *Systematic Botany*, p. 440, (1965).
2. C.F.T.R.I., Mysore, *Some Aspects of Food Research*, pp. 31-32, (1962).
3. Chowdhury, D. S., *et al.*, *Therapeutic usefulness of garlic in Leprosy*, *J. Ind. Med. Ass.*, 39, 517, (1962).
4. Ramanujam, K., *Garlic in the treatment of Acute Leprous Neuritis*, Leprosy in India, 34, 2, (1962).
5. Antia, F. P., *Clinical Dietetics and Nutrition*, p. 261, (1968).
6. Mrs. Soma, *Scientist, C.F.T.R.I.*, Mysore, (1968).
7. Chopra, R. N., *Indigenous Drugs of India*, pp. 414-22, (1933).

3. Ghosh, H., *Indian Medical World*, April, (1937).
4. Crossman, *Medical annual*, (1918).
5. Minchin, *Medical Press and Critic*, June, 13, (1918).
6. Daniel, F., *Food Remedies*, (1925).
7. Muzaffar Hussain, *Kitabul advia*, pp. 444-45, Lahore, (Pak), (1965).
8. Dastur, J. F., *Medicinal plants of India and Pakistan*, p. 15, (1962).
9. Harvey Day, *Curries of India*, Jaico Publication (1963).
10. Jagannath Vaidu, *Tibbey-Jawaherath*, pp. 208-9, (1966).
11. Hakeem Nawab Zakaulla, *Qharabadin-e-zakai*, p. 218, Pers. Mss. Lucknow (1889).
12. Hakeem Javid Hussain, *Lahasun-ki-dawa*, Urdu Mss. (1901).
13. Pandit Hari Hara, *Ayurvedic Chikitsay*, Kan. Mss., Mysore (1910).
14. Milton Denhurst, *Our Dogs*, London.
15. Aman, *Effects of garlic in diseases of Lungs and Nerves* F. No. 36, O.P.D., I.A.H., Mysore, (1965-68).

235. GINGER

Ginger: *Zingiber officinale* (B.N.); *Adraka* or *Shirangavir* or *Vishuva:* (Sans.); *Adrak:* (Hindi, Urdu, Dak.); *Zanjabeel:* (Arab, Pers.); *Hasey Shuntee:* (Kan.); *Inji:* (Tamil, Mal.); *Allum:* (Tel.); *Adu:* (Guj.); *Ada:* (Ori., Beng.).

Family: Zingiberaceae.

Zodiac: Cancer.

Food Value per 100 g. approximately

Carbohydrate	11.2 g.	Vitamin A	65 I.U.
Protein	2.3 g.	Vitamin C	7 mg.
Fat	1.5 g.	Nicotinic acid	0.7 mg.
Calcium	21.1 mg.	Digesting Time	2 Hrs.
Phosphorus	61 mg.	**CALORIES**	**75**
Iron	2.3 mg.		

Constitution: Hot 3° and Dry 1°.

Physiopharmacology and Therapeutics

Ginger is a rhizome belonging to the *Natural order* of *Scitamineae* and family of *Zingiberaceae*. It is a perennial horizontal root, having knots. It is tuberous and has pungent aromatic taste. Stem is elongated with linear and sessile leaves surrounding

the stem. They are dark-green, 4 to 13 inches long and hav smooth surface. Flower spikes emerge out terminating the leaf stem up to 3 inches long, bracts, corolla-greenish, yellow lip dark purple, often spotted yellow, 3-lobbed.[1] The plants hav become sterile on account of rapid vegetative propagation throug rhizomes.[2]

The rhizome ginger is dug out after the leafy parts are dried After washing ginger it is sold as fresh ginger in the vegetable market or is peeled, sliced and dried. The sun dried ginger is sol as *Sount*.

In India ginger is being used from *Vedic* period and is calle as *Maha-aushidhi* or the great medicine. Ancient physicians used ginger as a carminative and anti fermenting medicine. *Galen* the greek physician used ginger as a medicine to rectify the defective humours of the body. He used ginger in the treatment of peralysis caused by *phlegmatic* imbalance in the body. *Aviceena* used ginger as an aphrodisiac. *Pomose* also used ginger in the treatment of gout centuries ago. *Majoon* and *Jawarish-e-zanjabeel* are very popular unani carminative medicines.

Ginger is cultivated all over India, but, ginger grown at Kerala is found to be superior than other places in aroma and tas:e.

Chemical composition

Fresh ginger contains more volatile oils than the dry ginger. The aroma is attributed to *camphene*, phellandrene, zingibere *cineol citral* and *borneol*. The pungency is caused by the prese of *gingerol* a yellowish oily substance that is present in ging Ginger also contains fibre, resin and Starch. There is a considerable amount of *gingerin* and *potassium-oxalate* is also found in ginger (B.P.C. p. 1089).

Usually fresh ginger is used in the culinary preparations to increase aroma, taste and appetite. Due to its silagogue action, increases the movements of the stomach and the production of gastric juice. Therefore, ginger stimulates the digestive process and acts as an excellent carminative. *Tincture Zingebris mitis* or *forts* is one of the constituents of the official *carminative mixture* (B.P.).

Chewing a piece of fresh ginger after meals regularly is an ɔsurance against indigestion, cancer, gastritis, flatulence, astro intestinal infection and parasites. This protective action ɨ attributable to the excessive secretion of saliva, diastate ɑzyme and volatile oil.

Half a teaspoon of fresh ginger juice, one teaspoonful of *ɾesh lime juice*, and the same quantity of *fresh mint juice* is mixed n a tablespoonful of *honey*. A teaspoonful of this linctus is sucked ɓrice daily as a cure for acute bronchitis, pharyngitis, hoarseness, ɔyrosis, indigestion after heavy non-vegetarian and fried fatty ɓods, morning sickness, fermentive dyspepsia, nausea and vomit-ng due to biliousness, urticaria due to food allergy, jaundice, ɒiles etc.[3]

An inch piece of fresh ginger is pounded and boiled in a ɔupful of water for few minutes. The infusion sweetened with ɑugar is used thrice daily after meals as a medicine for ɑysmenorrhoea, and amenorrhoea due to exposure to cold winds nd taking cold bath.[3]

Chewing a piece of fresh ginger along with a clove and a ɔrystal of common salt is a medicine for pharyngitis, loss of voice due to shouting or singing, paralysed muscles of tongue and fauces, ɔolds, rhinitis, enlarged uvula, tonsillitis and Bell's paralysis[1].

A teaspoonful of the fresh ginger juice mixed with a cupful of *fenugreek decoction* and honey to taste is an excellent diaphoratic mixture to reduce fever in influenza. It acts as an expectorant in bronchitis, asthma, whooping cough, tuberculosis of the lungs etc. Fresh ginger juice 5 to 10 drops mixed in milk is given with very gratifying results to prevent and cure gastro-intestinal disturbances in infants and children.[4]

Ginger juice one teaspoonful mixed with a glassful of *tender coconut* is an excellent medicine for dropsy associated with scanty urination.[5]

Infusion of ginger prepared with *Bitter-sweet leaves* is given once at bed time as a remedy for rheumatism, colds and jaundice.[4]

Paste of fresh ginger is applied around the eye-sockets to improve the short sight caused by the deficient contractile power of the iris. Dry ginger powder mixed with warm ash and Benzoin powder (Ood-ka-ata) is rubbed over extremities of the limbs

to check the cold perspiration and improve blood circulation i syncope and collapse stage of cholera.[4]

Burnt ginger mixed with common salt is rubbed over th teeth to cure dental sensitiveness caused by eating sour fruit and toothache.[5]

Fresh ginger fried in ghee is used in diarrhoea and dysentery with *buttermilk* twice or thrice daily with excellent results.[5]

Fresh ginger juice half a teaspoon taken with *half boiled egg* and *honey* once daily at night for a month tones up the sex centre and cures impotency, pre-mature ejaculation, spermatorrhoea etc.[4]

Coconut oil in which a piece of fresh ginger is fried is applied as a liniment for rheumatism, neuralgia, sciatica, mylagia, bursitis etc.[4]

Ginger conserve: *Adrak ka murraba*

Select tender large fingers of fresh ginger, and wash them in cold water. Peel the ginger with a sharp stainless steel knife and cut into pieces of desired size and shape.

Boil the ginger pieces in 0.5 per cent solution of *citric acid* that is sufficient to cover the ginger pieces in a stainless vessel for at least six hours or cook the pieces in pressure-cooker for half an hour. This process will bleach the ginger and soften it.

Remove the ginger pieces and wash them again in cold water and prick them with wooden pegs to impregnate the syrup.

Prepare thick syrup by boiling 3 parts of sugar in 7 parts of water. Purify the syrup by adding a tablespoonful of milk when it is boiling. Remove the scum.

Put the cooked ginger pieces at the rate of one kg. per kg. of syrup and boil the ingredients for 15 minutes and allow them to stand overnight, taking care that the ginger is completely covered by the syrup. After 24 hours, drain off the syrup and add more sugar to it and boil the sugared ginger pieces for another 15-20 minutes and allow it again to stand overnight. Repeat this process until the syrup is sufficiently thick at 60° Brix. At this stage add a little *citric* or *tartaric* acid (0.1 per cent of the total weight of the syrup or 5 per cent, by weight of the invert sugar or corn syrup). Continue to allow the absorption by increasing

the strength of the syrup by 5° Brix each day, till it reaches 75° Brix.

Set aside the preserve for 2-3 months for through penetration of sugar into the ginger. After this period, boil the syrup for another 5 minutes. While still hot drain off the syrup, and roll the pieces on finely ground sugar. Place the pieces on wooden tray and dry them in sun until they are no longer sticky.

The left over syrup can be used for preparing aerated waters, or ginger preserve.

REFERENCES

1. Dastur, J. F., *Medicinal plants of India and Pakistan*, p. 179, (1962).
2. Mathur, R. C., *Systematic Botany*, p. 417, (1965).
3. Hakeem Mahamood Shariff, *Zathi Tajrubath*, Urdu Mss. Chamrajnagar, (1968).
4. Aman, *Clinical investigation of ginger in various diseases*, F. No. 6, (1959-67), I.A.H. Mysore.
5. Muzaffar Hussain, *Kitabul Advia*, p. 71, (1965).

235-236 MACE AND NUTMEG

Mace and Nutmeg: *Myristica fragrance:* (B.N.); *Japatri* and *Jathiphalam:* (Sans.); *Javithri* and *Jaiphal* or *Jaifal:* (Hindi, Urdu, Dak.); *Babasa* and *Jozbua:* (Arab.); *Bazbaz* and *Jozbuya:* (Pers.); *Jathipatri* and *Jakai:* (Kan.); *Jattipatri* and *Jattickka:* (Mal.).

Family: Myristaceae.

Zodiac: Scorpio.

Food Value per 100 g. approximately

	Mace	*Nutmeg*		*Mace*	*Nutmeg*
Carbohydrate	40 g.	119 g.	Iron	12.6mg.	4.5mg.
Protein	6.3 g.	7.5 g.	Vitamin A	Trace	—
Fat	24 g.	28 g.	Digesting Time	2 Hrs.	—
Calcium	175mg.	119mg.	**CALORIES**	434	469
Phosphorus	105mg.	238mg.			

Constitution: Hot and Dry 2°.

Physiopharmacology and Therapeutics

Mace

Mace and Nutmeg are the products of the same tree *Myristi fragrance*. Mace tree grows in Malaya, Singapore, Ceylon, b now it is cultivated in Malabar and Nilgiris in South India.

Mace is the dried thin covering of the fruit nutmeg. Th arillus is bright crimson in colour and is stripped off from th nutmeg. On drying the deep crimson colour of the mace chang into dull reddish-yellow. The dried lobes are sold as MACE. Th dried mace when soaked absorps water becomes soft and swells up.

Chemical composition

Mace contains 4-15 per cent of volatile oil similar to nutmeg It contains all the other chemicals as described in oil of nutmeg It also contains *fat*, *amylodextrin*, *Myristicin* etc.[1]

The use of mace is known from 2nd century A.D. *Charak* and other ancient Indian physicians used it in various medicines. Even Egyptians and Romans knew the therapeuti value of mace in ancient times.[3]

Mace is usually used in spices and blending betelnut. It i chewed along with betel leaf to create a feeling of euphoria, an stimulation of sex. It acts as an aphrodisiac by stimulating th higher centres of sex. It acts as a carminative by exerting the effects of its volatile oil. Excessive use of mace causes giddiness

Nutmeg

Nutmeg is the kernel of the seed of the fruit. The fruit resembles a small peach and splits when it ripens. Nutmeg consists of a large creamy endosperm that is covered by a thin dark brown perisperm. This covering penetrates the kernel by number of infoldings and produces the characteristic ruminate appearance of the section. The seeds are dried and the kernels, freed from their thin shells and dipped in milk of lime and dried before they are sold commercially. Treatment with lime milk prevents the spoilage of the nutmeg by worms. Nutmeg is broadly ovoid in shape and measure 2 to 2.5 c.m. Externally they are dark brown in colour and marked with reticulate furrows that correspond to the fibrovascular bundles in the perisperm.

Nutmeg has a strong aromatic smell and slightly bitter taste.[2] Like mace, nutmeg was also used in the preparation of various medicines in ancient times. Even today nutmeg is officially used in B.P.C. preparations like, *Pulvis Creta Aromatics*, *Spirit Ammonia Aromatics; Myristaceae* etc.[2] In Israel, decoction of nut-meg is given as *Love potion* to increase the sex stamina. Like mace, nut-meg is generally chewed with betel leaves to increase *potentia virilis*. According to *Weil* nutmeg produces a mild stimulation of cerebral centres and acts like 'sympathomimetic amines'. With discovery, from 1959, U.S.A. has listed nutmeg as a narcotic drug and has been banned from the general culinary use. *Weil* also reports that *'practice of taking nutmeg to produce a syndrome comparable to alcoholic inebriety is not uncommon amongst alcoholics who are deprived of alcohol.'*[3,7]

Powder of nutmeg 5 to 15 grs. mixed with *apple juice* or *banana* is used as a specific remedy for diarrhoea due to indigestion of food. The same quantity of powder of *nutmeg* taken with a tablespoonful of fresh *Amla juice* thrice daily is a medicine for indigestion, hiccough, morning sickness, palpitation of the heart, forgetfulness, insomnia, hypertension, mental irritability, depression etc. With *honey* and *half boiled egg*, it acts as an excellent sex tonic. Taking an hour before conjugal union helps one to get exhilarating feeling and acts as *Mumsik* during the act. It prolongs the time of seminal discharge.[4,5,6,7]

Nutmeg paste prepared by rubbing it on a stone slab in one's own early morning saliva before cleaning the mouth is applied once daily as a specific medicine for *alopecia areata*, *ringworm*, eczema etc.[5,7,8]

A nutmeg rubbed five to ten times on a slab of stone along with honey is given as a sleeping medicine for those infants who keep on crying all the night without any obvious reason. It is warned that, its regular use without getting the child properly examined by a physician causes serious complications and addiction. In large doses, nutmeg excites the motor cortex and produces epileptic convulsions and lessions in the liver. Even a teaspoon of nutmeg can produce toxic symptoms such as burning in the stomach, nausea, vomiting, restlessness, giddiness with fear of death and feeling of great excitement as if some heavy weight is put on the chest. Recovery is unusual within 24 hours.

Infusion prepared from half nutmeg in a pint of water, given along with *tender coconut water* an ounce at a time duri dehydration caused by vomiting and diarrhoea, particularly cholera.[7]

A nutmeg coarsely powdered is fried in *til* oil until all the pa ticles are brown. After cooling and straining, the oil is applie to relieve headache, rheumatic pains, neuralgia, sciatica et A little oil massaged over the shaft of the penis half an hou before sexual intercourse creates a very pleasing feeling durii the act in both.[6] It can also be used as a medicated dressing t heal chronic ulcers.

Sitting regularly under the shade of the nutmeg tree cure obesity.[7]

Nutmeg oil. *Oleum Myristicae B.P.*

Oil of nutmeg is expressed or distilled from the kernel o nutmeg or from mace. It is pale yellow in colour and become viscid as it becomes old. It has the characteristic aroma and tast of nutmeg. The expressed oil is bright orange in colour Specificgravity of nutmeg oil is 0.870 to 0.930.

Chemical composition

Oil of nutmeg contains 80 per cent of *d-camphene* 78 per cen of *dipentene, eugenol, isoeugenol, d-linalool, d-borneol, l-terpeneol,* 6 per cent of *geraniol, safrol,* and about 4 per cent of *myristicin,* an alcohol yielding *diketone* ($C_8H_{14}O_2$) an aldehyde resembling *citral, myristic,* and *myristinic acid.* It contains *formic butyric,* Octoic and a new *monocarboxylic* acid in the form of esters. *Myristicol* is a mixture of alcohols, of which *terpineol* is the chief.

Nutmeg oil is used in liniments, perfumery, hair lotions, and as an antispasmodic carminative. The usual dose of oil is ½ to 3 minims.

REFERENCES

1. B.P.C., pp. 651, 711, (1911).
2. Jeelani Gulam, *Magzanul advia,* p. 1734, (1915).
3. *Practitioner,* April 1967, Health Madras, p. 176, Vol. 45, No. 8, (1967).
4. Hakeem Zakaulla, *Mujerebath-e-Zakai,* Urdu Mss., (1898).
5. Hakeem Syed Akbar, *Tibbe-Akbari,* Pers. Mss., (1908).
6. Hakeem Jameel Khan, *Rahanuma-e-Jameeli,* Urdu Mss., (1870).
7. Pandit Shiva Shankar, Sans. Mss., (1787) Srirangapatnam.
8. Antia, F. P., *Clinical Dietetics and Nutrition,* p. 262, (1966).

237. OMUM

mum or Bishop's Weed: *Carum copticum:* (B.N.); *Dipaka, evani, Ugargandha:* (Sans.); *Ajowan:* (Hindi, Dak., Punj.); *amoon:* (Arab.); *Nanquah:* (Pers.); *Vadakki:* (Kan.); *Omom:* Tel.); *Voma:* (Tel.); *Ayamodakkam:* (Mal.); *Onava:* (Mar.); *jma:* (Guj.); *Joan:* (Beng.).

amily: Umbelliferae.

odaic: Gemini.

ood value per 100 g. approximately

arbohydrate	38.3 g.	Phosphorus	297 mg.
rotein	15.1 g.	Iron	14.4 mg.
at	17.8 g.	Digesting Time	2 Hrs.
alcium	1400 mg.	**CALORIES**	**378**

Constitution: Hot and Dry 3°.

Physiopharmacology and Therapeutics

Ajowan plant belongs to the family of *coriander*, resembles to *Dil* plant and grows up to 3 feet. It is cultivated in Iran, Afghanistan, Andhra Pradesh and other parts of India. The seeds are usually crowned by a ring of calyx. The dry seeds are harvested in the form of *Ajowan seeds.* Seeds are ovate about 2 mm. long and 1 mm. broad. There are five ridges over each seed with a depression in the middle. Inside the seed there are nine oil tubes that run vertically in them. Seeds are aromatic, sharp, tingling and slightly bitter. The colour of the seeds is greenish-brown[1].

Chemical Composition

Ajowan seeds contain a volatile oil that is rich in *cymene, terpene, thymene* and steroptin. There is 25 to 35 per cent fixed oil. *Thymol* is the chief constituent of ajowan seeds.

Ajowan is being used as a carminative medicine from the time of *Charaka* and *Sushruta.* Even Greek physicians like:

Dioscorides, Gelen etc., used ajowan in various carminative medicines. *Majoon* and *Jawarish-e-Kamoon* are some of the ver valuable Unani medicines prepared from ajowan seeds.

The name ajowan is derived from the Hindi word *Adarjawa* that means 'one which feeds'. The word *Nanqhua* 'that which desires bread' in Persian is also attributed to the carminative properties of ajowan seeds. The chemicals and volatile oil in the seeds stimulate the gastric secretions and movements of the villi in the intestines, kill the harmful germs and prevent the fermentation in the intestines. Therefore, ajowan seeds are chewed after food as a medicine for atonic dyspepsia, flatulent colic, dysentery, diarrhoea, and other gastro-intestinal disorders that are caused by indigestion[2, 3].

Ajowan seeds are soaked in fresh *ginger juice*, and dried in shade. Then, they are soaked in fresh *lime juice* and are dried again. Later they are soaked in *mint juice* and *papaya sap* and dried again. The processed dry seeds are powdered and preserved in a clean airtight container. A pinch of the powder taken immediately after food is an excellent medicine for atonic dyspepsia, heart burn, indigestion of carbohydrates, proteins and fats, flatulent colic, diarrhoea due to indigestion, gastro-intestinal infection, etc. The powder taken after every meal with a teaspoonful of *malt vinegar* is a preventive medicine in cholera epidemic. Using it with tender *coconut water* twice daily is a medicine for acute stage of cholera, dysentery, infective diarrhoea, nausea and vomiting, morning sickness, jaundice, etc.[5]

Plain ajowan seeds one pinch (10 grs.) are given along with *jaggery* as a folk medicine to prevent indigestion, and gastro-intestinal infection after child birth.. Seeds tied in a muslin bag in the form of tampoon are kept intravaginally or douched with infusion to prevent purpural fever after child birth. However, antiseptic preparations like: *Dettol* or *Savlon* (I.C.I.) lotion or cream have taken the place of ajowan douche nowadays.

Ajowan decoction is prepared by boiling a teaspoonful of the seeds and *Fenugreek* in a glassful of water for half an hour. An ounce of the infusion mixed with a tablespoonful of *honey* is given thrice daily as an effective expectorant during the treatment of tuberculosis, asthma, bronchitis, lung abscess, etc.[5]

Infusion of ajowan mixed with *common salt* is gargled in acute pharyngitis, sore throat, relaxed throat, hoarseness of the voice

ue to colds and shouting. A teaspoonful of the infusion mixed ith *soda bicarb* 2 grs. is given as a medicine for indigestion and atulence in children. Giving it with each feed helps easy diges- on and prevents the vomiting of the milk.

Fumes of the ajowan seeds are inhaled to ease expectoration nd asthmatic spasm.

Infusion of ajowan seeds given thrice daily for a month or wo with an *egg yolk* and *honey* reduces the desire for alcohol and pium[3].

Eating ajowan seeds and *jaggery* cures ringworm, syphilis, cabies, urticaria psoriasis etc. (Chakradoot).[4]

Chewing ajowan seeds prevents dental caries and foul breath. Chewing a pinch of seeds with a crystal of *common salt* and a *love* is a medicine for cough caused by acute pharyngitis n influenza.

Ajowan seeds are fried in pure *cow's ghee* with the kernel of *amarind seeds* in equal proportion. After the mixture turns olden brown, it is powdered and preserved in an air tight con- ainer. A teaspoonful of the powder mixed with a tablespoon- ul of *honey* is daily taken once with pure *cow's milk* before going o bed as an excellent nerve-tonic and aphrodisiac. It increases irility, cures pre-mature ejaculation of the semen and keeps one, ears younger, even, when dominated by grey thoughts.

Infusion of the seeds is instilled in the eyes to cure black eyes, lood clot formation due to injuries. It is massaged to relieve uscular pain caused by blows.

Powder of the ajowan seeds mixed with *white of an egg* is pplied over umbilical hernia in infants and children. The ame mixed with *honey* and *lime juice* is applied as a cure for corpion sting, acne. Ajowan seeds are fried in *coconut oil* and s massaged as a liniment for muscular pains. It is instilled in ainful ear and in stuffed nose due to rhinitis (Care must be aken to prevent oil inhalation). Paste of ajowan seeds prepared with half the quantity of *turmeric powder* is applied over scabies. Paste of the seeds is applied with *lime juice* over painful swellings.

Ajowan seeds are pounded with *onion*, *turmeric* and *castor oil* and the mixture is heated till the onion becomes soft. Then it is placed on a *betel leaf* and fomented over blood boils, cut wounds and injuries caused by stepping on nails. It reduces pain and

prevents the formation of pus. (*It is warned that such injuries are very dangerous however minor they are. They cause tetanus a very serious death trap if proper care and treatment by a physician is not given immediately after the injuries*).

Charred ajowan seeds half a teaspoonful are given thrice daily after food with *butter milk* as an effective medicine for food poisoning, diarrhoea, dysentery, jaundice, hepatitis, heart burn, indigestion, flatulent colic and dyspepsia, piles, pinworms etc. Powder of the seeds mixed with *alum* and *salt* is used as a dentifrice.

Excessive use of ajowan seeds causes dryness of the body fluids, damages the eyes and reduces the secretion of milk and semen[4].

Ajowan Oil (Oleum Ajowan I.C.A.)

Oil of ajowan is distilled from ajowan seeds in which it exists to the extent of 3 to 4 per cent. It occurs as a transparent or brownish liquid having the smell of thyme and a sharp burning taste. Its specific gravity is 0.917 to 0.930[1].

Chemical Composition

The oil contains 45 to 55 per cent of *Thymol.* After thymol is separated, the oil contains *cymene* ($C_{10}H_{13}$) with traces of *pinene*, *dipentene* and the mixture is commercially known as *Thymene*[1]. Oil of Ajowan is internally used in the dose of ½ to 3 minims along with *sugar* or *sugar candy* or *betel leaf* to cure atonic dyspepsia, indigestion, flatulent colic.[1] It is a specific medicine for nausea and vomiting when given with infusion of *Fennel seeds*. Oil mixed with *fresh mint juice* is given as an effective medicine for cholera. Given with a pinch of cinnamon powder is an excellent medicine for diarrhoea. It can also be used in all diseases indicated in *oleum menthol.*

Externally, oil of ajowan is used mixed with 9 parts of *til* or *coconut oil* to cure rheumatic pains, toothache, head-ache, ear-ache, ringworm, alopecia areata, venomous sting, psoriasis, infected wounds, boils, etc. It is applied in the nose to cure ozena, and maggot infested wounds.

Thymol (*Ajowan ka-phool or Sat-e-ajowan, B.P.*)

Thymol is prepared from the volatile oils of *Carum copticum*, *Thymus vulgaris*, *Monarda punctata* and other aromatic plants rich in *Thyme camphor*. Thymol can also be synthetically prepared from *nitrocumic-aldehyde*, *menthone*, and *paracymene*. Thymol is found in the form of large colourless, transparent rhombic prisms having the chemical formula $C_{10}H_{13}OH$. It has got an agreeable spicy, burning taste and aromatic smell. Its specific gravity is 1.028. Like *Menthol*, it melts when mixed with *camphor*. It is soluble in water (1 in 1500), alcohol (8 in 3) Chloroform (8 in 5) glycerine (1 in 190) etc.[1]

Thymol is medicinally used as a local and intestinal antiseptic. Ointment prepared by dissolving 1 part of thymol in 24 parts of white-paraffin (Vaselin) by heating the mixture, is a very valuable remedy for ringworm, psoriasis, actinomycosis chilblains, eczema, burns etc. Its application over the bare parts prevents from mosquito bite.

Volkmann's Solution (B.P.) is prepared from thymol, 0.1; glycerine, 2; alcohol, 2; water sufficient to produce 100. This is a very useful antiseptic lotion for washing infected wounds. It is gargled by mixing one tablespoonful in a glassful of warm water in stomatitis, relaxed throat, and prevents the leptothrix bucalis infection.

Nowadays thymol is very rarely used internally as a medicine for *Ancylostoma duodenale*. However, *Chlortetraethylene*, *oil of chenopodium Antepar* (B.W.) etc. are specific remedies for the eradication of hook worms.

REFERENCES

1. B.P.C. pages 739, 1040. (1911).
2. Jeelani Gulam, *Materia Medica*, Vol. 1, (Urdu), p. 621 (1912).
3. Aman, *Clinical trail of Ajowan in alcoholics*, (1965-67).
4. Jagannath, *Bharathi-Jadi-butiyan*, Vol. 1, (Urdu), pp. 23 to 49, (1961), Chandusi, U.P.
5. Hakeem Mohammad Najumalgani Khan, *Qhazanathul advia*, Urdu p. 403, 1917. (Lucknow).

238. PEPPER

Pepper: *Piper nigrum:* (B.N.); *Krishnam mircham:* (Sans.); *Kali mirch:* (Hindi, Urdu, Dak.); *Filfil-e-aswad:* (Arab); *Filfil-e-Siyah:* (Pers.); *Mensu:* (Kar.); *Maligu:* (Tam.); *Endu miriyalu:* (Tel.); *Kurumulaka* or *Milagu:* and *Kalamiri:* (Mal.); *Miri:* (Guj.); *Kancha-got mircha:* (Ori.); *Sakna-gol mirch:* (Beng.).

Family: Piperaceae.

Zodiac: Aries.

Food value per 100 g. approximately

Carbohydrate	49 g.	Iron	16.8 mg.
Protein	10.5 g.	Niacin	1.8 mg.
Fat	6.2 g.	Vitamin C	25 mg.
Calcium	255 mg.	Digesting Time	2½ Hrs.
Phosphorus	197 mg.	CALORIES	304

Constitution: Hot and Dry 3°.

Physiopharmacology and Therapeutics

Black pepper plant is a stout, glabrous evergreen creeper, much swollen at the nodes and cultivated in South India, Malaya, Siam etc. Leaves resemble like *betel leaves* and are broadly ovate, 4 to 9 inches long, 4½ inches broad, leathery, 5-9 ribed, paler beneath, but, they are coarser than *betel leaves.* Flowers are unisexual and bisexual in slender, projecting drooping spikes[1]. Fruits or berries are sessile having a pendulous spike. They bear in clusters. When the fruits are tender, they are pale or dark green in colour. When they begin to ripe, they become red and dark purple after they are dried. The berries are then separated from the stalk and graded for sale. Pepper berries are spherical, dark brown or black in colour and about 5 mm., in diameter. The outer covering is wrinkled. At the apex of the fruit the remains of the sessile stigma are visible. The pericarp is thin, and contains a single seed completely filling the cavity. There is a thin, narrow, dark pericarp in the vertical section of the

berry. Within this pericarp there is a whitish kernel of the seed, to which the pericarp is found firmly attached. The kernel is composed of perisperm, and the small endosperm is found surrounding the minute embryo at the apex of the fruit. Taste of pepper is pungent and aromatic. White pepper is obtained by soaking the black pepper in water and the upper covering is removed by rubbing in between the hands. White-pepper is less pungent than the black-pepper.[2]

There are several varieties of black pepper like: *Malabar Black Pepper, Garbled F.A.Q. Malayan Black Pepper* but *Uthirankotta, Kattanandan, Khumbhakodi* and *Kuthiravalli* are some of the best kinds for having high percentage of *Piperine*[3].

Pepper is cultivated in India from vedic period. Greeks also knew about the cultivation and the various uses of pepper about 400 B.C.[4] In Europe it was once considered as a very valuable spice. Once, when *Alaric* of the *Goth* conquered Rome in 400 A.D., he demanded 3000 lb. of pepper as part of the city's ransom![5]

Today, pepper is one of the most popular spices, that is used in many food industries as a flavouring agent. Due to high cost of pepper, Indian Government has set up various research projects regarding its scientific cultivation and marketing process. Pepper in its raw state carries a wide range of microorganisms which have been found to produce gas and off-flavour in the finished product. To overcome this defect, a new process of extracting the *oleoresin concentrate* which retains the flavour and 'bite' principles of pepper without any risk of attendent microbial spoilage in the processed foods from pepper and its rejections is discovered[6, 7].

The new product *oleoresin* is tried to blend with common salt with great success. It is named as *peppersal.* This flavouring product is used excellently in place of pepper and salt[6, 7].

Chemical Composition

Pepper contains 5 to 8.5 per cent *piperine*, 1 to 2.3 per cent *volatile oil* and pungent resin *chavicin*. The volatile oil consists of terpenes amongst which *l-phellandrene* has been identified[2].

Volatile oil of pepper, the alkaloid *pipperine* and the pungent substance *chavicin* act directly as gastric stimulants by secreting

more saliva and gastric juice. Gastro-intestinal movements are augmented and the strangulated gas is expelled resulting the relaxation of the intestines. It is therefore, used as an excellent carminative and digestive stomachic in atonic dyspepsia, indigestion, flatulent colic, diarrhoea and fermentation of the food.

Pepper has the dilating influence on the renal arteries and superficial vessels of the skin. Therefore, its use in the form of condiment; causes profuse sweating and urination and creates a feeling of warmth in the beginning and then follows the cool sensation.

Due to the diaphoratic and diuretic action, the infusion prepared from 20 grains of pounded pepper and 2 cloves of *garlic* 6 in ounces of water is given thrice daily with *honey* in malaria, scanty urination, etc. The same is also gargled in sore throat, relaxed uvula, tonsillitis, pharyngitis etc. with gratifying results.

Confectio pepper

Recipe

Fine pepper powder	10 parts	Clarified honey	75 parts
Fine Fennel powder	20 parts	Confectio rose	75 parts
Fine caraway powder	15 parts	Senna leaves fine powder	10 parts
Fine cardamom powder	10 parts	Sulphur powder	2 parts

Mix all these ingredients well and keep the mixture in a jar with a screw cap for a month.

Uses: A teaspoonful of the confection taken thrice daily with warm water is a very valuable remedy for prolapse of the rectum, piles, fissure of the anus, constipation, chronic urticaria, scabies, herpes progenitalis, (herpes paraeputialis), herpes zoster, herpes simplex, chronic dermatitis, senile dermatitis, vertigo, and rheumatic pains. Confection given with *fenugreek infusion* once at night for 15 to 20 days acts as a medicine for rhinitis, chronic bronchitis, asthma, bronchiactesis, cough due to excessive secretions of nasal fluid etc. Confection given with *tender coconut water* thrice daily with *Chloromycetin* (P & D) 2 capsules (500 mg) 3 times daily for 4 days is a specific medicine for gonorrhoea, cystitis, urethritis, prostatis, syphilis etc. (*It must be remembered that broad acting antibiotic like: Chloromphenicol, causes blood dyscrasia and dysbiosis if indiscriminately used*).

Pepper powder 15 grs. mixed with *honey* is given thrice daily as an antidote for arsenic poisoning.

Roast 12 pepper corns and take once daily with *honey* to get relief from cough, asthma, colds, rhinitis etc[8]. Burnt pepper 3 corns chewed with *betel-leaf* relieves non-diabetic thirst. Paste of two pepper prepared with *goat's milk* is put in the nostrils to cure congestive headache[9].

Pepper powder 20 grs. boiled in milk with a pinch of *turmeric powder* is used once daily for 3 days with very good results in acute coryza. Eating pepper 6 with *Almonds* 4 once daily with milk is a nerve-tonic and acts as an aphrodisiac in young impotents.

Infusion of the pepper prepared from 20 corns in 6 ounces of water is given twice daily as a cure for snake bite, opium intoxication, scorpion sting[10].

Eating pepper along with fish-meal counter acts its bad effects.

Sucking pepper 3 corns with a pinch of *ajowan seeds* and a crystal of *common salt* is an effective remedy for cough due to throat irritation.

Pepper paste prepared with a *garlic clove* and little *salt* is applied over relaxed uvula early in the morning. Eating the same chutney with an unlevened *ragi* chapati as a breakfast without drinking cold water is a remedy for common cold. It is a very popular folk-medicine in Mysore State (Author).

Fumes of the burning pepper are inhaled to arise the unconscious person in syncope, epilepsy, shock and hysteria.

Powder of pepper and *common salt* is an excellent dentifrice. Its daily use prevents the dental caries, foul breath, bleeding from the gums, cures the increased sensitiveness of the teeth, painful gums, toothache, and lack of appetite. A pinch of powder mixed with *clove oil* is put in the caried tooth to alleviate toothache.

Pepper is externally used as mustard. Its local application dilates the superficial vessles and acts as a counter-irritant, hence, a teaspoonful of pepper powder fried in *til oil* until it is charred can be used as an analgesic liniment for mylagia, rheumatic pains, alopacia, ringworm, urticaria, paralytic affections, headache etc.

REFERENCES

1. Dastur, J. F., *Medicinal Plants of India and Pakistan*, p. 132 (1965).
2. B.P.C. pp. 799-800 (1911).
3. C.F.T.R.I., Mysore, *Some Aspects of Food Research*, p. 32, (1962).
4. Jeelani Gulam, *Magzanul advia* (Urdu), p. 1910, (1916).
5. Harvey Day, *Curries of India*, p. 10, Jaico Publications India (1967).
6. C.F.T.R.I., Mysore, *Some Aspects of Food Research*, p. 33, (1962).
7. Lewis, Y. S., *et al.*, *Preparation of Spice Extractives*, C.F.T.R.I., Mysore Annual report, p. 46, (1967).
8. Mohammad Abdulla, *Tiryaq-e-azam*, Urdu Mss. (1867), Lucknow.
9. Nawab Abdul Hakeem 'Gunjenae advia' (Pers.), (1897), Lahore.
10. Hakeem Mohammad Noor Karim, *Magzanul advia*, (Urdu), p. 67. Noval Kishore Publishers (1915), Lucknow.

239. SAUNF

Saunf or **Fennel seeds:** *Foeniculum vulgare:* (B.N.); *Madhurika* or *Shutyushiya:* (Sans.); *Saunf:* (Hindi, Urdu, Dak.); *Raz-yanaj:* (Arab); *Badiyan* or *Sazya:* (Pers.); *Sonpina kalu:* (Kan.); *Shombu:* (Tam.); *Pedda-jilakura:* (Tel.); *Warialli:* (Guj.); *Panmauri:* (Beng.).

Family: Umbelliferae.

Zodiac: Virgo.

Constitution: Hot and Dry 2°.

Physiopharmacology and Therapeutics

Fennel plant is cultivated in India, Southern Europe, Malta, Japan etc. The stem is errect about 3 feet high. Leaves are pinate having 3 or 4 bifercation, segments narrow, linear. Flowers or Umbels consist of 15 or more rays, glaucous[1]. Fruits are 4 to 6 millimetres (Glacian and Russian) or 8 to 10 mm. (Saxon) in length and about 3 mm. in diameter. The colour of the fruits is greenish-yellow or yellowish-brown, oblong in shape and crowned by a stylopod. Fruits are glabrous and each is composed of two mericarps united and attached to the pedicel. Each

fruit has five prominent primary ridges, and in transverse section exhibits six large oil glands of 0.2 mm. wide. They are aromatic and have sweet and agreeable taste[2].

Chemical Composition

Fennel seeds are rich in 4 to 5 per cent volatile oil which contains *anethol* and *fenchone*.

Fennel seeds are used in condiments from bygone days. Indians, Romans, and Greeks knew about the medicinal value of these seeds even before *Christ*.

Infusion of the fennel seeds prepared by boiling a desert spoonful in 6 ounces of water for half an hour is taken 3 ounces with *honey* thrice daily after food to cure indigestion, biliousness, flatulence, constipation, atonic dyspepsia, impotency, scanty urination, thirst during summer and fever, painful menstruation and other irregularities of menstruation. It is given as a diuretic during the treatment of diseases of heart, liver and kidneys[1]. Decoction one to two teaspoonfuls is given with each feed to cure obstinate constipation in infants and children. It eases digestion of the milk prevents, the formation of gas and cures colic in children. Due to this therapeutic effect *fennel water* with '*ansie water*' is used as a base of all *Gripe waters*.

Chewing some seeds every day after meals prevents foul breath, indigestion, constipation, nausea and vomiting, hookworm infection and safeguards the eyesight.

It is said that eating a pinch of fennel seeds with *sugar* once or twice daily during the passage of *Sun* in the zodiac of *Aries* (i.e., from 22nd March to 21st April) and in *Cancer* (22nd June to 23rd July) prevents from diseases, increases eyesight and imparts longevity[3].

Fennel seeds boiled in the infusion of *dil leaves* is given as medicine after child birth to increase breast milk. Seeds boiled in pure wine are given as a cure for snakebite and scorpion sting. Eating fennel seeds with *figs* is a tonic-medicine for haemoptysis, cough, bronchitis and lung abscess. Paste of the seeds is applied over abdomen to relieve distention caused by flatulence—and retention of the urine. It is applied over face as a remedy for acne and its regular use whitens the complexion.

Saunf Oil (Oleum foeniculi B.P.C.).

Saunf oil is distilled from the dry fennel seeds. It is colourless or slightly yellow in colour having the typical camphoracious sweet taste and aroma. Its specific gravity is 0.953 to 0.985 at 25°. It is soluble in alcohol and rich in *fenchone* ($C_{10}H_{16}O$), *fenchol d-pinene, diptene, phellandrene* and *limonene.*

Oil of saunf is aromatic, carminative and antispasmodic It is used in various carminative preparations like: *Pulvis Glycerrhizae, Aqua foeniculi* etc. Half to three minims are used on a lump of *sugar* or *sugar candy.*

Leaves

Leaves of the fennel plant are highly praised as the protector of *eyesight.* It is said that an eagle rubs its eyes frequently with the leaves to keep its eyesight sharp. Leaf juice is boiled with *honey* and the scum is collected and preserved. Its regular application in the eyes cures conjunctivities, and weakness of the eyes. Juice of the fresh leaves is kept in a bottle with the bile of a *Peacock* and the bottle is daily exposed to sun for about 3 weeks. Then it is mixed in *black antimony* (Surma) and finely powdered. Its regular application in the eyes prevents cataract, opacity of cornea and premature loss of eyesight, excessive lachrymation, burning and smarting in the eyes after reading or doing needle work, tiredness of the eyes etc[3, 4]. Juice of the leaves is astringent, diaphoratic, carminative, antiperiodic, and expectorant. Its juice is given in asthma, bronchitis, infantile diarrhoea, catarrh of the bladder, dysentery etc[1].

Root

Root of the fennel plant mixed with *honey* is applied for dogbite[3]. (*Any one who is bitten by a dog should be given a course of Anti Rabies Vaccine to escape the risk of Rabies*).

REFERENCES

1. Dastur, J. F., *Medical Plants of India and Pakistan,* p. 87 (1965).
2. B.P.C. pp. 441 and 695, (1911).
3. Noor Kareem, *Magzanul advia,* p. 353 (1915).
4. Abdul Hakeem, *Bustan-ul-Mufaradath,* p. 206, (1908).

240. SINAPIS

Sinapis or Black mustard Seed: *Brassica Sinapiodes:* (B.N.); *Rajaka* or *Sarship:* (Sans.); *Kali rai:* (Hindi, Urdu, Dak.); *Khardal-e-aswad:* (Arab); *Sasvae:* (Kan.); *Kadagu:* (Tam.); *Avalu:* (Tel.); *Kaduka:* (Mal.); *Mohri:* (Mar.); *Sarisa:* (Ori., Beng.).

Family: Cruciferae.

Zodiac: Leo.

Food value per 100 g. approximately

Carbohydrate	23.5 g.	Iron	17.5 mg.
Protein	21.3 g.	Vitamin A	264 I.U.
Fat	38.6 g.	Vitamin B_2	75 mcg.
Calcium	490 mg.	Niacin	5 mg.
Phosphorus	700 mg.	CALORIES	539

Constitution: Hot and Dry 4°.

Physiopharmacology and Therapeutics

Black mustard is an annual herbacious plant largely cultivated in tropical countries. Dry seeds are small like *ragi seeds* and measure about 1 mm. in diameter. They are round, and darkish-brown or greyish-brown in colour. The covering of the seeds is pitted, but the internal part is yellowish and fatty. When the seeds are soaked in water, they get surrounded by a mucilage. Seeds are smell-less, but when they are pounded and moistened with water, they emit a peculiar pungent odour. Taste of mustard seeds is bitter and pungent. There are other two varieties of mustard seeds namely: *White mustard seeds* (*Brassica alba*) and *Indian mustard seeds* or *Sarsoon* (*Bassica juncea*). The blending of the ground flour of dried, ripe seeds of *Black mustard* or *Indian mustard* and *White mustard* that occurs as greenish-yellow powder is known as *Mustard* or *Sinapis* (*Latin*)[1].

Chemical Composition

Black mustard seeds contain a glycoside named *Sinigrin* (potassium myronate) and an enzyme, *Myrosin.* When mustard

seeds are mixed with water sinigrin and myrosin, *allyl isothiocyna* a volatile oil that is responsible for pungent and bitter smell an taste, is farmed. The white mustard contains a different cry stalline glycoside, *sinalbin* along with *myrosin*, which combine with water and hydrolyses the *sinalbin* producing *acrinyl isothiocy nate*, *sinapine acid sulphate* and *dextrose*. The volatile oil *acrin isothiocynate* is a yellow liquid that is pungent and counte irritant in its action. White mustard seeds contain a fixed o (30 per cent), protein (25 per cent), and mucillage[1].

Mustard seeds are used in condiments from time immemoria by Romans, Greeks and Indians. *Pilani* a physician of ancien Rome writes: 'It is so pungent in flavour that it burns like fire though at the same time it is remarkably wholesome for the body *Pythagoras* an another ancient physician claimed it as a cure f scorpion sting[2, 3].

Mustard is internationally used as an appetizer, flavouring agent and food preservative. Its presence in the food an pickles prevents the growth of *aspergillus niger* (Black mould).

Small quantity of mustard acts as a carminative and increase the gastric juice by its reflex action. Two to four teaspoonful o the mustard powder mixed in a glassful of warm water is given as a stomach wash in narcotic poisoning and snake bite[2, 4].

Chewing few seeds of mustard cures toothache and improves appetite[4].

Mustard is a rubefacient. By its application in the form of paste prepared from water, the blood vessels of the skin dilate resulting in the pinkish colouration of the skin. Then it causes burning pain due to the irritation of the sensory nerves and later causes local anesthesia by paralysing the nerve endings Its frequent application causes blisters, and a kind of yellowish green serum exudates from blebs. Therefore, its plaster c paste boiled in oil is applied as an analgesic in rheumatism sciatica, paralysis of limbs, pneumonia, pleurisy, gastralgia and other muscular pains. Paste of mustard seeds is applied over stomach to stop vomiting. Applied on the calf muscles acts as a stimulant by increasing the circulation, hence it can be used in syncope, and unconsciousness. In insanity and coma due to meningitis its plaster on the neck was considered as a remedy in bygone days. A teaspoonful of mustard powder mixed in a gallon of warm water is used as a medicated bath in

convulsions of the children caused by high fever. Sitz bath with mustard powder is found to be very effective in dysmenorrhoea and amenorrhoea caused by exposure to cold. Mustard foot bath is an excellent treatment for common cold. Application of mustard paste over ringworm and scorpion sting after washing the skin with sufficiently hot water is a common folk-medicine.

Rahezes claims that putting mustard seeds in the holes, kills all the poisonous insects and snakes[4].

Roasting a handful of white mustard seeds in a litre of *til* or *coconut oil* and after straining and cooling the oil is applied with little water over face before going to bed, cures pimples and whitens the complexion.

Mustard Oil (*Oleum sinapis expressum*)

Expressed oil of mustard is obtained from black and white mustard seeds. The oil is brownish-yellow having a mild taste with its specific gravity of 0.916 to 0.920.

The oil is used as a cooking medium, for lubricating purposes, and for making soaps and liniments. Application of mustard oil over the body and daily exposure to sun prevents and cures rickets. *Mustard volatile oil* is obtained by distilling the black and white mustard seeds. The oil thus obtained is a very powerful counter-irritant rich in *allyl isothiocyanate* (92 per cent). It is diluted with alcohol or oil and used as a very powerful vessicant from which *Linimentum Sipanis is prepared B.P.C.*[1]

REFERENCES

1. B.P.C. pp. 732 and 947, (1911).
2. Jeelani Gulam, *Materia Medica*, Urdu, p. 2088, Vol. 2 (1916).
3. Harvey Dey, *Curries of India*, p. 11, (1967).
4. Noor Kareem, *Magzanul advia*, Urdu, p. 309, (1915), Lucknow.

241. TAMARIND

Tamarind: *Tamrindus indica:* (B.N.); *Amlika:* (Sans.); *Imli:* (Hindi); *Tamar-hindi:* (Urdu, Pers.); *Hammar:* (Arab); *Puli:* (Tam. Mal.); *Chinta pandu:* (Tel.); *Chinch:* (Mar.); *Hunse-hannu:* (Kan.); *Gadamdi:* (Sindhi); *Tentuli:* (Ori.); *Tentul:* (Beng.).

Family: Caesalpiniaceae.

Zodiac: Pisces.

Food value per 100 g. approximately

Carbohydrate	64 g.	Vitamin A	98 I.U.
Protein	3.2 g.	Niacin	0.7 mg.
Fat	0.5 g.	Vitamin C	Trace
Calcium	168 mg.	Digesting Time	3 Hrs.
Phosphorus	108 mg.	**CALORIES**	**287**
Iron	108 mg.		

Constitution: Cold 1° and Dry 2°.

Physiopharmacology and Therapeutics

Tamarind tree is the native of Africa and South India. It grows to the height of 60 to 70 feet with a broad trunk. It is an ornamental tree with a longevity of 120 years. The leaves are one inch long leguminous, half an inch broad and sour in taste. The flowers are pinkish-white and sour in taste.

The fruit is a legume measuring from 2 to 10 inches long having a shape of a crescent. It is covered with a brown colour over the green epicarp when it is tender. As the fruit ripes the covering becomes hard and brittle and the pulp becomes dark-maroon having strings of fibres and about 7 to 10 large brown hard seeds. The pulp is sourish-sweet in taste and emits a typical sour odour. When the outer covering is dry the fruits are plucked and the pulp is separated from outer covering, fibres and seeds. The *pink* variety is called *Lal imli.*

Chemical Composition

Tamarind contains 10 per cent of *tartaric acid*, 8 per cent acid *potassium tartarate*, and 25 to 40 per cent *invert sugar*. The total acidity varies from 11 to 10 per cent.[1]

Tamarind is extensively used in the preparation of curries all over South India. Pulp of ripe tamarind is laxative, antiscorbutic, anti-periodic, antiseptic, anti-biliousness, etc. It antidotes the poisonous effects of alcohol and dhatoora[2]. Its paste is applied over head and body to prevent the sun stroke[2, 4, 5]. A teaspoon of the pulp mixed with *butter-milk*, and *banana mash* is used with excellently good result in dysentery, diarrhoea, and colitis. The water decanted by immersing some tamarind for an hour is given with *honey* or *sugar* to quench thirst in fevers, biliousness, vomiting and scanty urination. Pulp a teaspoon is used with *jaggery* and *cumin* thrice daily to cure jaundice, nausea, vomiting, and giddiness. Chewing a piece of tamarind with some *salt* and *pepper* is a folk-medicine for morning sickness, indigestion and pyrosis. Cleaning the tongue with tamarind and salt increases appetite and prevents foul breath. Tamarind water with *salt* is gargled in sore throat, stomatitis and the hot pulp is applied to hasten suppuration in boils. Excessive use of tamarind is not advised, as it causes hyperacidity of the system, cough and weakens sex power. A new process of extracting tamarind extract is discovered at C.F.T.R.I. and it is commercially marketed. It is very convenient to use and can be kept handy where tamarind is not available. It is a gift to Indians who are living abroad.

Leaves

Tender leaves are cooked with tender mango and used as a cure for biliousness, jaundice, piles, and summer heat, enlarged spleen due to malaria, dysentery, etc. Leaves are fomented to relieve rheumatic pains, and inflammatory swelling, sore eyes etc. Infusion of the leaves is gargled for sore throat. It is used as a lotion for washing foul smelling ulcers. Paste of the leaves is applied over scabies. Powder of the dry leaves is dusted to cure chronic leg ulcers and boils. Fresh leaf juice in which a hot iron is dipped is used as a cure for dysentery. Fresh leaf juice is given as an antidote for marking nut and opium poisoning.

Flowers

Infusion of the flowers can also be used as that of leaves. Flower juice with honey is a medicine for bronchitis[4, 5, 6].

Bark

Bark of the tamarind tree is astringent. Hence, its infusion is used as a gargle in sore throat. Its fine powder is dusted over ulcers. Its paste with water is applied as a cure for scorpion sting. A kind of wine can be prepared by fermenting sugared tamarind pulp. Fresh juice of the inner bark an ounce is given thrice daily to increase breast milk. Paste of the bark and leaves is applied to relieve burning pain in the ulcer of guineaworm. Ash of the bark mixed with ghee is applied to heal burns and scalds[4, 5].

Seed

Among all the other parts of tree the seed is a very valuable part. It is very rich in tannin, oil and pectin. Powder of the seeds prepared by removing the outer covering by soaking them in water for 4 days is mixed with equal quantity of *sugar*, powder of puffed *Bengal gram* (*phutaney*), few seeds of *cardamom* and *dates* and a teaspoonful is used once daily with a glassful of *milk* to cure noctural emissions, spermatorrhoea, leucorrhoea, diarrhoea, piles, etc.[4, 5]

Eating the powder of two whole seeds with a pinch of *turmeric powder* and 10 seeds of *wild banana* once daily for 3 days is a preventive measure for smallpox.

Paste of the tamarind seed is applied in the vagina to improve the relaxed walls. It gives a pleasure of orgasm in woman if applied half an hour before conjugal union.[3, 4, 5, 6]

Tamarind seeds are roasted and coarsely pounded. They are boiled in water and sugar to form a medium syrup. Essence of desired flavour, colour, and citric acid is added and cooled. It forms a very delicious jelly which can be cut into desired size and shape and can be kept in air-tight containers without spoilage for more than a year.

Poultice of the seeds is used to hasten pus formation. Paste prepared by boiling tamarind seed powder with water is a very useful adhesive agent.

The outer covering of the seed 10 grs. with equal quantity of *sugar* and *cumin* seeds is given twice daily in dysentery, diarrhoea and to absorb the fluids in a tumour or coagulated fluid in the body. (Discutent)[2].

Pound the seeds of tamarind with *Sindhoor* mix it with honey and apply to the penis before half an hour of conjugal union to get the retentivity[6].

Paste of the boiled tamarind seeds is applied in the relaxed vagina to contract the passage[4].

The covering of the tamarind seed is finely powdered and a pinch of the powder is given thrice daily for a week to cure bleeding piles[3].

Steep black gram, tamarind seeds in milk for a night. Then dry the ingredients in sun. Grind them and prepare chapaties with flour. Eat them daily by preparing fresh chapaties and enjoy the bliss of the conjugal union[7].

Take equal quantity of tamarind seeds with *old jaggery*, ajowan seeds and honey one hour before conjugal union for retentivity[9].

Sleeping under a tamarind tree is said to cause ill health.[7]

REFERENCES

1. B.P.C. p. 1026, (1911).
2. Dastur, J. F., *Medical Plants of India and Pakistan*, p. 158 (1952).
3. Hakeem Syed Zakaulla, *Qharabadeen-e-Zakai*, p. 182, (1881).
4. Hakeem Noor Kareem, *Magzanul advia*, Urdu, p. 215 (1915).
5. Hakeem Najmulgani, *Qhazanath-ul-advia*, Vol. 1, p. 541, (1917).
6. Hakeem Mohammad Abdul Hakeem, *Bustan-ul-Mufaradath*, p. 72, (1895).
7. Ali Akbar, *Mujere-bath-e-Akbari*, Pers. Mss. (1880).
8. Hakeem Abdul Haleem, *Tiriyaq-e-Azam*, Lucknow, Urdu Mss. (1890).
9. Kaviraj, Vaidyarathna Harban Singh of Varnasi Random notes in Sans. (1818).

242. TURMERIC

Turmeric: *Curcuma longa:* (B.N.); *Haridra:* (Sans); *Haldi:* (Hindi, Urdu, Dak.); *Uruqussufar:* (Arab.); *Zard chob:* (Pers.); *Arshna:* (Kan.); *Manjal:* (Tam.); *Pasupu:* (Tel.); *Manajal:* (Mal.); *Haldal:* (Mar.); *Haldar:* (Guj.); *Hade:* (Sindhi); *Halat:* (Ori., Beng.); *Lidder:* (Kash.); *Sambalu:* (Kagathi).

Family: Zingiberaceae.

Zodiac: Aries.

Food Value per 100 g. approximately

Carbohydrate	68.1 g.	Vitamin A	50 I.U.
Protein	6.2 g.	Vitamin B_2	2.5 mcg.
Fat	4.9 g.	Niacin	Trace
Calcium	151 mg.	Digesting Time	2½ Hrs.
Phosphorus	220 mg.	**CALORIES**	**350**
Iron	22.9 mg.		

Constitution: Hot and Dry 3°.

Physiopharmacology and Therapeutics

Turmeric plant is a perennial herb that grows to a height of 2-3 feet with an aerial stem. The leaves are thick and thick tuberous rhizomes which are transversely ring-marked by leaf scars. The yellow pigment named *curcumin* is distributed throughout the plant but, the dye is more concentrated in the rhizomes. The rhizomes are dug up after the aerial stems have died down, washed, steamed and dried in the sun or oven. The turmeric fingers are sold as, long, knotty subcylindrical pieces, bluntly tapering towards either ends. Turmeric pieces are compact and heavy, having a yellow-brownish colour, and the outer surface is marked longitudinally with leaf-scars. The internal surface is dark-orange in colour and looks wet even though it is dry. Taste and smell of turmeric are aromatic. Colouring the turmeric fingers by boiling in cowdung and smearing with *lead chromate* is largely practiced. But, both the methods are dangerous and cause infection and lead poisoning. To overcome this effect C.F.T.R.I., Mysore has evolved a new chemical technique that is simple and safe[2].

Turmeric is being cultivated in China, Java, etc., from olden days, but it is largely used in India as a flavouring and colouring

agent in curries, condiments, for dying silk, cotton and above all, it is considered as a very sacred article in all religious and social ceremonies in India.

It is also used in pharmacy and confectionery. Turmeric acts as a regent to identify the alkalinity of a substance by changing into deep reddish brown colour. Turmeric test paper is on the official list of B.P.C[1].

Turmeric contains a yellow crystalline substance *curcumin* (5 per cent) and volatile oil (5 per cent).

Using turmeric in the form of condiments is carminative, antiseptic, anti-flatulent, blood purifier, expectorant etc.

Adding half a teaspoonful of turmeric powder and a pinch of coarsely powdered *pepper* in a glassful of boiling milk and allowed to warm. It is used before going to bed as a medicine for cold, bronchitis, rhinitis, sore throat etc.

An inch piece of turmeric is ground into paste and used once daily with an ounce of fresh *bitter sweet leaf juice* or *butter-milk* for a week as a cure for catarrhal jaundice, rheumatism, piles, diarrhoea, dysentery, chronic colitis, burning in the anus after passing stool, chronic skin diseases, anasarca, etc.

Turmeric one teaspoon mixed in an ounce of *honey* is taken thrice daily for three months as a cure for tropical eosinophilia. Supplementing *Hetrezan* (Lederle) 50 mg. two to three times daily for a week and reducing the dose after the reduction of blood eosinophilia and continuing it once daily for three to four months is an specific treatment of asthma, filariasis etc.

Inhaling the fumes of turmeric powder with *tea leaves, blackgram* and *Bengalgram* powder, reduces the spasms of asthma, cures cold and relieves headache.[4]

Paste of fresh turmeric is applied over skin to cure ringworm, scabies, indolent ulcers, etc.

Poultice prepared by mixing turmeric powder with a little *slaked lime, white of an egg*, a pinch of *ajowan seeds powder* is applied and exposed to heat to relieve pain caused by sprains, mylagia, dislocation of the joints, boils, cut wounds etc.[5]

A teaspoonful of the turmeric paste mixed with *milk cream, sandal paste* and *Bengal gram flour* applied once daily is an excellent cosmetic to keep the face flower fresh and velvet soft.[5]

A teaspoon of the turmeric powder heated in an ounce of *Neem oil* is applied as a dressing for maggot infested smallpox

ulcers, chronic ulcers, bed sores, psoriasis, leprosy, scabies, eczema etc.[5]

Paste of turmeric mixed with *onion juice, ajowan seeds* is applied over scorpion sting, scabies, psoriasis, itching of the skin etc.[5]

Regular application of turmeric paste over the body and taking an inch long piece of *turmeric* with three *cloves* orally once daily before breakfast during menstruation and for three more days after the stoppage of menstruation is found to be an effective contraceptive.[5]

Fine powder of charred turmeric is applied over the blood boils by mixing it in water to hasten suppuration and healing the ulcers. Used it as a dentifrice with salt, is effective for relieving tooth ache. It prevents foul breath and dental caries.[5]

A piece of turmeric is immersed in fresh *lime juice* for 40 days. Afterwards it is dried in shade and finely powdered with equal quantity of *black antimony*, (Surma). Its daily application in the eyes cures ophthalmia, itching and watering of the eyes and prevents refractive errors.[5]

A clean cloth dyed in turmeric and dried is used to wipe the sore eyes. It is an excellent antiseptic to prevent eye infection.

Take an inch finger of turmeric and place it inside the gall-bladder of a black-goat for 3 days changing one gall-bladder every day. On the third day, open the bladder and mix the bile in equal quantity of *malt-vinegar* and immerse the turmeric in it for 4 days. Then, dry the turmeric piece and preserve. Paste of this medicated turmeric prepared with *malt-vinegar* is applied daily over the face to cure black heads, acne, and other ugly looking spots on the face. Author has tried it with gratifying results in a number of patients.[5]

Taking equal quantity of *turmeric powder*, *pepper* and *rock salt* 10 grs. each along with a glassful of *orange juice* during the night prevents from sleepiness without causing any tiredness. It is a boon to automobile drivers.[5]

REFERENCES

1. B.P.C. p. 359, (1911).
2. C.F.T.R.I., *Some Aspects of Food Research*, p. 32, (1962).
3. Mathur, R. C., *Systematic Botany*, p. 417, (1965).
4. Zakaulla, *Qharabadeen-e-Zakai*, p. 210, (1890).
5. Aman, *Clinical investigations of Turmeric in Various diseases*, 1960-1967.

PART X

FLESH FOODS

FLESH FOODS AND THEIR DESCRIPTION

The chief source of all the flesh foods is the meat of *Sheep, Goat, Ox, Cow, Buffalow, Deer, Rabbit, Camel, Pig etc.*

Other than these animals, birds like: *poultry, peacock, pigeon, Sitar and crane* are also very common sources of supplying the flesh foods. The aquatic vertebras like: *Fishes, Crab, Prawn, Oyester* etc., are some of the common sources of flesh foods too.

Before I explain the individual source of the flesh foods, I would like to give a general idea of the most commonly used flesh foods.

Flesh foods consist of a muscle of a respective animal, or bird. Physiologically all the flesh foods are made up of thin string like tubular fibres which are bound by adhesive chemicals like: Gelatine and Collagen. In between these muscle fibres, the fat globules are embeded. The muscle fibres are strong and elastic and their strength depends on the age of the animal. The younger the animal is, the tender the fibres are and older the age, the harder and tougher they are. Therefore, it takes little longertime to cook the flesh of the aged animal.

The chemical composition of the flesh foods is more or less the same, except some extractives which give them various flavours and taste. The chief constituents of the meat are: *Myosin, Myogen, Globulin* and *Haemoglobin.* The other chemical substances which are common in the meat are: phosphoric and uric acids, iron, calcium, potassium, iodine, phosphorus, fats, vitamins A, B_1, B_2, C, and water.

Digestion and absorption of the meat

For easy digestion and complete absorption, any meat you desire to eat should be cooked well so as to soften the fibres and the connective tissue which holds them together into gelatine, to remove the excess of fat, to alter the haemoglobin, to get the extractives, kill the contaminated germs and destroy their toxins. Though there are various ways of cooking the meat such as: roasting, grilling, frying and stewing etc., but cooking the meat in water with some spices and vegetables over the slow fire or in a pressure cooker, is the most ideal way to get the best flavour and taste. The digestibility of such cooked meat which is

soaked for few minutes in water into which a teaspoonful of pure vinegar is added shortens the cooking time, because, vinegar acts on the fibres and makes them tender. The acetic acid and the potassium contained in the vinegar kill all the harmful germs too.

After eating the cooked meat, its fibres begin to swell up and break into fine pulp by the action of hydrochloric acid and other various gastric juices in the stomach. Then, it enters the intestines and is completely absorbed into the blood stream leaving only about 5 per cent residue. Therefore, it is of some value in certain intestinal diseases, high metabolic disorders and tuberculosis. In all such conditions, the liquid extractives of the meat are very helpful in supplying the proteins and thus controlling the '*Negative Nitrogen Balance.*'

Hygiene of the Flesh Foods

All flesh foods are a very good source of transmitting poisonous germs and their toxins and cause *Food Poisoning* which is explained in the forthcoming pages of this book. The contamination usually takes place through the infected knife of the butcher and spreads to the deeper tissues of the flesh. Exposure to the dust in the warmer climates of the tropics also decomposes the flesh and turns it into green bad smelling meat. Eating such foetid exposed meat is very dangerous and should never be attempted.

There are various methods of preservation of the meat such as: *salting*, *canning*, *smoking* etc., which are useful only in places where fresh meat is not available. Freezing the meat in clean sterilized refrigerators is also a safe and cheap method of preserving the meat, but, eating fresh meat of a slaughtered animal whose blood is drained is the most delicious and hygienic when compared to other meats of the animals which are not bled properly.

The cooking should be in a very clean kitchen and the cook should not have any infection such as: typhoid, sorethroat, dysentery diphtheria etc. Because, even the cooked meat dishes are very susceptible to such infections and cause the disease. After you eat any meat-dish take a teaspoonful of pure *malt vinegar* in a glassful of cold water to prevent most of the bad effects caused by the meat.

243. SHEEP

Sheep: *Ovis-Vigeni:* (Zoological Name); *Mesha:* (Sans.); *Bhaid:* (Hindi, Urdu, Dak.); *Ullazan:* (Arab.); *Gosfand:* (Pers.); *Kuri:* (Kan.).

Family: Herbivora.

Zodiac: Aries.

Food Value of mutton per 100 g. approximately

Carbohydrate	0.5 g.	Vitamin B_1	175 mcg.
Protein	18.5 g.	Vitamin B_2	265 mcg.
Fat	13.5 g.	Vitamin B_{12}	1.26 mcg.
Calcium	150 mg.	Niacin	6.8 mg.
Phosphorus	150 mg.	Vitamin C	4 mg.
Iron	3 mg.	Oxalic acid	1.5 mg.
Purine	300 mg.	Cholesterol	70 mg.
Palmitic acid	29 per cent	Sodium	63 mg.
Stearic acid	25 per cent	Potassium	244 mg.
Oleic acid	36 per cent	Digesting Time	3 Hrs.
Linoleic acid	3 per cent	**CALORIES**	**102**
Vitamin A	31 I.U.		

Essential Amino Acids (g. per 100 g. protein)

Arginine	6.5	Methionine	2.4
Histidine	2.8	Phenylalanine	4.1
Isoleucine	5.2	Threonine	4.4
Leucine	8.2	Tryptophan	1.2
Lysine	8.1	Valine	4.9
Cystine	1.3		

Constitution: Hot and wet 2°

Mutton extract

Recipe*

Minced mutton	...	One kg.
Fresh raw papaya sap	...	One teaspoonful
or		
Raw papaya pieces with peel	...	One handful
Fresh coriander leaves (chopped)	...	One prig

* Author.

Recipe

Fresh ginger (chopped)	...	Two inches long piece
Cinnamon	...	Two inches long piece
Onion (Chopped)	...	One big size
Garlic (Chopped)	...	Two cloves
Pepper powder	...	Half teaspoonful
Turmeric powder	...	One pinch
Cardamom (Coarsely powdered)	...	One pinch
Malt vinegar	...	Two teaspoonful
Salt	...	To taste
Water	...	Four glassful

Preparation method

Soak the minced mutton after delicately washing it in the required water with vinegar for about half an hour. Then mix all the other ingredients in the same water and cook them in a pressure cooker for about 12 minutes or 35 minutes in an open vessel. Strain the extract when it is cool and use a cupful or more three to four times daily to enjoy the radiant health, vigour and longevity. Its regular use while recovering from acute fevers, after surgical operations, tuberculosis, neurasthenia, after child birth, etc., is an effective protein-tonic. It can also be used in all indications of protein deficiency in all ages. Taking a wine-glassful of *wincarnis* or *Maullaham* (Hamdard Delhi) with mutton extract increases its medicinal and food value.

Chemical composition of mutton extract*

Total Nitrogen	16.94	Cl' as NaCl	5.782
Total protein value	100 (68.34)	Total creatinine	5.670
Ash	27.71	Reducing sugars	2.11
Fat	0.63		

* Baliga, B.R. *et al.*, Symposium on proteins, pp. 335-341, 14-16, Aug. C.F.T.R.I., Mysore (1960).

Note: Mutton extract should not be used during active phase of fevers, nephritis etc.

Medicinal value of mutton

Sheep is a very popular animal which is reared from thousands of years, perhaps from the time of Adam. It is

highly valued for its meat which is called *mutton*, wool and hide are also of much importance.

Mutton is a very delicious flesh and its nutritive value is known from thousands of years in Asia. Even today, it is a very popular source of high class protein all over the world. But, from economic aspect, it is a dear food.

Mutton Extract

Dr Graham and Dr V. H. Mottram say, 'The *principal* nutritive constituent of meat is protein and it is a compact and easily digested source of this that is chiefly of value. Meat protein is characterized by the rapidity with which it can be digested and absorbed into the body; its absorption co-efficient is remarkably high; and it has a high biological value. It is, moreover, a "*quick fuel*" with a high specific dynamic action. This gives it an advantage in cold weather, but because of these "heating" qualities its use should be restricted in summer'.

'It has been held that the meat proteins (or possibly the extractives of meat) produce a stimulating effect on the cells and on body generally, and the feeling of well-being which follows a meat meal has been put down to this cause. Meat is also supposed to arouse animal passion and to excite savages not accustomed to it to a nervous condition amounting almost to intoxication'. (Food and Dietetics, pp. 416-17).

The very famous ancient Indian physician *Charaka* writes in his book *Charaka Samhita*, 'Meat juice should be regarded as promotive of youth, intelligence, sense facilities and longevity'. (pp. 314, 549, Vol. 2).

He further describes, 'For all creatures the flesh juice is most nourishing (pleasant) and cordial; and for those that are wasted, convalescing, emaciated, deficient in semen and desirous of enhanced strength and complexion, meat juice is to be regarded as Nectar itself'. (pp. 312, 313 and 549).

He also writes, 'If those given to constant exercise and indulgence in women and wine take meat juice daily, they will never fall ill or become weak'. (pp. 315 and 350).

The other organs of the sheep other than mutton such as: *liver, kidney, lungs, heart, blood and sweetbread* are also used as food. These are called by one name OFFAL. The other digestive

organs like: *tongue*, *stomach*, *intestines* etc., are called TRIPE and they are commonly used by the poorer class for their economy.

Liver

Liver of the sheep is a compact organ having very little connective tissue. Therefore, it is hard to digest unless it is finely minced or chewed well. It contains a different kind of protein from mutton. The nucleo-protein of the liver changes into nuclein, which is a chief source of uric-acid in the body. Therefore, persons having gouty diathesis feel their symptoms become aggravated after eating a hearty liver meal. It should be avoided by such persons for their good.

Food Value of liver per 100 g. approximately

Carbohydrate	1.4 g.	Oleic acid	27 per cent
Protein	19.3 g.	Linoleic acid	5 per cent
Fat	7.5 g.	Vitamin A	22,300 I.U.
Calcium	14 mg.	Vitamin B_1	357 mcg.
Phosphorus	385 mg.	Vitamin B_2	1690 mcg.
Iron	6.3 mg.	Vitamin B_{12}	40-100 mcg.
Sodium	83 mg.	Niacin	18 mg.
Potassium	296 mg.	Vitamin C	20 mg.
Purine	500 mg.	Cholesterol	610 mg.
Palmitic acid	13 per cent	**CALORIES**	**150**
Steric acid	18 per cent		

Clinical manifestations of liver therapy

It is already mentioned about the history of liver therapy (see page 115). However, the other special manifestations of liver therapy in the form of *crude liver extract* are described below.

(a) Herpes zoster ophthalmicus and pro-genitalis

OKSALA[2] of *Mellersta Hospital, Jyvaskyla* recommends the administration of liver extract with antibiotics, cortisone and hydrocortisone with mydriatics in herpes. He confirms that just after one injection of liver extract the pain and fever subsides. Should such an improvement fail, the treatment should be discontinued. He believes that such injections of liver apparently promote healing of the skin eruption and prevent post-herpetic

neuralgia. Author successfully treated few cases of herpes-progenitalis (Praeputialis) with intramuscular injections of *crude liver extract* (T.C.F.) 2 ml. plus *Bepanthen* (Roche) 0.5 g. 2 ml. once in alternate days for a week. Later, *Bepanthen* was replaced with *Redisol H.* (Merc. Sharp and Dome) 500 mcg. for another week.

(b) In Obstetrics and Gynaecology

It is common for an obstetrician and gynaecologist to come across many untreated anaemic patients who complain a feeling of lassitude during the last trimester of pregnancy. For such patients, the author *et al.*, at Indo-American Hospital, Mysore, gave a clinical trial with *Imferon* and *Uniferon-F.* in one group of patients LOA and ROA consisting of 100 multiparae and 60 primiparae having haemoglobin between 50-70 per cent per 100 ml. blood. 50 patients of *A group* received *Imferon* or *Uniferon-F.* 2 ml. (I.M.) once daily for 3 days and then alternately for 14 days. The other 50 patients of *B group* received *Imferon* or *Uniferon-F* 2 ml. alternating with *Crude liver extract* 2 ml. for 10 days.

In the A group although the treatment was stopped for a fortnight before the expected time after the haemoglobin rose up to 90 per cent. Still the lassitude and uterine inertia in primiparae and lassitude in multiparae after the child-birth was present. In the B group, the mothers were free from such complaints except slight uterine inertia in about 20 per cent of primiparae. However, injecting 2 ml. of *Crude liver extract* during first stage of labour eased the child-birth and there was no post-partum complications and the mothers went home cheerfully after a week.[3] MORTBOYS[4] and OSMOND[5] found that regular use of liver extract 4 ml. once daily for 2 or 3 days following child-birth hastens recovery and facilitates a return to full vigour. Giving 2 ml. *whole liver extract* I.M. once in three days after the cessation of menstruation improves the chances of pregnancy in functional sterility[3].

(c) Hepatitis and Cirrhosis of liver

DAS[6], treated hepatitis with *purified liver extract* 0.2 ml. I.M. to find the sensitivity of the patient. If the patient does not show

any sensitivity, he used daily 3.5 ml. intravenously. He also used *crude liver extract* 0.5 ml. diluted with glucose 25 ml. with equally good results. However, he finds that such treatment in infective hepatitis is ineffective. The growth promoting factor of liver extracts which stimulates the regeneration of hepatic cells is made use in the treatment of cirrhosis of the liver[6]. Liver extract may also be given orally or parentally with good results. *Mechositil* or *Ferro-B-liver-Unichem-labs.* can be safely given in such conditions.[3]

(d) Frunculosis and ulcers

SUKHTANKAR treated number of children who were suffering from multiple boils; with *whole liver extract.* These children did not respond to antibiotics, but reacted well to liver therapy in a very short time. The author believes, that liver therapy is far more effective and long lasting than that of antibiotics which only destroy the causative germs and frequent relapses of the ailment are observed. *Whole liver extract* on the other hand improves the basic resistence of the patients, and is very effectively used in the treatment of tropical anaemias with which these boils are usually associated[7].

The author used *Livoderm*-T.C.F. a liver extract ointment in bed sores, chronic ulcers, eczema and herpes zoster with excellent results. KHAN[8] tried topical application of *Livoderm*-T.C.F. in tropical ulcers of leprosy with 59 per cent good results.[4]

(e) Anabolic and Liver protective action

Intramuscular use of *crude liver extract* 2 ml. combined with vitamin B_{12} (*Redisol-H*) 500 mcg. given once a day for a week and then an once in three days for 30 days is found effective in improving the appetite and weight-gain by normalising the function of liver during convalescence from typhoid, parotitis, measles, smallpox, scarlet fever, para-typhoid or infectious mononucleosis, etc.[9] Combining *crude liver extract* T.C.F. 2 ml.+ *Folic acid* 5 mg. T.C.F. and *Streptomycin* I.G. in 2 ml. distilled water is alternately given for 2 months with daily intake of I.N.H. 100 mg. t.d.s. is found to be excellently good in acute pulmonary tuberculosis. It has been used in patients in their homes with good results.[3]

(f) Regulating the heart in Surgery

Administration of liver extract 2 ml. once daily for 4 days to patients who are expecting to undergo surgical operations of various disorders notably thyroidectomy is found to be very effective in preventing cardiac complications. It is noted that patients with arterioventricular block and early auricular fibrillation the improvement is remarkable except in essential hypertension[10].

(g) Megaloblastic anaemia and nutritional macrocytic anaemia

Although the discovery of B_{12} has changed the entire aspect of the treatment of megaloblastic anaemia, still, the value of crude liver extract, both orally and parentally is found to be very effective in helping the retentivity of vitamin B_{12} in the body. It is found that there is an *alkali resistant thermostable haemopietic factor* in the crude liver. It is observed that haemotological and clinical responses show improved effect of crude liver extract over other preparations that are singularly used [11, 12, 13].

In these indications taking a teaspoonful of *Livibron* (Parke and Davis) or a capsule of *Campoferron* (Bayer) three times daily after food is very helpful.

Liver that is roasted over charcoal fire is chewed with honey as a medicine for stomatitis, angular stomatitis, gingivitis, etc.

Kidneys

Like liver, the structure of the kidneys also contains dense fibres with less connective tissue and nucleo-protein. Therefore, it is hard to digest them unless they are minced or chewed well.

The use of the kidneys with their caps is found to have some medicinal value in the treatment of rheumatism, gout, and other infections. This may be due to *adrenal cortesone* which is a wonder hormone for inflammations. *Aviceena* is of opinion that kidneys cooked with *mint* and *ginger* and *omum* are used for the discolouration of the skin.

Lungs

The wonderful bellows of our body are composed of elastic tissue and protein, but, they are not much important in the diet and medicine.

Heart

Heart is composed of dense muscles and contains an enzyme Adenosine-triphosphate (A.T.P.) which activates the heart muscles and feeds them with energy and nutrition. The extract of the heart is used as a heart tonic from ancient times and even today, scientists after years of research have found that, it is really a good source of energy for the well being of heart.

Heart Extract

Heart extract prepared like mutton extract or by enzymatic digestion of heart or heart muscle, is usually used as a heart tonic.

Amino acids per cent in Heart extract

Nitrogen value	16.00	Glutamic acid	14.9
Protein value	100	Threonine	3.22
Cystine	3.88	Alanine	9.1
Lysine	9.9	Tyrosine	3.64
Histidine	3.4	Methionine	3.6
Arginine	9.9	Valine	4.0
Asperatic acid	5.1	Phenylalanine	2.5
Serine	3.61	Isoleucine	5.5
Glycine	5.8	Leucine	6.5

Apart from these substances there is also a considerable amount of *cytochrome C, cytochrome Q, inositol, heparin, vitamin* B_1, B_2, B_{12}, *folic acid, lyxoflavin, pyridoxine, calcium pantothenate, vitamin C and E, calcium, phosphorus, iron, cholesterol reducing factor, heart rate accelerating and coronary vessels dilating hormone.*[15]

It has been ascertained that these nutrients are very much essential for the smooth rythmic function and automatic-self repair of this wonderful pump that is working regularly even before the child is born.

From bygone days, organo-therapy with extracts of different animal organs to strengthen and cure the diseases of the similar organs of the human body are employed empirically with good results. Impressed by these effects, researchers took interest in giving a clinical trial and standardized the extracts of various organs. After the researches of *Minont* and *Murphy,* the official

use of crude and purified liver extract became very popular with wonderful results and the various clinical indications of liver-extract therapy are already explained in the foregoing pages. Extracts of bones, stomach etc., have also been used in the form of *Ossopan*, *Rubadon* etc., prepared by a Swiss firm *Robapharm Labs*. In this country *T. T. Krishnamachri & Co. of Madras* is marketing these products. Although heart extracts are used empirically as a tonic for various heart disorders, but the systematic clinical research and biological standardization was not attempted successfully. However, *Hamid* of *Cipla Laboratories* introduced heart extract in the form of *Herzolan*. *Cardiplex* Siris-Vijaywada, a combination of heart-muscle extract+Vitamin B Complex and E. is also a patent of heart extract. A desert spoonful (8 ml) or more of any one of these extracts used twice daily before or after meals for a month or more according to the severity of the heart's condition is found effective during the treatment of cardiac ischaemia, acute coronary thrombosis, myocardial damage, hypertension, angina pectoris, enlargement of the heart, peripheral vasso vascular disturbances, congestive heart failure, hypertension diabetes, arrythmia with extra systoles due to excessive smoking etc. Its regular use prevents the early ageing by keeping the healthy condition of the heart. Clinical study by *Prof. Gupta et al.*,[16] conformed that extract of heart given in the form of *Recosen* (T.T.K.) by intra muscular injection has an efficacy in various cardiological disorders, notably in congestive heart failure. The researchers recommend that heart extract in the form of *Recosen* as follows:—

1. '*Recosen may be utilised as an adjuvant to digitalis therapy in cases of moderate to severe degree of congestive cardiac failure.*'
2. '*Recosen can abolish nausea, vomiting, palpitation etc.—subjective symptom of digitalis toxicity.*'
3. '*Digitalis is better tolerated when given along with Recosen*'.
4. '*Recosen supported by chlorothiazide will produce satisfactory results in mild cases of congestive cardiac failure due to ischaemic heart disease*'.
5. '*Recosen will not produce any significant change in patients with post-commissurotomy syndrome*'.

Blood

Blood of every animal is a media which supplies nutrients and oxygen to all the worn out cells of the body. But, when taken as a food it does not supply any food elements and serves as a means of sustenance. *Holy Bible* and *Holy Quran* also forbid the use of animal blood. (Holy Quran., CH. 2: 172. 173). However, some tribal people fry the blood and eat as food in the hope to get some vigour.

Sweet bread

Sweet bread consists of *thymus gland*, *pancreas* and *spleen* which are sold very cheaply and a good source of digestive proteins. Like kidneys and liver, they are rich in nucleoproteins, therefore, they are not advised in gout and other rheumatic and acid diathesis. These glands are easily digested and act as an intrinsic factor in anaemias.

Tripe

Tripe is the name applied to the stomach and intestines of the ox (or sheep) after they are cleaned and boiled (V. H. M. and G. Graham.)

Stomach of the sheep is commonly used along with the intestines. Tripe contains a large amount of digestive enzymes, and soft connective tissues which change into gelatin and get easily absorbed after they are cooked.

Brain

Brain of the sheep is a good source of fat, *cholesterin* and *leciethin*. It is composed of soft tissue which is very rich in phosphorus and is easily digested but, unfortunately such a valuable food is imperfectly absorbed up to about 43 per cent, therefore, it is not a suitable food for invalids and persons who have weak digestion.

Brain roasted with spices and a pinch of *turmeric powder* is used as a nervine-tonic for weakness of the sex and nervousness but, it is bad for persons who are having high blood pressure, asthma, disorders of the heart, etc.

Stomach extract

Stomach extract is mentioned in *Charaka Samhita* as *Agnidhara Kalasara.* SUSRUTA and VAGABHATA also wrote about the medicinal value of aqueous extract of Gastric and Duodenal mucosa. The Acharyas observed and made it clear that there is a close relationship between the secretary activity of gastro-intestinal tract and tissue metabolism. They also mentioned that formation of colouring matter (haemoglobin) is associated with *Yakrit* (liver), *Pliha* (Spleen) and *Anashayana* (Stomach) and the other organs derived their benefit from the mucosal lining extending from the pyloric region of the stomach (grahani) through the duodenum, stomach and the small intestines. According to *Tri-dosha* theory of Ayurveda and *Iqlat*-hormony of Unani medical philosophy, the factors that are secreted in this space are responsible for not only digesting the food, but also the secretions govern the hormonious function of *bile pitta or* (Safra) and furnish sufficient power to *dhatus* (tissues) for the tissue-metabolism (dhatu-paka). It has also been proved that hyperactivity of the tissues is resulted due to hyper metabolism of the tissues resulting in wasting and hypotrophy of the tissues. Similarly, hypoactivity of this factor in the tissues is claimed to produce hypertrophy of the tissues. Hence, *Susruta* claims that the impairment of the factor (*Pachakagni*) in the stomach and the small intestines plays a major role in the pathogenesis (*Samprapthi*) of many diseases such as: *Sotha* and *Jalodara* which correspond to *ascites* and *oedema* resulting from damage to the liver (yakritodara) and spleen (plihodara).[21, 22, 23, 24] It is unfortunate that the exponents of these theories did not attempt to prove this by using any active principle, derived from the digestive organs in the treatment of oedema and ascites[25]. It may be due to socio-religious reasons in ancient times forbidding the use of animal tissues and organs in medicine (Author). However, a Mohammadan physician *Aviceena* used the stomach lining of chicken as a base in *Majoon-e-hyath-baksh meda*, to cure indigestion, weakness of the stomach, heart, liver, intestines and kidneys as early as 1030 A.D.

Scientists, after realising the beneficent value of liver extract, focused their attention and demonstrated the presence of a diuretic substance in the extracts of duodenum, jejunum and ileum.

Impressed by the statements of the ancient and modern physicians, DWARAKANATH, under the joint collaboration with the scientists of C.F.T.R.I., Mysore, gave a clinical trial at Government College of Indian Medicine, Mysore during 1955. The researchers prepared fresh aqueous extract of the mucosa of the stomach and duodenum of goats that were slaughtered a couple of hours ago. The stomach extract was prepared by peeling the mucosa and sub mucosa after washing the tissues in cold water. Then the mucosa was weighed, minced and extracted with two successive 5-volume instalments of water. The extract was strained through a muslin cloth and two ounces of the extract was administered twice daily for 15 days to patients suffering from general dropsy with scanty urination caused by various liver, kidney, spleen and heart disorders with excellent results having complete remission of the dropsy due to profuse diuresis. Other general measures, like: salt free diet, bed rest, nutritious diet etc., were observed during the treatment.

Extract of the stomach and intestines prepared like mutton extract (without spices) is used by the author as an excellent medicine to heal gastric ulcers, colitis, indigestion, heart-burn in pregnancy, dyspepsia in anaemics and tubercular patients etc. A glassful of the extract along with a capsule of *campoferron* (Bayer) after meals thrice daily is a specific treatment for nutritional macrocytic and microcytic anaemias, weakness during pregnancy, and after childbirth. Its regular use during the last trimester, prevents all the pre and postnatal complications. Administering *Robudon* U.V. or U.D. (T.T.K.) orally or by intramuscular injections once daily for 20 to 25 days is recommended during the regular treatment of gastric and duodenal ulcer with antacids, antispasmodics, analgesics, rest and bland diet.

Testicles

Testicles of the sheep roasted in ghee with spices are a good source of testicular hormones. They are used in the weakness of the sex, excessive and painful menstruation, azoaspermia, enlargement of the prostate gland etc.

Uterus

Cooked uterus of the sheep is used as medicine for threatened and habitual abortion, excessive bleeding in between the periods

and during menstruation, sterility, haemorrhagica metropathica etc. Its udders are cooked or roasted and used to increase the breast milk.

Milk

Milk of the sheep is a very nutritious tonic for the weak and debilitated persons. It is used with honey during the treatment of tuberculosis, gonorrhoea, cystitis, obesity, flatulence etc. Its excessive use is bad for respiratory disorders and causes eye diseases. (T.V.M.S. Chattiar). Milk with *lime juice* is a remedy for dysentery.

Bones

Bones of the sheep, particularly of the limbs contain a digestible gelatine which is extracted after boiling them for some time. The soup of the bones is a very good medicine for the children who are suffering from rickets, protein deficiency diseases, etc. It supplies highly absorbable calcium and phosphorus. Cooked bone-marrow is a very valuable tonic-medicine for the weak and anaemic children.

Urine

In Ayurveda, the urine of the sheep is used in the treatment of leprosy, piles, gonorrhoea, dropsy etc. In such conditions it is mixed with some honey and a teaspoonful is internally given (Kaviraj, Swamy Ramdas). It is said that the shepherds who sleep with the sheep do not get tuberculosis due to constant inhalation of the ammonia gas which is present in the vapour of the urine (Dr A. K. Nadkarni).

Dung

Dung of the sheep is a remedy for jaundice and other liver diseases. It is mixed in certain proportion with *jaggery*, *cummin seeds* and is given with *butter-milk* with very good results. (Hakeem Syed Sultan).

Fat

Fat of the sheep is hard to digest and is harmful for heart, eyes, blood, high blood pressure, diabetes, etc. The melted fat with

some *coconut oil* is a good liniment for the painful and swollen conditions of the joints. The fat derived from the wool is used as a base in the ointments.

Hides

Hides are used in making a number of varieties of A class leather goods. A piece of dry skin of the sheep roasted in a teaspoon of *coconut oil*, and the warm oil is put to cure ear ache caused by exposure to the cold. The same oil is applied over eczema, chopped skin, cracked soles and palms with good results.[29]

244. GOAT

Goat: *Ovis-aries:* (Z.N.); *Cheli:* (Hindi, Dak.,); *Bhed:* (Urdu); *Aadu:* (Kan.).

Family: Herbivora.

Zodiac: Capricorn.

Essential Amino acids (g. per 100 g. protein)

Arginine	2.2	Methionine	3.1
Histidine	2.0	Phenylalanine	5.8
Isoleucine	4.6	Threonine	5.0
Leucine	8.8	Tryptophan	1.7
Lysine	6.4	Valine	7.4
Cystine	2.3		

Constitution: Cold 1° and Wet 2°.

Goat is also reared for its flesh and skin and has got more or less the same nutritive and medicinal value like sheep. Its milk is superior to sheep's milk and has got more nutritive and medicinal value.

Food Value per 100 g. approximately (Milk)

Carbohydrate	5 g.	Vitamin A	151 I.U.
Protein	4 g.	Vitamin B_1	56 mcg.
Fat	3.5 g.	Vitamin B_2	40 mcg.
Calcium	168 mg.	Digesting Time	2¾ Hrs.
Phosphorus	119 mg.	**CALORIES**	**84**
Iron	0.3 mg.		

Fresh boiled milk sweetened with honey, drunk every night with a *banana* or a handful of roasted *ground nuts* is a very good tonic for diabetes, asthma, night blindness, neuritis, constipation, sterility, rickets, falling of the hair, nervousness, sick-headache, etc. The father of our nation *Shri Mahatma Gandhi* praised about this recipe and it was his regular food. He used to say that his mental power, good health, strength etc., was due to the regular use of this recipe. He would have survived for some more years if the unkindest bullets of a tyrant had not hit him.

Some persons are allergic to the mutton or the milk of the goat, therefore, it must be used with care. Dr C. Muttu, M.D., says, 'sleeping with goats is not only curative for tuberculosis, but also prevents it due to the constant inhalation of the ammonia vapour which is present in the urine of the goat and sheep. The roasted penis of the goat eaten every day for three months increases the sex power and cures functional impotency. Equal quantity of goat's blood and honey is applied over the shaft of the penis to increase its dimension, and hardness. It should be applied for 3 months.[29]

REFERENCES

1. Swaminathan, M. and Bhagawan, R. K. *Our Food*, p. 160 (1966).
2. Oksala, A., *J.A.M.A.*, 7th Sept. p. 86, (1957).
3. Aman and Seethalakshmi, F.R.C.S., *Clinical uses of Mutton and crude liver extract* (1959-66).
4. Mortboys, W. H., *The Practitioner*, pp. 191-92 Aug. (1955).
5. Osmond, T. G., *et al.*, *Practitioner*, p. 77, July (1953).
6. Das, *et al.*, *Antiseptic*, p. 793, Nov. (1958).
7. Sukhtankar, K. M., *Indian Journal of Paediatrics*, p. 153, July (1949).
8. Khan, S. M., *The Indian Practitioner*, 437, 17, (1964).
9. J.A.M.A., 981 27th Jan. (1959).
10. J.A.M.A., p. 208/1262, March, 14, (1959).
11. Narayan, M. S. and Dharmarajan, J. A. P. (India) p. 1. Jan. (1964).
12. Am. J. Clin. Nut., 12, 145-149, Feb. (1963).
13. Ann. *Int. Med.*, 58, 37, 46, Jan. (1963).
14. Pardhan, V. G. and Bhat, J. V., *Microbiological evaluation of heart extracts* pp. 212-17, Symposium of proteins papers proceeding, C.F.T.R.I. Mysore 14-16 Aug. (1960).
15. Herzolan Cipla-literature No. 751067 (1968).
16. Prof. Gupta, J. C. and Chatterjee, K., *Assessment of Clinical efficacy of Recosen, Antiseptic*, pp. 504-12. Vol. 65, No. 7, (1968).
17. Susruta: Sutra: Ch. 21: Sh. 10.

18. Ashtanga Hridaya: Sutra: Ch. 12: Sh. 13.
19. Susruta: Sharir: Ch. 18: Sh. 19.
20. Asht. Hridaya: Sharir: Ch. 3: Sh. 51-53, and Charaka Chikitsa: Ch. 15: Sh. 10.
21. Asht. Sangrah: Sutra: Ch. 19: Sh. 18-19.
22. Charaka: Chikitsa: Ch. 13: Sh. 9-10.
23. Charaka: Chikitsa: Ch. 13: Sh. 24.
24. Asht. Hridaya: Nidan: Ch. 12: Sh. 1.
25. Dwarkanath, C., Laxminarayan Rao, M. V., and Subramanyam, V., '*A Brief Report on the Preliminary Observations on the effect of "Agnidhara Kalasara". Antiseptic*', Vol. 54, No. 6, pp. 419-32 (1957).
26. Cow, D., *J. Physiol* 48: (1914).
27. Petri, S. and Jensinius, H., *Acta. Med. Scandinic*, 106:274 (1941).
28. Gillman, J., and Gillman, T., *Acta. Int. Med.*, 76: 63 (1945).
29. Zakai, *Qharabadeen-e-Zakai*, p. 331, (1890).

245. COW AND BULL

Cow and Bull: *Bos-taurus:* (Z.N.); *Govo:* (Sans.); *Gai* aur *Bail* (Hindi, Urdu, Dak.); *Baqar:* (Arab.).

Family: Herbivora.

Zodiac: Taurus.

Food Value per 100 g. approximately

Carbohydrate	0.1 g.	Vitamin B_3	40 mcg.
Protein	25 g.	Vitamin B_{12}	2.8 mcg.
Fat	3 g.	Niacin	7 mg.
Calcium	11 mg.	Vitamin C	4 mg.
Phosphorus	189 mg.	Oxalic acid	0.2 mg.
Iron	0.7 mg.	Purines	700 mg.
Sodium	65 mg.	Cholesterol	125 mg.
Potassium	333 mg.	Digesting Time	3½ Hrs.
Vitamin A	Trace	**CALORIES**	**112**
Vitamin B_1	150 mcg.		

Essential Amino Acids (g. per 100 g. protein)

Arginine	6.5	Methionine	2.5
Histidine	3.2	Phenylalanine	4.1
Isoleucine	5.2	Threonine	4.4
Leucine	8.2	Tryptophan	1.2
Lysine	8.7	Valine	5.6
Cystine	1.3		

Constitution: Hot 1° and Dry 2°.

Medicinal uses

Cow and bull are reared all over the world for the milk and flesh. In India, bull is also used in agriculture and for drawing carts. Beef or the meat is a cheap source of protein.

Lean beef or *Veal* is nutritive and improves the health of growing children, hence, soup of the veal can be regularly given in chronic wasting diseases, kwashiorkor, tuberculosis etc. with good results. In ancient times beef was usually used by Rajput warriors before going to war[22,23]. Even *Holy Quran* advises to use beef to become brave. *Charaka* advises that beef is suitable for labourers and those who live in cold climate. It is an ideal warmth giving food during winter.

Ox-bile: *Fel bovinum purifactum:* (Latin); *Gorochanam:* (Sans.); *Gai-ya-bail ka pitha* or *Zahar mohra:* (Hindi, Urdu, Dak.,); *Hajar-ul-baqar:* (Arab.); *Pad-zahare-haivani:* (Pers.); *Gorojani:* (Tam.); *Gorojanam:* (Tel.).

Desiccated ox-bile is prepared by evaporating ox-bile to $\frac{1}{8}$ part and alcohol is added. It is filtered and evaporated to make it thick and dried in the form of a greenish-yellow powder and sealed in gelatine capsules of 5 grs. each. *Desical* (Parke-Davis) is a convenient form of desiccated ox-bile which can be used in all indications of ox-bile.

Ox-bile is internally used from time immemorial as a cure for jaundice, dyspepsia, gall-stones, cholecystitis, measles, whooping-cough, convulsions due to roundworms, diarrhoea, hysteria, melancholia, intestinal disorders due to defective secretion of bile, urticaria, etc[23].

Taking ox-bile in the form of *Desical* one to two capsules immediately after meals, prevents the formation of gases caused due to intestinal fermentation of the food rich in starches, fats etc. It stimulates the secretion of bile and prevents the biliary stagnation in the gall-bladder, kills the pathogenic organisms in the gastro-intestinal tract, emulsifies the fat and helps its easy digestion. It tones up the intestine, increases the peristalsis and cures chronic constipation. Taking one or two capsules of *Desical* immediately after non-vegetarian fatty food, aids quick digestion, empties the stomach earlier and prevents the putrification

of food in the stomach. Its regular use by the patients of high-blood pressure, asthma myxoedema, diabetes, obesity, bowel and liver disorders is recommended by the author.

Fresh ox-bile applied in the eyes, cures belepheritis. Few drops put in the ear cures acute otitis media. It is applied with honey to heal the chronic ulcers, and relieves the pain of bee sting. Its intra-vaginal application with *aloes* causes abortion.

Beef extract

Beef extract prepared like mutton extract is used as a substitute in all the indications of mutton extract.

Beef-liver extract is the richest source of iron and B_{12}. 100 g. of liver contains 50 to 130 mg. of B_{12}. It is useful in infertility, sprue, weakness of smokers and prevents stomach cancer.

Cow's Milk: *Lactis-femi-bos-taurus:* (Lat.); *Gavaksheera:* (Sans.); *Gai-ka-doodh:* (Hindi, Urdu, Dak.); *Laban-ul-baqar:* (Arab.); *Sheer-e-gavo:* (Pers.); *Hasina-halu:* (Kan.); *Pallu:* (Tam., Tel).

Zodiac: Aquarius

Food Value per 100 g. approximately

Carbohydrate	5.1 g.	Vitamin A	170 I.U.
Protein	3.1 g.	Vitamin B_1	56 mcg.
Fat	3.5 g.	Vitamin B_2	199 mcg.
Calcium	119 mg.	Vitamin B_{12}	4.8 mcg/Lit.
Phosphorus	87 mg.	Niacin	0.3 mg.
Iron	0.3 mg.	Cholesterol	11 mg.
Sodium	34 mg.	Digesting Time	2 Hrs.
Potassium	130 mg.	**CALORIES**	**61**

Essential Amino-acid (g. per 100 g. protein)

Arginine	3.7	Methionine	2.5
Histidine	2.7	Phenylalanine	4.9
Isoleucine	6.5	Tryptophan	1.4
Leucine	7.9	Valine	7.0
Cystine	0.9		

Constitution: Moderate.

Physiopharmacology and Therapeutics

According to *Rigveda*, milk is called as 'VRISHNYAM PAYAM' which means, *Strength Giving Drink.* Prof. N. J. Rosenau, of Harward University Medical School says, 'In fact milk is the only single article of food that fairly represents a complete diet. It has no equal for the promotion of growth as nutrition'.

If we examine the chemical composition of the milk, we will know that it is an unique article of food which is perfect in its food components such as: proteins, carbohydrates, fat, minerals and vitamins. It is the only food that comes to us naturally from the living body.

Protein

The chief proteins of the milk are *caseinogen* and *lactalbumin* which give a better biological value of mixed proteins. The protein *Caseinogen* is insoluble in water, therefore, it is kept in solution in milk due to various inorganic minerals present in it. Milk proteins are found to be the best animal proteins for the wear and tear of the worn out tissues and for the building of the body's defective cells. This is attributed to the presence of the methionine in the milk proteins. (Himsworth and Glynn.). These proteins can be classed as A quality proteins and can be used in the treatment of kwashiorkor and the low resistance, of the vital force caused by protein deficiency. Milk proteins are very much essential during childhood, pregnancy, lactation, acute febrile conditions, malnutrition, after major surgical operations etc. They are also necessary during the treatment of tuberculosis, rickets, asthma, nervous breakdown, urticaria, insanity, hysteria, anaemias, diabetes, cancer, nephritis, sleeplessness and liver disorders. For high concentration one to two teaspoons of *Casilan* or *Casilan* 12 (Glaxo) or *Protinules* (Alembic) stirred in a cup of milk or fruit juice sweetened with honey will give the best results to overcome the protein deficiency. These patents are made from Caseinogen.

Fat

The next food component in the milk is fat, which exists in the form of fine micro-globules which are suspended collidally in

the form of emulsion of extraordinary perfection. This is the reason that milk looks white. Milk fat is very easily digested due to microsomic condition of the size of the fine globules which are estimated to be as small as 2.3 to 4.0 microns. (One microne is equal to 25,000 to part of an inch).

If the milk is allowed to stand or centrifuged, the fat globules run together and float to the surface as cream and according to *Droop Richmond* experiments, it contains about 60 per cent of the fat in the cream of centrifugally obtained samples. If the fat is removed from the milk either by skimming or by centrifugal method is called *skimmed milk.*

There is a belief that skimmed milk powder is not good for health, and therefore, it should not be used. This is erroneous. Nonfat milk is not inferior to pure fresh milk. It is found that even after the milk is skimmed, there will be about 0.5 per cent of the fat which is sufficient to give the nutritive value to the milk. It is more digestible and supplies the same quantity of calcium and phosphorus, perhaps little more than the fresh milk and it is free from all the pathogenic bacilli. Even, children of any age can be fed with this milk with all the benefits of the fresh cow's milk without any harm. It is donated free, not because it is useless, but as a token of goodwill and sympathy of the Americans.

Minerals

From the mineral aspect of the milk, it contains plenty of phosphates in the form of potassium and calcium phosphates. They are the chief inorganic salts which build the muscles and the bones. But, milk contains very little iron, because, it is the food of a young calf and every newborn has got plenty of iron reserve in the blood and liver, therefore, God might have reduced the iron content of the milk. However, a little addition of iron in the form of collidal iron such as: *Tonoferron* (E.P.I.) 5-10 drops or *Neo-Ferrum* (Crooks) will supplement the required elemental iron in deficiency diseases in children and adults. During health, taking milk with a couple of *dates* is sufficient to supply the daily need of iron along with calcium and phosphorus.

In addition to these minerals, it is really surprising to know that milk is rich in citric acid which is chiefly combined with

magnesium and calcium to form their respective citrates. These citrates prevent the formation of large clumps of curds in the stomach after the milk is drunk. Therefore, in children who vomit milk after drinking it, a few grains of chemically pure *potassium* or *sodium citrate* added in the milk prevents such episodes. It is found that a good milching cow yields as much citric acid in a day as is found in 2 or 3 fresh lemons. (Henkel.).

Vitamins

Fresh milk is a very good source of vitamin A, B_2 nicotinic acid and vitamin D. The unboiled milk contains vitamin C, but on boiling, it is lost, therefore, boiled milk should always be drunk with some citrus fruits to supplement vitamin C.

The chemical composition of the milk varies in different cows in different seasons in different countries. During summer when there is no green grass, the quality of the milk falls in vitamins except vitamin D, which is built by the action of sun rays. The quality of the milk is found to be rich in all the vitamins during spring time when there is plenty of emerald green grass. According to *Vedas*, *Charaka* and *Bhavaprakash*, the quality of the milk differs from cow to cow. They say, that the milk of a healthy *black cow* which grazes in the sunny green fields is superior to all the other cows having different colours. This milk tastes better due to high quality carbohydrate in the form of milk-sugar or lactose. Lactose is the chief carbohydrate in all the milks which supplies the calories and energy to the body. The milk-sugar is different from ordinary sugar and does not ferment easily by the yeasts and easily gets converted into lactic acid by the action of *lactic-acid-bacteria*. Therefore, milk-sugar is of great value in the dilation of the stomach and excessive fermentation in the intestines. The high concentration of lactose in the black cow's milk with vitamins A, B-comp, C and D which are activated by Utra-Violet-Rays of the sun and make it a perfect food and medicine during the treatment of tuberculosis, asthma, diabetes, food allergies, chronic cough, protein deficiency diseases, rickets, premature old age, loss of sex vigour, falling of the hair, weak and puny children etc., (Charaka). It prevents all the diseases caused by the disorganisation of the phlegmatic (kapha) (windy) and VAYU (Sans) humerous. (Bhavaprakash.).

Fresh milk of the other cows having *black spots* on their skin comes next to the black cow's milk, and has more or less the same nutritive and medicinal properties. The milk of the *white* and *brown cow* is supposed to cause indigestion and phlegmatic derangements and is not of good taste. *Charaka*, therefore, advised that all children, sick persons and weak invalids should drink only the fresh milk drawn from a pure black cow.

Digestion of milk

Milk, after entering the stomach, becomes a clot by the combined action of free hydrochloric acid (HCl) and other gastric ferments like: Rennin. This clot of the milk is a tough leathery mass of casin which offers great resistance to get easily digested. One may wonder why milk curd is so easily digested, when it is also a clot of milk? According to *Hans B. Selxe* and *Hart*, calcium caseinate which is the clot formed by the action of rennin in the stomach will not be digested easily by the stomach enzymes, particularly, the pepsin in the absence of free HCl in the stomach and the clot passes directly in the intestines where it remains as a solid mass and does not get fully absorbed in. That is why, in young children who are fed on whole milk, the formation of the casein clot is common due to the absence of the free HCl, and the children suffer from digestive complaints. How the acid helps its digestion is; in the presence of proper proportion of the stomach acid, a denser clot is formed and the secretion of the casein becomes easier in the presence of the acid, and this clot is easily digested by pepsin. It is strange, if you have excess of HCl in the stomach even then the digestion of the milk becomes difficult due to the formation of the *casein hydrochloride* which is still harder to get digested.

In case of curd, the chemical composition is different and the particles of fermented caseinogen which are found in precipitated form can get easily digested completely.

Therefore, the easiest and simple method to reduce the formation of the milk clot in the stomach is to dilute it with water and boil it sufficiently to coagulate the free albumin. Addition of five grains of sodium citrate to a glass of milk, converts some of the free soluble calcium salts into calcium citrate and makes the milk easily digestible. It is a common practice to give some

citrated milk to a child who vomits after every feed of the milk. Addition of some mucilaginous gruel like rice conjee or barley water with every feed also prevents the formation of milk clot. It is found that drinking milk with some citrus fruits or with some solids like: biscuits makes it more digestible and the absorption will be complete.

Milk activated by the pepsin, reduces the quantity of the free acid in the stomach, it is therefore, of very much value in hyper-acidity and gastric ulcers. It leaves the stomach after two or three hours and enters the intestines where it is activated by the pancreatic juice which helps its complete absorption without any waste. It is proved beyond any doubt that the digestion of the milk is more perfect in children than the adults. In rickets, the absorption of fats and calcium is poor and forms insoluble soap which causes diarrhoea after drinking whole milk.

With all these considerations it is apt to say that milk is VRISHNYAM PAYAM.

Uses of Milk

Milk is one of the most common articles of food throughout the world used during infancy, childhood, sickness and old age. Being a liquid food and easy to take and digest, it can be safely given to all irrespective of any age and disease except in milk-allergy and certain gastro-intestinal disorders. It is readily available anywhere in the world at any time and saves your valuable life by guarding your health against various diseases. However, excessive use of milk causes constipation, indigestion and it should never be used immediately after a heavy meal.

Having such a wonderful gift from God, we must thank Him and know it perfectly and use it daily. However, with all these good qualities, milk is one of the most common medias which help the transmission of the deadly diseases like: typhoid, para-typhoid, diphtheria, measles, dysentery, cholera, infective enteritis, tuberculosis, undulent fever etc. These diseases are caused by their respective germs that favourably grow in it. Contaminated milk transmits the germs in the gastro-intestinal tract. Therefore, the most easy method to check the infection is to boil the milk properly for nearly half an hour as soon as you get it from the dairy. Boiling the milk not only kills all the harmful germs

9. Drinking milk of a pregnant cow causes pimples in young girls due to the progestrone and oestrin hormones.
10. Milk should not be used with fish, prawn, eggs, oyster if a person is allergic, otherwise there is no harm.

Milk diet during infancy and childhood

Next to human milk, fresh cow's milk is the most ideal food for infants and children. The feeding of the babies is a very complicated subject and for all the details read the author's book *From The Cradle To The Grave.* However, for proper feeding, follow the instructions as given below:

Cow's milk should be properly boiled and diluted with sterilized water which is simply done by boiling. During the first month of the baby, three ounces of the whole boiled milk, two ounces of clean boiled water and a teaspoon of honey is required per feed, and about five to six such feeds should be given by from 6 o'clock in the morning until 10 o'clock in the night. If the baby does not relish this quantity, give it in four hourly feed. In this country, the ignorant mothers boil the milk for a very long time and then remove the cream before the baby is fed. They mix water in half to half proportion before the milk is boiled and keep the whole thing until night, and also, they heat the milk every time they feed. This is not a proper method of preparing the milk. You must only boil the whole milk in a clean vessel and cool it immediately by immersing the vessel in the cold water. Keep the milk in a well stoppered milk bottle or in a covered vessel. Every time you feed your baby, mix only the boiling water in the required quantity of cold milk and this mixture will give the right temperature. It helps easy digestion of the baby and prevents all the gastric disorders and infection. Never feed the sleeping baby during the night. If the baby does not sleep and cries with hunger, give him some warm water sweetened with glucose or ordinary sugar. Never feed your child with your dirty hands and do not breathe directly over the baby while you are feeding. After the feed is over, allow the child to remain in reclining position and help him to burp two or three times and allow him to lie on the right side for some time.

After the child is fed for a month, increase the quantity of the milk by one to one and a half an ounce and supplement him with

a teaspoonful of fresh orange juice once or twice in between the feeds. If your child vomits the milk after each feed, mix five grains of *soda-citras* in each feed two to three times a day. If the child still vomits, never lose your precious time to consult your doctor. Supplementing multivitamin preparations like: *Theregran*, *Visynereal* or *ABDEC-drops* with 2 to 3 drops of *Neo-Ferrum* is advised to keep your baby lovely and healthy. Never, never use *Gripe-Mixtures* as tonics for your growing babies. Start giving some solid foods like: *Farex* with milk after the sixth month but continue to give until the age is reached to eighteen months. In this country, ignorant parents consider that milk is the food for the babies, sick persons and a drink to be mixed with their daily coffee or tea. The unfortunate child is deprived from milk soon after he starts eating some solid foods and some of the poor children hardly get a cup of milk once in a month. This is partly due to poverty and due to ignorance. Thanks to the generous donations of milk from the peoples of U.S.A. and Canada who give it free to the poor children and mothers in the underfed countries, but, in spite of their poverty, some of the parents do not allow their hungry children to drink this milk, because, it is not a milk and it causes diseases. Such parents should know that there is no difference between a cow's fresh milk and powdered milk. The powdered milk is more nutritious than the fresh cow's milk and safe to drink after reconstituting with clean water. The calcium content of the powdered milk is higher than the fresh milk. Remember, all the common diseases which are so prevalent in these countries and malnutrition is caused by the improper supply of milk during infancy and childhood and the ignorant parents are responsible for it. The consumption of milk in other countries is given below:

Country	*Per capita* (Consumption per day)	
Finland	... 63	Ozs.
Sweden	... 56	,,
Canada	... 58	,,
Australia	... 46	,,
Denmark	... 40.7	,,
U.S.A.	... 30.06	,,
India	... 5.3	,,
Mysore	... 1.5	,,

Cow's milk can be harmful to babies

As a paediatrician, I insist that a child should always be breast fed because when compared to the mother's milk, cow's milk contains four to five times as much calcium and phosphorus and two to three times as much casein in the form of protein. If one studies the physiology of the kidneys in infancy he will know that the young kidneys are less efficient in excreting a concentrated urine and fail to get rid of certain body metabolites if the plasma concentration becomes too high. It is noted that phosphorus excretion is particularly inefficient in infants.

Following the concentrated feeds of cow's milk HAWORTH found that the infants become ill, refuse to take more feeds and go in to convulsions attributed to high serum level of sodium, potassium, phosphorus. There may be renal failure ending in death if the infant is unrecognized and untreated. This condition is known as *Hyperelectrolytaemia.*

Infants having birth injuries and para-thyroid deficiency in the first week of life become an easy prey to *neonatal tetany* if they are fed on concentrated cow's milk. This is due to inability of the infant to excrete the high phosphorus ingested in the form of milk. Scurvy, allergy, low resistance to infection, idiopathic hypercalcaemia, ulcerative colitis and dangers of *strontium-90* radioactivity are more common in infants who are fed on cow's milk. It is therefore, necessary to get your child fully checked up by a physician.

Other uses of milk

If your child is scalded or your finger tip is burnt, put the injured part immediately in the milk and dress it with the wet pack of milk. It prevents the formation of blisters and gives immediate relief from pain and burning sensation. This is just the first aid and you must see your doctor for the necessary treatment. Remember, all injuries however minor they are, become serious if, they are neglected, relying on home remedies.

Milk is really a very good cosmetic and a beauty aid. In a full glass of pure full cream boiled milk, squeeze one fresh lime and set it for ten minutes or more. Then apply it over hands, face, neck, soles and arms and allow it to dry. Do not wipe or wash and go to bed. Wash with only warm water in the

morning. Do it every night regularly and see your face how beautiful it locks and feel your hands how flower soft they will be. This was the secret of the world famous Moghal *Queen Noor Jehan* who is still the star of beauties in the minds of beauty admirers. It is confirmed, that the queen of Emperor Jehangir the Moghal monarch of India was bathing daily in the cow's fresh milk with pure rose water mixed in it. You too can be Queen Noor Jehan's rival if you can afford to do the same.

Washing your lovely hair with milk and the *yolk of* egg every day, keeps the hair long healthy, and silky-soft. It increases the hair-growth and protects all the diseases of scalp.

Drinking a glass of milk every night sweetened with pure honey is a very effective night cap for sleeplessness, and acts as a tonic and tranquilliser if regularly given during the last month of pregnancy. Milk with honey given during the first stage of labour shortens the labour stages and refreshes the tired mother after the childbirth.

Cream of milk mixed with a little *vinegar* and a pinch of *turmeric powder* is a very effective home made dressing for the cut wounds, eczema, and other simple traumatic injuries. It acts as a very effective poultice in ripening the blood boils and heals them without sepsis.

Drinking milk with *tender coconut water* is a very effective food-diuretic in nephritis, cystitis, pyelitis etc. The protein free injectable milk is still a sheet anchor in the treatment of blood boils, cellulitis, ulcers etc.

A glassful of pure boiled milk mixed with a pinch of *turmeric powder* and few *broken peppers*, taken every night for three nights is a very effective remedy for common cold, hoarseness, enlarged uvula, pharyngitis, laryngitis, tonsillitis, bronchitis, asthma, acute trachitis etc.

For chronic sleeplessness, massaging the milk over both the soles is found effective. Putting few drops of milk in the eyes is said to cure belepheritis, conjunctivitis, burning in the eyes due to strain and redness caused by exposure to intense light.

Some useful milk-foods

The most useful foods which we derive from the milk are: *Cream, Butter, Whey, Curd, Butter-milk, Cheese, Casein* etc.

Cream: *Balai:* (Hindi)

Milk-cream is prepared by centrifuge or by heating the milk and the fat that appears on the surface is collected in the form of cream. It contains about 1.8 per cent of protein, in the form of methionine and casein 42 per cent of fat, 2.4 per cent of lactose and 0.059 per cent of calcium. Therefore, it is a very valuable article of food to give energy, and good health. It can moderately be used by diabetics and other persons who are forbidden to take excess of fats. Its daily intake should not exceed more than 50 g.

A tablespoonful of milk cream with two teaspoonfuls of honey is used as a fattening food for the children and strengthens the muscles and bones too. It is the chief ingredient of the Ice-cream which you and your children love to eat. Eating cream in excess by persons who are having some heart diseases like: high blood pressure, coronary ischaemia, obesity is not advisable. Because it elevates the blood cholesterol.

Application of the cream over the face an hour before you go to bed is a very good toilet cold cream. It nourishes the skin with the best natural amino-acids, fat and calcium. Thus it keeps it velvet soft, protects it from pimples, wrinkles, dryness and makes you look years younger. Massaging the palms, soles and the neck with cream, keeps them soft, healthy and it is a medicine for the ugly and painful fissures.

Cream mixed with a pinch of *turmeric powder* and the fresh *juice of rose petals* is a very effective ointment for skin diseases, rectal fissure, piles, haemorrhoids, burning and smarting ulcers, burns and scalds, cracked nipples, fissures of the palms and soles, dry broken lips due to cold and frost, pimples, boils and ulcers.

Eating milk cream with *rose flowers* and *honey* is a tonic for stomach cancer, gastric ulcer, colitis, cirrhosis of the liver in children and alcoholics, weakness of the heart, tuberculosis, constipation, stomach ache due to irritable food, piles, haemorrhoids, burning and smarting in the rectum after stool in anaemic persons, weakness during pregnancy and after childbirth, etc.

Butter: *Makhan:* (Hindi, Urdu); *Maska:* (Dak.); *Benney:* (Kan.).

Butter is made by churning the cream. By this process all the fat globules run into a solid mass and form into butter.

The peculiar aroma of the butter is due to the growth of lactic-acid forming organisms during the ripening of the cream. These organisms produce certain chemicals like: *Acetylmethylcarbinol* [illegible] *Diacetyl* flavours and gives aroma to the butter.

Butter contains some water with traces of *caseinogen* which helps the decomposition of butter on keeping it for some time, therefore, butter is clarified or dehydrated to make it last long. In our country, clarification of the butter is known from thousands of years which we call it Ghee (Butter-oil). It can be kept for a longer time.

Butter is the most valuable source of animal fat which is composed of certain fatty acids such as: *Butyric, Capric, Caproic, Caprilic acids.* They are soluble in water and they help the absorption of vitamin B_1 in the intestines. Of the non-soluble fats, Oelic and Oelin are very important which give the property of low melting point to the butter. A teaspoonful (5 g.) of butter contains Vitamin A 165 I. U. and vitamin D 21 I. U. and copper 0.075 p.p.m. Cholesterol content of butter is 280mg./100g.

Taking butter with bread or biscuit sweetened with *rose conserve* (Gulkhand. Urdu) is a very good tonic for the growing children, convalescing persons, tired feeling, general debility after surgical operations, common cold, tuberculosis, stomach ache etc. *Datey et al.*, proved that the incidence of arteriosclerosis with butter and butter fat is minimum whereas it is maximum with hydrogenated oils[28].

Massaging the children with pure butter and exposing them to early morning sun for half an hour is a very effective method of keeping your children healthy and strong. It strengthens the bones, increases the ressistance against the diseases and enhances their longevity.

Apply butter over your face like a cold cream and cleanly wipe it after an hour. Do it every night and continue it regularly and see how wonderfully your face blooms. Application of the butter over the burns and scalds, eczema, insect stings, cuts, and other minor injuries is very effective. It is a wonderful remedy for rough cracked hands due to constant work. Daily massaging with it, makes them flower soft, tapers the finger and makes them look charming.

Although the absorption of the butter is complete in the intestines and it is easily digested, but its excessive use, particularly

by those who are fat and are suffering from heart disorders, dyspepsia, high blood pressure, gall-stones jaundice, hepatitis etc., is contra-indicated.

Ghee: *Butter-oil: Tuppa:* (Kan.)

Ghee is made by melting the butter and the water is evaporated. In India it is common to add some spices while melting the butter to increase the flavour of the butter-oil. Though it is a very popular article of food, still, it is not so useful as fresh butter. However, it is the best cooking medium to impart flavour and nutrition to the food. When butter is heated the liberation of the fatty acids in the ghee disagree with some persons and cause indigestion.

A teaspoonful of ghee with a cup of milk is a laxative tonic for the growing babies and children. Like butter, it is also massaged over the body and exposed to the early morning sun. The sterilized pure ghee is used as a very nutritive tonic and it is given by intramuscular injection in rickets and tuberculosis. *Pandit J. L. Duveji*, says, 'To those children who incessantly cry and do not suck mother's milk, give sodium chloride (common salt) mixed with ghee and sugar candy in a teaspoon. Few drops of ghee put in the stuffed nose is a very good remedy for sinusitis and colds. It is a golden remedy for chronic constipation too'.[26]

Taking a teaspoonful of ghee with a teaspoonful of *white onion juice* and *honey* with an *egg*, every morning is a nervine tonic. It increases the sex power, builds the worn out cells, nourishes them and acts as a medicine for hysteria, insanity nervousness, weakness of the memory, neurasthenia, insomnia, etc.

Charaka says, that the ghee is a very effective ointment in healing the chronic ulcers. He actually calls it as a *Mahagirtha* for 111 years old ghee.

Like other fats, ghee is also contra-indicated in high-blood-pressure, diabetes, jaundice, hepatitis, chronic dyspepsia, obesity, coronary thrombosis, cardiac ischaemia, congestive heart failure etc.

Margarine

Margarine is an imitation of butter which is made by animal or vegetable fats of the right melting-point adding sour-milk

without fat and the mixture is rapidly freezed to form margarine. Before it is freezed, some lecithin, and some yellow colour with lactic acid microbes is added to give the aroma of butter. Some brands contain vitamin A and D and they are equally nutritious but inferior to butter.

Whey

Whey is prepared by adding some *rennet* or *lime juice* to the hot milk and setting it aside for 4-5 hours. Then the whole clot is stirred with the clear fluid and strained through fine cloth. Whey is a very nutritive liquid-food for the invalids suffering from digestive disturbances. It is a good thirst quencher too.

Whey mixed with a ripe *banana*, *honey* and teaspoonful of fresh *rose bud juice*, is an excellent tonic-food in typhoid, gastritis, gastric ulcer, constipation, weakness after major surgery, during pregnancy and after childbirth, tuberculosis, piles, etc.

Milk sugar (*saccrham lactis*) is made by evaporating whey. It is a very effective form of sugar for making official syrups for children who are having gastric disturbances.

Curd: *Dahi:* (Hindi, Urdu, Dak.); *Labban ul hamiz:* (Arab); *Tafrath:* (Pers.); *Masru:* (Kan.); *Taire:* (Tam.); *Dhunuru:* (Sindhi); *Dai:* (Beng.).

Zodiac: Aquarius

Food Value per 100 g. approximately

Carbohydrate	3.39	Vitamin A	130 I.U.
Protein	2.9 g.	Vitamin B_1	0.06 mg.
Fat	2.9 g.	Vitamin B_2	0.20 mg.
Calcium	0.12 g.	Niacin	0.1 mg.
Phosphorus	0.19 g.	Vitamin C	1.6 mg.
Iron	0.3 mg.	Potassium	193 mg.
Sodium	57 mg.	Digesting Time	2 Hrs.
Oxalic acid	0.2 mg.	**CALORIES**	**130**

Constitution: Cold and Wet 2°.

Physiopharmacology and Therapeutics

Curd is prepared by adding a little *starter* or curd or *lime juice* if curd is not available to start with in the pre-boiled warm milk

and set in a warm place overnight. The lactic acid organisms on finding a favourable sterile media, begin to grow by the process of fermentation. During this process alcohol, carbondioxide, lactic and succinic acid are formed by the action of *Lactobacilli-acidophilus*. Due to the formation of acids the milk is coagulated and *soft curd* is formed. There are some milks particularly buffalo's milk that is not properly heated forms a *Hard curd.* Soft curd is usually prepared from properly boiled cow's milk. It is digestible and suitable for infant feeding. Hard curd is extremely tough and the curd tension is high. Therefore, it is suitable for cheese making[16].

Yoghurt

Yoghurt is a curd prepared by the action of a special kind of 'Starter' having a different kind of lactic acid bacillus called *Lactobacillus bulgaricus.*[1,17]

Buttermilk

Buttermilk is prepared by churning curd and adding some water and the fat in the form of *butter* is removed. This process is common all over India. Fatty buttermilk can also be prepared by churning the curd with more water without removing the fat. Buttermilk has the same nutritive and therapeutic value of curd.

In India, preparation of curd and its medicinal uses are known from the time of *Attareya* and *Agnivesha*, the sages who learnt the art of healing from *Lord Indira* before the Vedic period (6000 to 3000 B.C.). Even the Rumanians, Bulgarians knew the art of making *yoghurt* and used it as a medicine for gastro-intestinal disorders. Researches conducted all over India confirmed that *Punjabis* living in both Pakistan and Indian-Punjab sector are stronger, healthier and live longer than other Indians and Pakistanis. The factors are attributed to simple living hard working, and regular consumption of wheat and curd in the form of *lassi* or *buttermilk.*[18]

How curd acts as a medicine

In the body acid-resisting organisms pass through the stomach and stay in the small intestine which are sterile from other organisms. During few days after the child birth, the intestinal tract of the

body remains sterile from micro-organisms and the *lactobacillus bifidus* which are present in the intestinal tract of the breast fed baby yield to *lactobacillus-acidiphilus* after the baby is fed on cow's milk in addition to breast milk.

In healthy subjects, there exists a very delicate balance between the intestinal flora that are grouped into *Proteolytic* and *Acidogenic.* This delicate balance is maintained by symboisis and competition. The presence of resistant acidogenic organisms check the growth of proteolytic organisms in the small intestine and they are driven into the caecum and large intestine, where these organisms mix with other pathogenic organism such as *Clostridium butyric, Proteus Enterococci, E. Coli, Streptococci, Lactobacilli* and others. These micro-organisms cause fermentation in the intestines in the presence of dysbiosis (absence of useful flora), liberating alcohol, CO_2, and by breaking down the albumins they produce complex products which liberate ammonia changing the pH value of the faeces.

The micro-organisms in the intestine are very much essential for good health because they secrete enzymes similar to those secreted by the digestive organs. These bacterial enzymes split sucrose and neutral fats and change albumins into peptones and amino acids, and by their chemical enzymatic action, also change the cellulose into glucose, a very complicated bacterial chemical change indeed. The organisms also play a very important role in the synthesis of B-complex vitamins and vitamin K (N. C. Dey, Medical Bacteriology, 1, Edn.)

Administration of broad acting anti-biotics, not only kills the pathogenic organisms but also wipesout the useful intestinal flora that are essential to maintain the normal balance of health. This mass destruction of these organisms helps the regeneration of the pathogenic organisms after the anti-biotics are withdrawn following the cure of a certain disease and the superinfection causes toxaemia, avitaminosis, diarrhoea, colitis etc.

Clinical manifestations

(a) Diarrhoea and vomiting in children

The most common emergency in medical practice is diarrhoea and vomiting in children. This is a very complicated malady which terminates in death due to toxaemia and dehydration if

immediate and proper treatment is not given. This is commonly found in the bottle-fed babies and it may be attributed to unhygienic factors while feeding them. The most common organism that excites these symptoms seems to be *Escherichia coli.*

It is observed that feeding children with a teaspoonful of curd sweetened with *sugar* or *honey* an hour before the usual feed prevents such episodes.

(b) Amoebiasis

In a country like ours, various intestinal infestion is prevalent due to improper sanitation and ignorance of hygiene. One of the most common intestinal infections in the tropics is Amoebiasis and once it sets, it leaves very grave imprints over the sands of health. The efficacy of Lactobacillus-acidophilus is demonstrated by giving it as a curd medicine for one week in amoebic dysentery. The stools remained free from the amoeba after ten days of curd therapy in mild types of cases. But, in acute and severe toxaemic conditions specific remedies should be given under the guidance of a physician and the stools should be microscopically tested monthly once for the continuance of the treatment. *Aralis*, (Dyes, Calcutta), *Neo-Viaspet* (Hoechst. Germany), *Amicline* (Grimault. Bombay). *Humantin* (Parke-Davis) etc., are some of the most potent drugs used in the treatment of amoebic dysentery.

(c) Hepatitis and Jaundice

Infection of the liver is a very complicated emergency in medical practice and the causes are various. The prognosis of virus hepatitis is very obscure and therefore, such patients should always be treated in a well equipped hospital.

Excessive liberation of ammonia is one of the major causes of coma in hepatitis. It can be prevented by using plenty of curd. The lactic acid organisms in the curd or buttermilk counteract the formation of ammonia. Hence, the hepato-encephalopathic manifestations are warded off.

In jaundice curd or buttermilk with soft boiled rice is an ideal diet. Author recommends buttermilk sweetened with *honey* along with *Live-52* (Himco) one tablet three times daily and a capsule of *Desical* (Parke-Davis) regularly for a fortnight

for excellently good results. (It must be remembered that correct diagnosis of jaundice is very important before giving any treatment.)

(d) Excessive burning in the rectum

In general practice a number of patients complain of severe burning and intense itching in rectum after passing the stools. This type of non-pathological pruritus-ani and burning can be successfully controlled and cured in a couple of days by giving plenty of curd and lemon juice with bland diet. It is found that the normal pH value of the stool (5-6), is altered due to alkalinity of the stool and ammonia content, giving the curd recipe makes the stool acitic and alleviates the burning and itching[12].

(e) Gastric sepsis

Patients who are suffering from duodenal ulcer and carcinoma of the stomach usually harbour both non-pathogenic and pathogenic organisms after stomach surgery. The organisms that are commonly found are, *coli aerogenes*, *betahaemolytic streptococcus*, *pneumococcus*, *staphylococcus aureus*, *E. coli*, *aerobacter aerogens* and *proteius* and such gastric sepsis can be cured by giving buttermilk liberally. Buttermilk can also be safely given in typhoid, colitis, etc.

Buttermilk or curd treatment is indicated in mild infection, but in certain serious and complicated diseases, high concentration of the lactic acid germs having resistance to the antibiotics are required. This draw back is present in the curd or buttermilk and they are not readily available in emergencies. To overcome this defect, scientists have preserved the lactic-acid germs grown on various antibiotics and nutrients are exposed to U.V.R. Then they are Lyphoilised, that means a process of dehydration of the water to make the germs resistant by direct conversion of the water into gas by the process of sublimation, freezed, and are sealed in vaccum ampules. This method of preservation of the organisms, prevents the growth and maintains the organoleptic characteristics of the fresh products. Adding the contents of the ampule in a glass of sugared water revives the germs and they are orally given to all the patients who are sick. In India, LACTISYN is a patent combination

of lactic-acid organisms and is sold in the form of ampules ready to use. Author found it to be very effective during the treatment of aforesaid diseases.

Other uses of Curds

Curds is an antidote for copper poisoning. It should be given immediately after vomiting and diarrhoea with intense pain in the abdomen. A glass of curds mixed with a pinch of pepper given after cobra-bite acts as a remedy (Pandit J. L. Devoji).

Regular use of buttermilk or curds during the treatment with antibiotics and Sulpha-drugs prevents the after effects of these drugs. Its regular use cures migraine[10].

Dressing with curds and a pinch of *turmeric powder* cures eczema, scabies, itching of the skin, boils etc.

Curds or buttermilk with rice, *jaggery* and *pepper* is a very cooling diet in summer for burning in the urine, burning in the anus, diabetes, excessive thirst, etc. With jaggery, it is a medicine for piles. It is a tonic-food for old persons.

Cooking meats with curds, makes them soft and retains their flavour and increases the digestibility. Soaking fowl meat in curds or buttermilk for half an hour, removes the smell from it and makes it tender to cook easily.

Cheese: *Paneer:* (Urdu)

Cheese is made by the formation of the clot by the addition of rennet or by souring the milk by curding with lactic-acid organisms. Then the whey is separated by pressure and the curds is ground, melted, and the molten liquid is moulded by compressing hard to form the cheese cubes. The cheese made from the renneted milk is sweet and is called *sweet cheese*. **Stilton** is such an example of cheese. **Cheddar** is the cheese made from the sour curds and can be kept longer than stilton.

The peculiar smell and flavour of the cheese is due to the formation of butyric, acetic, caproic and propionic acids. The sharpness of the cheese is due to the acids and the degeneration of proteins with ammonia.

Cheese is a very concentrated food rich in the following components per 100 g. (*Chedder Cheese*).

Carbohydrate	Trace	Iron	0.57 mg.
Protein	25 g.	Vitamin A	1500 I.U.
Fat	35 g.	Vitamin B_1	30 mcg.
Calcium	810 mg.	Vitamin B_2	500 mcg.
Phosphorus	545 mg.	**CALORIES**	**120**

Cheese is a bit hard to digest unless it is chewed well or finely grated. This is due to the fatty lumps which are water proof and they are inactivated by the digestive juices, however, once it leaves the stomach, about 90 per cent of it is digested.[2, 20]

Cheese is available in sealed tins and it can also be made in your home by the following method:

Strain the sour curds through a fine cloth and allow it to stand overnight so as to drain all the whey. Grind the solid mass left in the cloth into fine paste and eat with salt. *Cheese whey* is used for the preparation of B_{12}.[24, 25]

Eating cheese every day with honey and few *almonds* is one of the choicest tonics in nervous debility, insomnia, weakness of the memory etc. Particulary it is a boon to the mental workers.

Giving grated cheese to children is a very good tonic to prevent rickets, protein, vitamin A, B and D deficiency diseases. It helps the development of the body, nerve cells, blood, sex hormones etc. It prevents the early ageing, premature greyness of the hair, falling of the hair, refractive errors, common cold, tuberculosis, cancer, diabetes, asthma, weakness of the heart, insanity, high blood pressure etc. Cheese is the life giving support to the brain and you must thank God for such a gift. Excessive consumption of *cheese* or *butter* liquefies the *cell-membrane* and causes drowsiness. (*Antiseptic*, p. 181, March 1969, Madras).

Casein

Casein is the protein separated from the milk and is sold in the form of powder. It supplies about 75 per cent of the A class protein. *Casilan*, *Nervogen*, *Sanatogen* are some of the milk-casein patent preparations.

Koumiss

Koumiss is an alcoholic sour milk-beverage which is made as follows: Take four ounces of clean pre-boiled water and add

the equal quantity of pure whole cow's milk. Add, an ounce of *honey* and 20 grains of *Brewer's yeast powder* to this mixture and put it in a clean sterilized bottle and cork it tightly. Keep the bottle in a cool place and shake it frequently. After four days the *Koumiss* will be ready. It is a very effective tonic during the treatment of tuberculosis, rheumatism, atonic dyspepsia, nephritis, cystitis, pyelitis, infantile diarrhoea, dysentery, typhoid, colitis, kidney stones, urethritis, gonorrhoea, piles, weakness during pregnancy and lactation, common cold, morning sickness etc.[24]

Urine

Urine of the cow is an antiseptic rich in ammonia, urea etc. In olden days, the ancient surgeons of India, used to dip the surgical instruments in the fresh black cow's urine before a surgical operation. In Ayurvedic medicine, it is internally given along with certain preparations as a cure for kidney diseases and as a laxative in chronic constipation. The vegetable drugs like: *aconite, croton seeds* etc., are purified in the cow's urine to make them less poisonous before they are used in the medicinal preparations. Some such other poisonous herbs are also boiled in the cow's urine to make them less poisonous.[24]

Dung

The cow dung is a very good manure, but in India such a valuable thing is used as a fuel. It is rich in potash, therefore, it gives intense heat when it is burnt. A kind of gas is prepared from the dung, which is used for lighting and burning purpose in rural parts.

Horns and Bones

Horns and the bones of this animal are used in the sugar industry and the bone-meal is used as a good manure. Powder of the horn half a teaspoonful given with *vinegar* or water, cures bleeding from nose, impotency and enlarged spleen. Burnt horn is used as an effective cleansing dentifrice.

The skin is used in the manufacture of various leather goods. With all these benefits and uses of the organs of the cow, she is aptly called as the sacred mother.

246. BUFFALO

Buffalo: *Bos-bubalus:* (Z.N.); *Mahish:* (Sans.); *Bhians:* (Urdu, Dak. Hindi); *Aljamoosh:* (Arab.); *Yemmey:* (Kan.); *Dumputu:* (Tam.); *Aenamu:* (Tel.); *Hahish:* (Beng.).

Like cow, buffalo is also a domestic animal reared for its milk. The flesh of the buffalo is not so popular as that of mutton and meat but, its milk is very popular all over India.

Food Value per 100 g. approximately (Milk)

Carbohydrate	5 g.	Vitamin A	164 I.U.
Protein	4.2 g.	Vitamin B_1	40 mcg.
Fat	9 g.	Phosphorus	129 mg.
Calcium	210 mg.	Digesting Time	3 Hrs.
Iron	4 mg.	**CALORIES**	**115**

Buffalo's milk is very rich in fats and calcium, therefore, it is thicker than the cow's milk and takes more time to get digested. However, adding sufficient quantity of water and proper boiling makes it digestible. Even children can be fed with this milk after proper dilution. *Amul Milk* formulated by C.F.T.R.I., Mysore is a very popular baby food in India is made from the buffalo's milk with vitamins and minerals. The pure milk is a wholesome food for all except those who have dyspepsia, jaundice, high-blood pressure, asthma etc. Drinking a glass of milk every night with honey is a tonic for weak and lean persons, tuberculosis, gastric ulcer, impotency, chest pain, rickets, protein deficiency diseases etc.

The curds prepared from the skimmed milk has got the same value of cow's milk-curd, but, excessive use of this curds causes rhythmic disorder of the heart that disappears on stopping the use of curds. Drinking a glass of curds with a tablespoonful of *honey* and a teaspoonful of *fresh rose-petal-juice* from the beginning of the pregnancy until the childbirth is a recipe to beautify the unborn baby. Cow's milk curds can also be used. It also eases the childbirth, keeps you healthy, and prevents the post-natal complications. If you cannot digest the whole curds, dilute it with water and churn it well before you drink[21].

REFERENCES

1. Antia, F. P., *Clinical Dietetics and Nutrition*, pp. 222 to 237 (1966).
2. Hutchison's *Food and the Principles of Dietetics*, pp. 369 to 398 10th Ed. (1948).
3. Swaminathan, M., Bhagwan, R. K., *Our Food*, (1966).
4. Van Den Berg, J. C. T., *Milk Hygiene*, W.H.O. Monograph Services, No. 48, 322, (1962).
5. Aykroyd, W. R., *et al., Health Bulletin*, No. 23. G.I.P. 5th Ed. (1956), Delhi.
6. Jackson, R. H., *Proteins of Homogenized Milk fat Globule Membrane*, University of Michigan (1959).
7. King, N., *Common Wealth Agriculture Bureaux*, Franham 99, Royal, Bucks England, (1955).
8. Lemaitre, P., *Current Technological problems of milk powder manufacture*, Inds. aliment. agric., 84 (4), 513 (1967).
9. Camus, A., *Fermented milks*, Ind. aliment. agri., 84 (4), 505 (1967).
10. Joshi, V. K., *Effect of trypsin on milk in relation to its proteose-peptone.*
11. Necheles, H. and Beck, *Lactobacillus and Intestinal Flora.* A review of a new interesting subject. The Medicine and Surgery, 41 (B) 44 (D), Sep. (1965).
12. Monsus, V., *Considerations of Internal Bacteriology*, L'Artois Medical, March (1959).
13. Lactisyn Literature, No. G/B/1/66., Grimault Laboratories, Pvt. Ltd., 20 Haines Road, Bombay.
14. John Sonneland, M.D., *Butter milk and Gastric Sepsis*, Spokane Pac. Med. Surg. April (1965), Washington.
15. Brooks, L. H., *Diseases of Colon and Rectum*, 1:372 (1958).
16. Bhale Rao, V. R., *The Chemistry and Technology of Milk Concentrates*, J. F. Science, Vol. 1, No. 3, pp. 46-53 Oct. (1964).
17. Iyengar, M. K. K. *et al., Effect of Heat treatment of buffalo and Cow milk in the manufacture of Yoghurt*, J. Dairy Science, 20, (1), 8, (1967).
18. Amrith Lal Arora, B.Sc., *Head of the Soda recovery Dept.*, Mandya National Paper Mills, Belagola, Mysore (1968).
19. Rao, R. V., *et al., Studies on the Curd tension of Milk*, J. Food Science Vol. 1, No. 2, July (1964).
20. James, W. Jones, London, *Yoghurt means Good Health not bad milk*, The Health, Vol. 44, No. 3, pp. 60-61 (1966), Madras.
21. Richardson, G. A., *et al., Market mild and related Products*, 33, 557, The Gilsen Publishing Co., Milwahkee, Wisc, U.S.A., (1929).
22. Camus, A., Butter, *Inds. aliment. agric.*, 84 (4), 525 (1967).
23. Reinhold, G. W., *et al., Starter Cultures for chedder Cheese*, J. Milk. Fd. Technol. 30 (8) 247, (1967).
24. Hakeem Syed Jameel, *Kanzul Mujerebath*, Pers. Mss., Lahore, (1867).
25. Roy, A., *Journal of Ayurveda*, Feb. (1926).
26. Nadkarni, K. M., *The Indian Matria Medica*, Vol. 11, pp. 141 and 161, (1954).
27. Bullerman, L. B., *et al.*, Appl. Microbiol., 14, (3), 353 (1966).

28. Berry, E. C. *et al.*, Appl. Microbiol., 14, (3), 353 (1966).
29. Erwin, L. J., *J. Aust. J. Dairy Technol.*, 21 (1), 10 (1966).
30. Haworth, J. C., *Cow's milk can be dangerous to babies*, The Winnipeg Clinic Quarterly, pp. 44-50, June (1962), U.S.A.
31. Datey, K. K., *et al.*, *Role of different edible oils and fats in pathogenesis of arteriosclerosis*, J. P. G., Med. Vol. 13, No. 3, July (1967).
32. The Indian Practitioner, *Special number Amoebiasis and Giardiasis*, No. 10, Oct. (1968).
33. Todd, A. S. and Hopes, P. O. D., *Staphyloccoccal entritis two associated fatal cases*, *Lancet* ii., 749 (1955).
34. Swellengrebel, N. H., *Sixth International Congress on Tropical Medicine and Malaria*, Lisbon, (1958).
35. Fladung, H., *Scope for the treatment of Intestinal disorders*, (Diarrhoea with a Synergy of lactic ferments).
36. Hawley, H. B., *et al.*, *Factors affecting the implantation of Lactobacilli in the Intestinal Flora with l-acidophilus*, *Lancet* 1: 399-403 (1965).
37. Robinson, E. L. and Thompson, W. L., *Effect on Weight gain of the addition of Lactobacillus acidophilus to the formula of newborn infants*, J. Paed., 41, 395 (1952).

247. CAMEL

Camel: *Camelous-dromodarious:* (Z.N.); *Ustra:* (Sans.); *Oont* (Hindi, Urdu); *Jamal:* (Arab); *Shutur:* (Pers.); *Vonte:* (Kan.).

Constitution: Hot and dry.

Camel is the desert animal and is used as a conveyance in the Sahara. Therefore, it is called the 'ship of the desert'. Its milk is very nutritious and aphrodisiac. The secret of Arabian sex fantasy described in the book *The perfume Garden of Sheik Nefzui* is attributed to the consumption of *camels' milk*, *honey*, and *dates*. Milk is laxative due to the richness in salts.

The meat is hard to digest and causes acidity if used in excess. It is a tonic for liver disorders, impotency, piles, weakness of the heart, etc. The body of a person suffering from oedema used to be exposed to the fumes by burning the dung in ancient times.

248. DEER

Deer: *Antilope-cervicapra:* (Z.N.); *Mrug:* (Sans.); *Hiran:* (Hindi, Dak., Urdu); *Gazal:* (Arab.); *Ahu:* (Pers.); *Jinkay:* (Kan.).

Yes, it is the same spotted deer which you see in your zoo and it is the most elegant and beautiful of all the Indian animals.

It is mercilessly hunted for its flesh and skin which is mostly used for decorative purpose. It is said that sitting over the tanned skin, reduces the sexual feeling, that is why you see every Indian sage is with a folded deer skin and he sits over it while he is meditating.

The flesh of the deer is given as a medicine for tuberculosis, piles, jaundice, chronic cough, ulcerative colitis, impotency etc.

The soup made in the usual way is given for forty days regularly as a cure in enlarged spleen, liver and jaundice, since it is difficult to get its meat regularly for such a long time I could not investigate clinically.

Roasted deer skin is applied over the ulcers and the oil in which the skin is fried is a remedy for acute ear-ache caused by the exposure to the cold winds.

The calcined powder of the horns prepared according to the Ayurvedic method is given in 2 to 5 grains with *honey* as a very effective remedy for pneumonia, asthma, cough, bleeding tendencies, rheumatism, pleurisy, pleurodynia, premature bleeding before childbirth, loss of appetite, tonsillitis, passing of the phosphates in the urine etc. The calcined powder is called *Khushta-e-Barasingha.* The medicinal action is due to calcium oxide.

249. RABBIT

Rabbit: *Oryctolagus-cuniculus:* (Z.N.); *Shashak:* (Sans.); *Kharha* or *Khargosh:* (Hindi, Dak., Urdu); *Alarnib:* (Arab.); *Mula:* (Kan.).

The flesh of the rabbit is given to cure torpidity of the liver, weakness of the heart, loss of memory and impotency. It increases the secretion of the testicular hormones and retains the sex vigour in old age.

Fresh blood applied over the superfluous hair acts as a depilatory.

Dry bile is applied for opacity of cornea with good results (Hakeem Syed Sultan).

250. PIG

Pig: *Suvar:* (Hindi, Urdu, Dak.); *Khanzeer:* (Arab.); *Handi:* (Kan.); *Pandri:* (Tam.).

Pig is a domestic animal which is reared for its flesh. Pork is a very good source of A class proteins but, eating it excessively, causes blood diseases and acidity of the system.

251. POULTRY

Chicken: *Gallus domesticus:* (Latin); *Murg:* (Hindi, Urdu, Dak.); *Aladjaj:* (Arab.); *Qhuroos:* (Pers.); *Kolley:* (Kan., Tam.).

Zodiac: Cancer.

Food Value per 100 g. approximately

Protein	27.6 g.	Vitamin B_1	0.08 mg.
Fat	1 g.	Vitamin B_2	0.16 mg.
Calcium	25 mg.	Vitamin B_{12} (liver)	8 mcg.
Phosphorus	248 mg.	Niacin	5.7 mg.
Iron	1.5 mg.	Purine	500 mg.
Sodium	58 mg.	Cholesterol	60-90 mg.
Potassium	296 mg.	Digesting Time	3 Hrs.
Oxalic acid	0.4 mg.	**CALORIES**	**109**
Vitamin A	230 I.U.		

Essential Amino-Acids (g. per 100 g. protein)

Arginine	6.3	Methionine	2.9
Histidine	2.9	Phenylalanine	3.7
Isoleucine	5.3	Threonine	4.3
Leucine	7.6	Tryptophan	1.2
Lysine	8.8	Valine	4.9
Cystine	1.3		

Constitution: Hot and Wet 1°.

Medicinal Value

Poultry breeding is a very popular trade all over the world for the supply of A class protein in the form of meat and eggs. Of

all the meats, the chicken meat is considered as the most nutritious and delicious. Sulphur compounds, aldehydes, ketones, aromatic compounds, furans, esters, hydrocarbons, alcohols, terpens etc., were among the 62 identified compounds from about 227 compounds obtained from the boiling chicken meat[1].

Chicken extract

Chicken extract prepared from the tender meat like mutton extract is a very effective liquid-protein-food during convalescence from acute febrile diseases. Its regular use is an aphrodisiac and rejuvenates the body. It is particularly useful during pregnancy, after child birth, influenza, rundown condition of the body, nervous weakness and insanity. It can also be given in all the protein deficiency indications that are described in the foregoing pages. Where chicken extract is not possible to prepare, make use of *chicken essence* in the form of ampules prepared by *Smith Stanistreet* or *Nutritone* (Cipla) with the same benefits.

Stale reheated chicken curry should not be used, because it forms hydrogen sulphide that causes vomiting and diarrhoea. Chicken is contra-indicated in piles, syphilis, jaundice, gonorrhoea and allergic diathesis. Eating the meat of *turkey* has similar nutritive value and cures psoriasis if regularly used.

Irradiation of chicken meat 0.5 Mrad increases three times in storage life-free from *Salmonellae* and *Staphylococci.*[2]

Egg: *Ova:* (Lat.); *And:* (Sans.); *Anda:* (Hindi, Urdu, Dak.); *Baiza:* (Pers.); *Mottay:* (Kan.); *Muttai:* (Tam.).

Food Value per 100 g. approximately. (Two normal size eggs)

Protein	13.1 g.	Vitamin A	2000 I.U.
Fat	13.1 g.	Vitamin B_1	129 mcg.
Calcium	60 mg.	Vitamin B_2	0.3 mcg.
Phosphorus	217 mg.	Potassium	145 mg.
Iron	7 mg.	Cholesterol	1330 mg.
Sodium	129 mg.	Digesting Time	3 Hrs.
Oxalic acid	0.2 mg.	**CALORIES**	**147**
Purine	140 mg.		

Essential Amino-Acids (g. per 100 g. protein)

Arginine	6.6	Methionine	3.1
Histidine	2.4	Phenylalanine	5.8
Isoleucine	4.6	Threonine	5.0
Leucine	8.8	Tryptophan	1.7
Lysine	6.4	Valine	7.4
Cystine	2.3		

Constitution: Moderate.

Egg is a treasure house of energy and food having all the building materials hermetically sealed in the shell. *Mr. Kingsley* says:

'Treasure houses, wherein lie,
Locked by angels alchemy,
Milk and hair and blood and bone'.

Egg consists of three parts, namely: *the shell, the white of an egg* and *the yolk.*

Shell

The milky white shell is made up of calcium carbonate, which helps to supply the calcium during hatching time, therefore, about 9 per cent of the weight is lost during this process. Besides this mineral, the other substances like: magnesium, iron, sulphur, phosphorus are also present in traces in the shell. It preserves the nutritive value of the inner contents and protects them from the bad influence of the atmosphere.

The shell has some medicinal use if it is calcined according to Ayurvedic methods, and the oxidized powder is given in 5 to 10 grains with honey for rickets, spermatorrhoea and urinary calculi. (Pandit Shiv Sharma). A teaspoon of the shell powder soaked in a teaspoonful of fresh *lime-juice* over night and in the morning, the yolk of an egg is mixed in it and massaged over the scalp and washed in warm water to lengthen and prevent hairfall.

White of an Egg

White of an egg is composed of pure albumin in the form of protein such as: *Ovalbumin, Conalbumin, Ovomucin,* and *Ovomucoid coid.* The first two are found in major proportion and the later

two are found as *glycero-proteins* in smaller amount (Eichholz, U.S.A.).

Beside these proteins, the white of an egg contains the following chemicals per 100 g. approximately.

Calcium	5.2 mg.	Chloride	170 mg.
Copper	0.03 mg.	Iron	0.1 mg.
Magnesium	10.7 mg.	Phosphorus	33 mg.
Potassium	148 mg.	Sodium	192 mg.
Sulphur	183 mg.	Vitamin B_2	0.5 mg.
Cholesterol	0 mg.		

White of an egg mixed with warm milk sweetened with *honey*, it is a good nutritive tonic in rickets, tuberculosis, nephritis, toxaemia of the pregnancy, loss of weight, during pregnancy and lactation, common cold, hepatitis, cirrhosis of the liver, etc. The same can be given as a harmless antidote for Arsenic, Mercury, Copper, Zinc, Lead, Creosote and poisoning by other gastro intestinal irritants. In all such poisoning it acts mechanically enveloping the poisonous particles and covering the inflamed mucous membrane of the gastro intestinal tract.

A teaspoonful of the albumin, mixed with the equal quantity of *milk cream* and few drops of *lime juice* rubbed briskly between the palms and applied over the face every night before going to bed, keeps one's face velvet soft and flower fresh. It prevents from pimples, blackheads, ugly looking scars, dryness of the face, early wrinkling etc. Its regular use makes one look young and beautiful.

Massage a teaspoonful of albumin over the scalp and wash the hair without using any shampoo, and see how beautiful the hair looks. It prevents from dandruff, dryness of the hair, premature falling and greyness. It feeds the roots of the hair with the best and naturally blended food and safeguards the life of the hair. Snuffing chared white of an egg is a specific remedy for epistaxis.

White of an egg mixed with any washing or toilet soap shavings is applied over the sprains or dislocations and radiant heat is applied to dry it. It reduces pain and acts as a first aid measure in such injuries.

Yolk of an egg

Yolk is the yellow part of the egg which is found in the centre of the shell surrounded by the albumin and fastened by suspenders.

It is the chief source of nutrition to the growing chick and is composed of highly emulsified fat, proteins in the form of *Vitellin*, which is rich in phosphorus, cystine, tryptophan and tyrosine combined with livitine.

The highly emulsified fat is the etherial extract which contains soluble lipines along with other fatty acids like: palmitic, steric, oleic and linoleic in various proportions. The other lipines are chemical compounds of leciethin, kephollin, sphingomyellin etc. These substances contain phosphorus and aid the glutamic acid synthesis in the organism, development of the bones and nerves. The yolk is also rich in cholesterol which acts like a carrier of vitamin D in the form of ergosterol. It is estimated that each egg yolk contains 1330 mg. of free cholesterol.

MaCance and *Widdowson* found that each 100 gm. of yolk or two yolks contain the following minerals in highly assimilable form:

Calcium	147.5 mg.	Sodium	50 mg.
Chlorine	142 mg.	Sulphur	165 mg.
Copper	0.02 mg.	Vitamin A	8800 I.U.
Iron	6.13 mg.	Vitamin B_1	101 I.U.
Magnesium	15 mg.	Vitamin D	500 I.U.
Phosphorus	495 mg.	H_2O (Water)	54 per cent
Potassium	123 mg.	Extractives	2 per cent

Yolk of an egg has an immense medicinal value in number of diseases of various organs such as: liver, brain, nerves, heart and sex.

In liver diseases like: hepatitis, cirrhosis, toxaemias of pregnancy, alcoholic toxaemia, diabetes, anaemias, ascitis, torpidity of the liver etc., the boiled egg's yolk mixed with a tablespoonful of *honey* is given two to three times daily with very good results along with the standard treatment.

In the diseases of the brain and nerves, yolk of an half boiled egg mixed with *honey* and few *almonds* taken every night

before going to bed is a specific tonic; notably for insomnia, weakness of the memory, lack of concentration, lack of retentivity of intelligence, forgetfulnes, mental irritability, tension, feeling of great tiredness after some mental work and falling asleep while reading in bed, constant yawning and lack of interest in the daily work, insanity, hysteria, heaviness in the back of the head after sexual intercourse, great tiredness and heavy feeling in the eyes as if they are pulled in the back by a string after reading and seeing bright light, burning in the eyes as if *pepper* paste is applied in them, moody, weeping tendency, pessimistic, fears of death but tries to commit suicide, hates contradiction and cannot control anger, neurotic, sees some body is chasing and hates to go alone in darkness, epilepsy, stubborn children, etc.

In the treatment of heart diseases, yolk of the egg should be carefully given, as it contains high cholesterol. It is particularly contra-indicated in high blood pressure, coronary heart disorders, etc. However, yolk of the boiled egg with honey and a slice of bread in the morning can be given once a week without any harm during the convalescence of these diseases under the supervision of a physician.

Egg as a sex tonic

How the prince of *'The perfume Garden of Sheik Nefzui'* was able to deflower the eighty virgins without ejaculating the semen is no wonder, anyone can perform the same feat though not with eighty if he eats two *yolks of eggs* fried in pure *butter* and kept floating in the *honey* for one hour and takes with a glass of pure *fresh cow's milk* for forty nights. (Add one part of *fresh white onion juice* to two parts of the *honey* and heat it until all the watery content is evaporated and use this honey instead of plain honey.) This million dollar recipe is a boon to all the youths who really want to enjoy the sex pleasure and retain the virility in old age. Try it today and bless the grand soul of the Arabian Sheik.

Fry the yolk in some *til oil* or *butter* and apply the oil for two months over the bald patches and falling of the hair and see how the hair begin to grow. Massaging the *same oil* over the body of the penis and the undeveloped breasts, makes them grow beautiful,

trong and hard. Yolk mixed with honey is applied once daily ›ver the face as a best cosmetic. It also cures pimples.

The yolk mixed with the *goat's blood* and *honey* and massaged over the body of the male organ, increases its dimensions and hardens it during errection.[7]

Massage the yolk of an egg with *fresh rose flower juice* over your face before you go to bed and wash it in the morning with plain soap and warm water. Do it every night and make it a regular habit to remain beautiful.

Chewing the yolk of the boiled egg is a specific remedy for stomatitis, ulcerative gums, pyorrhoea, cracked tongue, lack of appetite, insipid taste in the mouth etc.

Digestibility of the Egg

The digestibility of an egg depends on how you cook it. The raw whole egg is hard to digest and so is the hard boiled one. Half boiled egg is the most ideal way of taking the egg for its easy digestion. Boiling the egg hard forms the alkaline sulphides from the white of the egg and develops disagreeable smell. The same thing happens when the egg is rotten. This can be prevented if you boil the egg for about seven minutes and put it in cold water immediately. Finely chopped egg can be easily digested in the stomach and is completely absorbed in the intestines. The fried egg too is hard to digest and persons who have weak digestion should not take egg in this form. The digestibility of the egg is so good that one healthy adult can take twenty eggs at a time without any harm, however, one must be cautious to eat them in such an excess.

Eating half-boiled fresh egg with *honey* once daily with *milk* before going to bed, acts as a food-medicine to chronic coryza, bleeding from mouth etc.

Eating a semiboiled egg with a pinch of *cinnamon powder* and *Bamboo mana* once daily is a specific medicine for impotency caused by excessive masterbation, homosexual indulgence etc.[7, 9].

Eating an egg (half boiled) with *ginger conserve* cures rheumatism, piles and prevents the formation of pus in the bladder and kidneys[8, 9].

Application of the boiled yolk mixed with a little slaked line over the boils, opens them and heals quickly.[9] (Beware of diabetic

carbuncles which should never be attempted to treat unless the urine and blood-sugar is examined to diagnose the disease.)

Fry the yolk of an egg until it becomes black. Then squeez it through a fine cloth and collect the oil. Its regular application increases hair growth, hardens the penis, cures rheumatism and bleaches the complexion.[7, 8, 9]

Some persons are allergic to eggs and develop urticaria, nausea and vomiting after eating them. In such conditions, take a capsule of *Benedryl* 50 mg. or any other anti-histamine three times a day and try to avoid eating eggs in future.

Eating eggs when you are not happy is very bad, as, it causes toxic manifestations. *Dr. Hilton Ira Jones says*, 'Remember when you are eating an egg when your mood is not good and you have a row with some one, you are eating the *Toad's stool.* The greater part of the egg is composed of *Colin*, the harmless substance. When a person is angered, the acidity of the stomach increases oxidising the Colin. When oxidised Colin of the egg becomes *Muscarine*, the poisonous substance found in the Toad's stool, that is why the effect is the same'. Also, never eat the rotten eggs and the exposed egg products, because, the egg foods can be easily contaminated by various germs and cause food poisoning. For details, read *Food Poisoning* section in this book. The simple way to find the quality of the egg is to put it in a dish of fresh water, if it sinks, it is good, if it floats, discard it. The spoilage of the eggs is caused by bacterial, contamination and the dissipation of the net work of the fibres attributed to increase in pH of albumin.

Eggs can be preserved in a refrigerator. If you do not have it, immerse them in 10 per cent common salt solution. They can be kept for a fortnight by changing the solution every day. Dr B. Panda of C.F.T.R.I., Mysore has evolved a new method of preserving eggs by washing them with a special detergent and coating them with a chemical oil. A process of preparing *egg-powder* is also discovered by the same scientist.

A raw egg, beaten in *milk*, *honey* and a teasoponful of *brandy* or *port wine* is a very good health giving-tonic for all the weak and under weight persons. It cures hematuria, spermatorrhoea, leucorrhoea etc. Because the egg is free from purine bodies, it can be given in gout and rheumatism. It is a specific tonic for diabetes and common cold. For the children

ıalf boiled egg must be given to help them to grow sturdy, healthy and strong. It is found that in India, the consumption of the eggs is so low that weekly one egg is hardly used *per capita*. The simple reason is, it is dear and most of us are ignorant of its medicinal and health value and there is a social barrier too. Whatever it may be the cause, make sure that you or your children eat one egg at least once in two days. Tell your friends too and be happy with radiant health, happiness and longevity. Excessive ːe of fried eggs is bad for health and causes urinary calculi, ıiliousness, scabies etc.

252. DUCK

Duck: *Batakh* or *Badak:* (Hindi, Urdu, Dak.); *Murgabi:* (Pers.); *Bathu:* (Kan.).

Food Value per 100 g. approximately

Constitution: Hot and Wet.

	Flesh	*Egg*		*Egg*
Protein	22.3 g.	14 g.	Vitamin A	1190 I.U.
Fat	4.2 g.	14 g.	Vitamin B_2	120 mcg.
Calcium	3.5 g.	70 mg.	Nicotinic acid	0.4 mg.
Phosphorus	245 mg.	280 mg.	Iron	3 mg.
CALORIES	**129**	**178**	Carbohydrate	0.7 mg.
			Cholesterol	70 mg.

Medicinal uses

Like chicken and turkey, duck is also reared as a domestic bird for its eggs and flesh, but, it is not so popular as chicken, because of a kind of disagreeable smell and the lack of extractives.

The consumption of duck eggs sometimes causes food poisoning due to *Salmonellae organisms* and high acidity in the system. The high content of the fat in eggs and flesh causes indigestion and increases the blood cholesterol, therefore, it is contra indicated in almost all the heart diseases and rheumatism. Soaking the flesh of the duck for half an hour in curds or butter milk, takes away the bad smell and makes it to cook better.

253. PEACOCK

Peacock: *Mayur* or *More:* (Sans., Hindi, Urdu, Dak.); *Tavoos:* (Arab., Pers.); *Navoolu:* (Kan.); *Mayil:* (Tam.).

Peacock is a national and sacred bird of India. It looks beautiful with its multi-coloured feathers.

Flesh of the bird is very delicious and has some medicinal value in the treatment of tuberculosis, asthma, weakness of the memo: pregnancy and childhood, sex and eyesight. (Use with curds.)

Fat of the bird is applied as a specific remedy for burns and scalds, rheumatism, dislocations, contusions etc. Boiled with *jasmine leaf juice* until the watery portion is evaporated and the same applied over the male sex organ every day for a month, increases its dimension and gives a woody stiffness during errection.[9]

Burnt ash of the feathers of the tail is given with honey to cure nausea and morning sickness. The coloured part of the tail feather is cut into fine pieces and given with jaggery once daily after the 2nd month of pregnancy to have a son.[9] Smoking the feather by burning in a *chilam* is said to cure guineaworm.

Dr N. N. Sen Gupta recommends the use of the peacock egg in the weakness of nerves due to excessive drainage of the semen, weakness of the heart, and stomach ulcers.

The bile of the peacock is also massaged over the shaft of penis in impotency.[9]

254. PIGEON

Pigeon: *Columbia-livia:* (Z.N.); *Kapota:* (Sans.); *Kabutar:* (Hindi, Urdu); *Hamam:* (Arab.); *Parvalakki:* (Kan.); *Pyara:* (Beng.); *Pura:* (Tam.).

Food Value of the flesh per 100 g. approximately

Protein	25	g.	Calcium	13 mg.
Fat	5	g.	Phosphorus	237 mg.
			CALORIES	**137**

Constitution: Hot 2° and Dry 1°.

Medicinal Value

Soup of the flesh of the wild pigeon is very popular in India for all kinds of paralysis, particularly it is very effective for Bell's Palsy or facial paralysis, impotency, protein deficiency, common cold, tuberculosis, asthma, leprosy, dropsy etc.

Fresh blood is also smeared over the paralytic parts and is given to drink with honey or brandy. It is an effective remedy for cerebral embolism, but, is useless for cerebral haemorrhage.

Feeding children with pigeon's egg helps them to talk early.

Dry powder of the droppings of the wild pigeons ground with *honey* is applied over the penis to increase its size and strength (Sadhu Narayan). Breeding wild pigeons in homes prevents infectious diseases, particularly smallpox, insanity and other mental derangements.[9]

255. TITAR

Titar: *Grey patridge, Francolinus pondicherinus:* (Z.N.); *Tittar:* (Sans.); *Titar:* (Hindi, Dak., Urdu); *Tuluk-petta:* (Tam.); *Aldaraj:* (Arab.); *Goujalakki:* (Kan.).

Flesh and the brain of the bird is very delicious and an effective tonic for weak memory, weakness of the sex; of the lungs, of the heart, for tuberculosis, piles, bleeding from the nose, weakness during pregnancy and lactation etc. (Dr N. N. Sen Gupta).

REFERENCES

1. Nonaka, D. R., *et al., J. Agri. Fd Sci.*, 15 (4) 713 (1967).
2. Mecchi, H. *et al., Origin of Hydrogen sulphide in heated chicken muscle, J. Fd Sci.*, 29 (4), 393, (1964).
3. Incze, K., *J. Fd Sci.*, Vol. 4, p. 190 (1967).
4. Fromm, D., *Some physical and Chemical Changes in the Vitelline Membrane of hen's egg during storage, J. Fd Sci.*, 32 (1), 5, (1967).
5. Baliga, B. R., *et al., Some observation on the preparation of chicken essence etc.*, Symposium on proteins, p. 334. Aug. 14-16, (1960).
6. Swaminathan, M. and Bhagwan, R. K., *Our Food*, 5th Edn. (1966).
7. Muzafar Hussain, *Kitab-ul-Mufaradath*, (1956), Lahore.
8. Hakeem Abdul Hakeem, *Bustan-ul-Mufaradath*, (1908), Lucknow.
9. Hakeem Najam Mohammad Gani, *Qhazanathal Advia*, (Urdu), p. 584, (1917).

256. FISH

Fish: *Pisces:* (Lat.); *Machlee:* (Hindi, Urdu, Dak.); *Meenu:* (San., Kan.); *Meen:* (Tam.); *Mahi:* (Pers.).

Zodiac: Pisces.

Food Value per 100 g. approximately (Rohi)

Protein	22.3 g.	Vitamin A	30 I.U.
Fat	1.7 g.	Vitamin B_1	98 mcg.
Calcium	60 mg.	Vitamin B_{12}	11-40 mcg.
Phosphorus	425 mg.	Niacin	3.9 mg.
Iron	1 mg.	Cholesterol	150 mg.
Oxalic acid	0.6 mg.	Digesting Time	4 Hrs.
Purine	300 mg.	**CALORIES**	**98**
Sodium	69 mg.		
Potassium	224 mg.		

Fishes are one of the most wonderful creation of God which live in water. There are about thousands of their kinds ranging from the size of an elephant to a finger nail and all of them are good source of food, rich in protein and fat.

Among these thousands of varieties we eat a few of them like: Cod, eel, haddock, herring, salmon, turbot etc. Even among them some are rich in fat and some are much less. Those that are 10 per cent fatty, are salmon, eel, herring etc., and non-fatty with 1 per cent fat are, cod, flounder, haddock, etc. The fatty fishes are hard to digest and cause high acidity in the system, whereas, the lean fishes are easily digested and are very popular as nutritive food. According to Langworthy, the digestibility of the fresh fish is complete. Dry salted fish causes indigestion.

Fish roe or the milt is equally nutritive and a very good source of protein. According to MaCance and Widdowson, each ounce of it contains about: (Fried Roe.)

Carbohydrate	4.7 g.	Phosphorus	915.5 mg.
Proteins	23.4 g.	Iron	1.5 mg.
Fat	15.8 mg.	**CALORIES**	**74**
Calcium	15.7 mg.		

Fish meal is a good source of fat, vitamins, proteins minerals etc. but, due to the lack of extractives and considerable waste while cleaning makes it unpopular.

The medicinal and nutritive value of the fishes depends on their kinds and the water in which they live. *Charaka* says, 'Different properties have been ascribed not only to different fishes, but of the same fish living and growing in different waters. Fish from different water and sources are also recommended to be taken in different seasons'. (For details read K. M. Nadkarni's Indian Materia Medica).

Among all the Indian fishes, rahu is the best and is more nutritious, but there are some fishes like: *Scioeridus-pama* or Whiting, that is a large ugly looking white fatty fish which causes some skin diseases like leucoderma, scabies etc.

Fish should be eaten with its back bone, because, much of the calcium and phosphorus is deposited in it, therefore, it is particularly useful for rickets, impotency, nervousness, lack of memory, weakness of the eyes, sterility etc. Fish eggs are very nutritive and aphrodisiac. Non-smell fish powder is prepared from fish at C.F.T.R.I. and it is hoped to solve the protein deficiency.

According to Ayurveda, eating fish with curds and egg is contra indicated, because it causes indigestion and vomiting in sensitive persons. Egg also should not be eaten along with curds due to the same reasons. When you are eating fish make sure that you have some malt-vinegar or lime juice with it. It prevents the bad effects of fish meal if used in excess.

Fish is very popular for its liver oil, particularly, Cod-Liver and Shark Liver Oil is extensively used as a medicine.

Cod-liver oil: *Oleum morrhue:* (Lat.); *Machlee ka tail:* (Urdu, Hindi); *Rogan-e-mahi:* (Pers.); *Meenu-enne:* (Tam., Kan.); *Chappe-noi:* (Tel.).

Family: Telivosta.

Cod-Liver-Oil is rich in vitamin A, D, phosphorus, calcium in their natural form. There are number of patents made from pure cod liver oil such as, *Seven Seas* etc. In India, *Shark liver oil* is very popular and it is extracted in the Government Factory of Kerala from the fresh liver by steam filteration at 180°F. Then it is again filtered at low temperature at 42°F and the fat is separated. The oil drawn by this method is golden in colour

and has the good nutritive factors. It is sold in the form of capsules by name '*Adamin*' and each capsule contains about 6000 I.U. of Vitamin A, and 1000 I.U. of Vitamin D, which is standardised with the precision Beckman Photo-Electric Spectophotometer.

Besides these food factors, the oil is rich in fatty acids like: Oleac, palmitic, steric, and 85 per cent fixed oil, acetin, palmitin, cetarin, tri-methylamine, iodine, bromine, sodium, potassium, mohurrine, aciline, butelamine, amylamine, hexylamine, cholestrin, resinous and colouring matter.

The presence of all these chemicals, vitamins, minerals, fats and proteins etc., makes it an excellent medicinal food which is suited to the most delicate stomachs without any bad effects. It is absorbed by the saponification action of the bile, pancreatic juice and intestinal enzymes through the lymphatic channel. During this process, it helps the absorption of the nitrogenous food materials which act as digestive agents during the food absorption.

Taking a Cod liver oil capsule or a tablespoonful of the oil mixed with tomato juice is one of the best and cheapest nature's medicinal tonic for the prevention of tuberculosis, asthma, bronchitis, emphysema of the lungs, infections of the lungs upper respiratory tract, caries of the teeth, bones, cancer and tuberculosis of the bones, rickets, gastric derangements, constipation, weakness during pregnancy and lactation, lack of growth in children, constant loss of weight, weakness of the memory, epilepsy, hysteria, difficulty in concentration, weakness of the eyes, night blindness, habitual abortions, sterility, nervousness, weakness of the heart, pimples, deafness, rhinitis, loss of smell, absence of sperms, all the diseases of vitamin A and D deficiency. Effect of the oil increases if used with fenugreek decoction sweetened with honey.

External application of the oil over the skin also helps its absorption in the blood and is massaged in the rickety children with great benefits. Its regular massage in the rheumatic arthritis is said to have good effect in reducing the inflammation and tenderness, but, it is not effective in gross deformity. Its external massage is effective in toad's skin and herpes. For burns and scalds, slow healing of the ulcers, its dressing is known from time

immemorial. It forms the granulations, prevents the pus formation and heals the ulcers quickly.

In certain conditions like infective fevers, spitting of the blood, gastric catarrh and indigestion, administration of the cod liver or shark liver oil is contra indicated because it causes indigestion.

Some persons are allergic to either fish or fish oils, which can however be prevented by taking any one the antihistamines like: *Benedryl, Avil, Synopen, Longiefene, Sovental, Calciluin,* etc., one tablet three times a day under the guidance of a physician.

Some patent preparations of Cod-liver oil

Adamin (Liquid and capsules), *Adexolin* (Liquid and capsules) *Seven Seas* (Liq. and Caps.), *Sharkoferrol, Ferradol, Halibut liver oil* (Caps.).

257. FROG'S MEAT

Frog: *Rana hexadactyla and R. tigrina:* (Lat.); *Mandooka:* (San.); *Maindook* or *Dadar:* (Hindi, Urdu, Dak.); *Zafda:* (Arab.); *Ghook:* (Pers.); *Kappay:* (Kan.); *Thavalai:* (Tam.); *Chandqa:* (Pashtu); *Dedar:* (Sindhi).

Zodiac: Cancer.

Food Value of frog leg meat 100 g. approximately*

	Rana hexadactyla	*Rana tigrina*
Moisture	97.8	79.6
Crude protein (N × 6.25) per cent	16.4	17.1
Non-protein nitrogen, per cent	0.4	0.4
Lipids, per cent	1.1	1.2
Calcium, mg. per cent	17.0	17.3
Total phosphorus mg. per cent	173.6	169.3
Iron mg. per cent	1.7	2.1

* Dani, N. P., *et al., J. Fd. Sci.,* Vol. III, No. 3, p. 109, 1966.

	Rana hexadactyla	*Rana tigrina*
Thiamine, mg. per cent	0.07	0.07
Riboflavin, mg. per cent	0.15	0.16
Niacin, mg. per cent	1.8	2.00
Lysine, g/16 N.	9.68	9.76
Methionine	3.09	304
Cystine, g/16 N.	1.08	1.04
Tryptophan, g/16 N.	1.15	0.07

Constitution: Hot and Wet 1°.

Although there are many varieties of frogs, but only *Rana-hexadactyla* and *R. tigrina* are two edible species of frogs. Frog's meat is used as a food as well as medicine from ancient times, but it is not a favourite dish in India. Even if I tell you that it is very nutritious you; will not include it in your daily menu. However, leg-meat of frogs is a very favourite and luxurious item of food in Western countries. In other Eastern countries frog-meat is also consumed by poor and tribal people. Frozen frog's-leg meat is one of the export items of India. In April 1967, India exported 39,000 kg. of frog legs valued at $6,000,000 to U.S.A. Nowadays its export is increased to three times more from Mangalore, Cochin, and Bombay where the frog-leg meat industry is located.

In Japan, frog's-meat is used internally as a medicine for tuberculosis. It is given as a tonic to improve general health. Frog contains only 40 mg. of cholesterol, therefore, there is no harm in eating by heart patients.

In India, frog's-meat is minced and its soup is given once daily for 40 days as a cure for syphilis, impotency etc., in folk-medicine. A cut frog is applied over the bleeding wounds to stop bleeding, and heal the wounds. The watery fluid that comes from the two ridges found in between the eyes of a frog is called *Mastey-e-ghook* and is used in aphrodisiac liniments. Fat is also used for this purpose, burns and scalds. Brain of the frog is cooked and used in haemoptysis, bleeding piles etc.

258. CRAB

Crab or **Cancer:** *Scilla sereta:* (Z.N.); *Karkataka:* (Sans.); *Khekda:* (Hindi, Urdu, Dak.); *Sartan:* (Arab.); *Quarchang:* (Pers.); *Nalli* or *Aedikai:* (Kan.); *Nandu:* (Tam.); *Endragapeetha:* (Tel.); *Nhandu:* (Mal.); *Kariachlo:* (Guj.); *Telitoor:* (Sindhi); *Kankara peshi:* (Beng.).

Zodiac: Aquarious.

Food Value per 100 g. approximately

Carbohydrate	3.5 g.	Cholesterol	145 mg.
Protein	8.7 g.	Vitamin A	1291 I.U.
Fat	1 g.	Niacin	3.1 mg.
Calcium	1351 mg.	Digesting Time	3¼ Hrs.
Phosphorus	250 mg.	**CALORIES**	**178**
Iron	150 mg.		

Constitution: Cold and Wet 2°.

Medicinal uses

The use of crab in the form of extract and calcined powder in the treatment of tuberculosis, urinary stones, haemoptysis, rickets, general weakness during and after pregnancy was discovered by many ancient Mohammadan physicians. Even today, *Qhurs-e-Sartan* is a very useful Unani preparation. Indian old folk also knew about the nutritive and therapeutic value of crab-soup during and after pregnancy, fevers, and general weakness.

The chemical analysis of crab-soup reveals, that it is a treasure house of highly assimilable calcium and iron.

A cupful of extract prepared like mutton extract or by simply boiling a handful of *river crabs* worth 25 paise supplies as much *Calcium* and *Iron* as by eating *any one of* the following luxury items of food approximately.

Whole milk (fresh cow's)	4½ cupful	Almonds	600 g.
Egg-yolks	of 9 fresh hen's eggs	Mutton	600 g.
		Liver (Sheep's)	12 kg.
Sardine fish	**500 g.**	Apples	**13 kg.**

Since there is a very high concentration of *iron*, *calcium* and *vitamin A*. The author tried the extract of crab in various indications of the above mentioned minerals and found gratifying results. Particularly giving a cupful of crab extract once daily during the treatment of tonsillitis, adenoids, tuberculosis, bronchitis, asthma, haemoptysis, lung abscess, emphysema, kwashiorkar, rickets, anaemias of varied causes, impotency, urticaria, hepatitis, cirrhosis of the liver and neurasthemia is very effective. It was amazingly noted that regular use of crab prevents the biochemical changes that are commonly found in an aged person. During 10 years period the author studied a group of more than 80 old patients of both sex. The most striking effect of crab-extract was a significant control of stress and blood-cholesterol in the hypertensive patients. In the control group, though they had a similar type of diet without crab; the signs of hypertension and hypercholestrolaemia was significantly noted, with the gradual appearance of wrinkling, mental irritability, changes in voice, general weakness associated with insomnia—whereas, the group who was taking a cupful of crab-extract once in 2 or 3 days remained much less free, from such changes during the same period. In 10 years study 20 patients of the control group and 2 patients of the crab-extract receiving group died at the age of 70 and 80. The monthly checkup of the remaining old masters who are still healthy after 70 and 80 years, significantly shows that there is a definite influence of the crab-extract over the ageing mechanisms. Convinced of this fact the author believes that if ageing process is controlled by *central nervous system*, *stress*, *muscular work*, *balanced diet* and *calciphylaxis*,[1, 2, 3, 4] here is a solution in the form of crab-extract which tones up the nervous system by supplying pure iron, calcium and vitamin A that is very much needed for the rich blood, for a man who does some manual work as a routine. The constant work of the muscles keeps the nervous system strong and in all such healthy persons mental stress is very less common. It is proved by a team of researchers that stress plays a major role in elevating *blood-cholesterol* which is also caused by excessive consumption of fatty foods.[2, 3, 4] Cholesterol is found to play a lot of mischief in the circulatory system causing many serious diseases shortening the life. The secret of many grand old men who have celebrated their 120 birthdays lies in their food habits, carefree—tranquil

simple life with a routine daily work. The grand age of *Shirali Muslimov* the oldest living Russian on the earth is 163 years in 1969. He has been working throughout his entire life and now of course he begins his day with doing some work. Why only Russians, there are many centurarians in America, India etc. The secret of longevity in India has excelled the whole world as a result of the practice of *yoga* that is the *food for soul.* The author believes that without the proper nourishment of the soul scientific dietetics will never increase health and longevity.

REFERENCES

1. Aman, *Clinical study of crab extract in practice of medicine*, F. No. 3. O.P.D. I.A.H., (1957, 1967).
2. Prof. Pikhelauri and Prof. Pavlov., *Geriatrics and Gerontology*, Soviet Feature, The Health, Vol. 44, p. 202, No. 9. (1966), Madras.
3. Stewart Wolf *et al.*, *Stress and Cholesterol*, The Health, Vol. 40, p. 271, No. 12, (1962), Madras.
4. Gordon, H., *Dietetics for the old and aged people*, S. Afr. Med. Journal, 1.2.1964, The Health, Vol. 42, p. 233, No. 10 (1964).
5. Hans Burno Selye. *Ageing and Calcium Metabolism Linked in Research*, J.A.M.A. Dec., 1962 Probe, Vol. 11, No. 6, p. 252, Aug. (1963) Bombay.

259. PRAWN

Prawn: *Palaemon curcinus:* (Z.N.); *Jhinga:* (Hindi and Urdu); *Samak-rubiyan:* (Arab.); *Era:* (Tam.); *Royya:* (Tel.); *Chemmeen:* (Mal.); *Jinga:* (Mar.); *Chingudi:* (Ori.); *Bagda chingri:* (Gen.).

Zodiac: Libra.

Food Value per 100 g. approximately

Carbohydrate	1.4 g.	Vitamin A	Trace
Protein	20.5 g.	Vitamin B_1	391 mcg.
Fat	0.3 g.	Vitamin B_2	98 mcg.
Calcium	87 mg.	Niacin	4.2 mg.
Phosphorus	238 mg.	Digesting Time	4 Hrs.
Iron	0.7 mg.	**CALORIES**	**84**
Cholesterol	150 mg.		

Prawn is a good source of protein but it is hard to digest. Fried prawn causes high acidity in the stomach. Steamed cooked prawn is useful for tuberculosis, weakness of the nerves, piles, etc. It should be eaten with some papaya to digest well.

PART XI

MISCELLANEOUS FOODS

260. ARECA NUT

Areca or **Betel nut:** *Areca catechu:* (B.N.); *Suprika:* (Sans.); *Supiyari* or *Chhaliya:* (Hindi, Urdu, Dak.); *Fufil:* (Arab.); *Pupil:* (Pers.); *Pakku:* (Tam.); *Vakka:* (Tel.); *Adike:* (Kan.); *Adaka:* (Mal.); *Gua:* (Ori., Beng.).

Family: Palmae.

Zodiac: Capricorn.

Food Value per 100 g. approximately

Carbohydrate	46.2 g.	Iron	1.4 mg.
Protein	4.2 g.	Vitamin A	Trace
Fat	4.2 g.	Digesting Time	3 Hrs.
Calcium	48 mg.	**CALORIES**	**245**
Phosphorus	119 mg.		

Constitution: Wet and Dry 2°.

Medicinal Value

Areca nut Palms are largely cultivated in the form of plantations for the valuable fruits. Fruits bear in bunches and when ripening they take a yellowish-orange colour. They are cut into two halves and a silvery hard kernel is removed from the fibrous covering. The kernel is cut into crescent shape thin slices, boiled with some red colour and dried to make it less astringent and bitter. Unboiled dry kernel is also sold which is called *chhaliya.*

Chemical Composition

Areca nut is rich in volatile alkaloid *arecoline* (*methyl-aracaidine* $C_7H_{11}NO_2$) which forms crystallizable salts, *aracaidine*, *arecaine*, *guvacine* and *choline*[1].

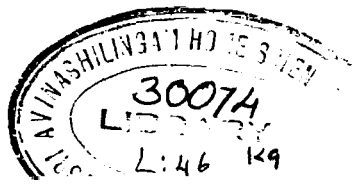
Areca nut is largely used as a masticatory and chewed with betel leaves and little slaked lime. It develops a red colour and most of the Indians are addicted to this habit. Chewing betelnut sweetens the breath, removes bad taste from the mouth, strengthens the gums, and checks perspiration. Powder of the nut 4 to 6 drams is given with *milk* or *honey* to expel roundworms. Powder is daily used as a home remedy to cure dysentery, diarrhoea, urinary stones and other disorders of urinary tract, spermatorrhoea, heart burn, morning sickness etc. *Majoon-e-supari pak* is a very renowned Unani medicine used to cure leucorrhoea. Dusting the areca-powder over cut wounds stops bleeding due to its astringent action[2,3].

Decoction of the nut is gargled for ulcerative stomatitis, sore throat, tooth ache, pharyngitis etc. Washing the wounds and ulcers with the infusion of the nut prevents sepsis and heals them quickly. It is found that the aqueous extract of betel nut inhibits the growth of *Staphyloccoci* and *Streptoccoci*[4].

Chewing betel nut in excess causes anaemia, jaundice and oral cancer.

After the researches of ANDERSON, HOLT and HOLZ on activated charcoal, the author studied the combined effect of activated charcoal of *Arecanut* and *Turmeric* prepared by charring both the ingredients in a closed earthen vessel. A teaspoonful of the powder is given thrice daily with water and found excellent results in aconite, atropine, barbiturates, camphor, canthrides, cocaine, delphinium, digitalis, ipecac, methylene blue, morphine muscarine, nicotine, opium, oxalates, parathion, penicillin, phenolphthalein, phenol, quinine, salicylates, stramonium, sulphonamides, veratrum, salts of arsenic, silver, mercury, lead and antimony, iodine, potassium permanganate and phosphorus poisoning. It can be given as a substitute for *Universal antidote* in the above said emergencies. One may object about the presence of *tannic acid* that causes hepatotoxic effects in patients who are predisposed to liver disorders. In this case, the powder of the burnt areca nut does not contain any active tannic acid, and can be used safely without *Universal antidote* that contains activated charcoal 2 parts magnesium oxide and tannic acid each 1 part.

Activated charcoal of *areca nut* and *turmeric* 10 to 30 grs. given with *butter-milk* acts excellently in curing dysentery, diarrhoea, heart burn, dyspepsia, jaundice, excessive passing of flatus


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either up or downward, flatulent colic, etc. It can be given even to infants without any fear in 5 to 10 grs. dose.

Powder of activated charcoal of areca nut 1 teaspoonful mixed with *magnesium trisilicate* 1, teaspoonful or *Pepsemar* (Dyes) 2 tablets thrice daily an hour after food is used with gratifying results in gastric ulcer. It neutralises the hyperacidity and absorbs the gases in the gastro-intestinal tract[4]. *Ultracarbon* (E. Merc), *carbindon* (Indon) etc. are some of the patents of activated charcoal.

REFERENCES

1. B.P.C., p. 143. (1911).
2. Dastur, J. F., *Medicinal Plants of India and Pakistan*, p. 22 (1965).
3. Noor Karim, *Magzanul advia*, p. 70, (1917).
4. Aman, *Betelnut and its various effects*, Research Record No. 131, I.A.H., Mysore, (1957-1968).
5. Anderson, A. H., *Acta pharmacol.*, Toxicol., 2, 69 (1946).
6. Holt, L. E. and Holz, P. H., *J. Paed.*, 63, 30, (1963).
7. Picchioni *et al.*, *Toxicol. Appl. Pharmacol.*, 8, 447, (1966).

261. ARROWROOT

Arrowroot: *Maranta-arundinacea:* (B.P.); *Tikora:* (Hindi); *Kuva hittu:* (Kan.); *Arthimava:* (Tam.); *Koova:* (Mal.); *Tava keera:* (Mar.); *Tikkur:* (Beng.).

Family: Marantaceae.

Food Value per 100 g. approximately

Carbohydrate	83.3 g.	Phosphorus	21 mg.
Protein	0.2 g.	Iron	1 mg.
Fat	0.1 g.	Digesting Time	2 Hrs.
Calcium	10 mg.	**CALORIES**	**332**

Constitution: Cold and Dry.

Medicinal value

Arrowroot plants grow in West Indies and Brazil. In India, the roots of *curcuma augustifolia* are washed and ground into a fine paste. The mass is stirred in water and allowed to stand

until the heavy particles are settled down. Then, the clear fluid is decanted and the starchy part is dried and packed in air tight tins. Conjee prepared from arrowroot is a valuable food for invalids suffering from gastro-intestinal diseases.

262. BETEL LEAVES

Betel Leaves: *Piper betel:* (B.N.); *Tambul:* (Sans.); *Tambul* or *pan:* (Hindi, Urdu, Dak., Pers.); *Fon:* (Arab.); *Villayadelay:* (Kan.); *Vettilai:* (Tam.); *Naga-valli:* (Tel.); *Nagar-bella:* (Guj.).

Family: Poperaceae.

Zodiac: Leo.

Carbohydrate	5.4 g.	Vitamin B_1	70 mcg.
Protein	3.1 g.	Vitamin B_2	32 mcg.
Fat	0.8 mg.	Niacin	0.7 mg.
Phosphorus	11 mg.	Vitamin C	4 mg.
Iron	5.4 mg.	**CALORIES**	44
Vitamin A	9441 I.U.		

Food Value per 100 g. approximately

Constitution: Hot and Dry.

Medicinal Value

Piper-betel is a perennial dioecious slender aromatic creeper extensively trailed over the trees of *Erythrina suberosa* (*Pangra* in Hindi.) It is cultivated all over South and other damper parts of India, Ceylon and Malaya. The leaves are smooth, glossy, long stalked, entire, cordate and alternate at the nodes. Apex of the leaves is prominently pointed, ribs 5-7 arising from the bare. Inflorescence a closely meshed spike that emerges from the base opposing the leaves. Male spike 3-6 inches and female spike 5 inches long, $\frac{1}{2}$ inch thick. Flowers are small, bracteate, usually bisexual or sometimes unisexual. Fruit is a small drupe often described erroneously as a berry[1, 2].

Among the many sacred and social customs, the use of *pan* as a beauty aid, as a token of bondage, of respect and good wishes, and as an humble homage to various Deities exists up-to-date from more than 2500 years. It is believed that the cultivation of betel leaves took its birth in South India and spread to various parts of India and Far East[9].

One of the *Naurathans* of *Vikramajeeth's* court *Kalidas* sang about *pan*. A chinese traveller by name *Iering* described the custom of chewing betel leaves was considered as sacred during the time of BUDHA. *Iben-e-Batoota* a very famous Persian tourist who visited ancient India and other Far East countries described in his travelling book about the custom of chewing *pan* in India in 1200 A.D. Many Holy saints like, *Qhaja Syed Mohammad Hassani Gesudaraz* of Gulbara, *Shankrachariya* etc., were also used to betel leaves. *Queen Noor Jehan* introduced the addition of lime in *pan*. Before that only *catechu* was used to create a delicate crimson colour[9].

Pan is usually chewed in the form of a *beeda* having a mixture of *slaked lime, betel leaves, areca nut, tobacco, cardamom, clove, mace, nutmeg* etc. It can still be made luxurious by adding *saffron, gold and silver leaves, musk* etc., but, only kings and very rich can afford to such *beedas*. It is told that His Highness the Nizam of Hyderabad used to spend about Rs. 1000, per *beeda!* If you can afford, try once. The poor only depend on some betel leaves, catechu, areca nut and lime.

Betel leaves contain antiseptic and aromatic volatile oils like: *Chavibetol, Chavicol* and *Cadinene*. The combination of areca nut and lime intensifies the above mentioned factors. Therefore, chewing betel-leaves is found to be effective in preventing dental caries, foul breath, etc. The astringent effect of the areca strengthens the gums and prevents early damage of the teeth[3]. Betel leaves chewing increases the saliva and aids carbohydrate digestion due to its diastase enzyme. It prevents the passing of immature hookworms from the lungs into stomach due to constant expectoration and spitting[8]. The absorption of calcium ions is easier in the buccal cavity, therefore, one feels a kind of warmth after chewing betel quid. It is therefore regularly used in cold places and after childbirth to keep oneself warm. The volatile oils have also some useful sedative effects on the sexual and cough centres, hence, chewing betel leaves often imparts an

aphrodisiac, expectorant and anti-tussive effect. Betel leaves paste mixed with *coconut oil* is applied to scalp prevents dandruff and lengthens the hair[9].

These are some of the uses of betel leaves if chewed once or twice a day and the mouth is washed immediately after spitting the fluid in some tin containing Dettol or any other antiseptic. But, in persons who are suffering from high blood pressure, cardiac ischaemia, gastro-intestinal disorders, chewing of betel leaves causes severe complications. One of the author's patients who was recovering from congestive heart failure died within minutes after chewing the betel leaves during one religious function in spite of being warned about the dire consequences. The calcium ion in such digitalised patients is always fatal. Sometimes if one chews betel leaves for the first time, feels giddiness and experiences a sharp stabbing pain in the chest. This can be remedied by sucking a crystal of *common-salt* or some *sugar*.

It is estimated that about 50 crores of men and women indulge in chewing betel leaves. Since most of them are ignorant of personal and social hygiene, they spit the tainted saliva anywhere they like. This bad habit plays a major part in spreading a number of infections and spoils the cleanliness of the place.

After 10 years of investigation in these regular betel chewers the author confirms that excessive chewing of betel leaves causes oral cancer and excites malignancy if it is already there. Let us therefore, know something about *Cancer* in general and *Oral Cancer* in particular in detail.

Oral cancer and betel leaves chewing

Although cancer is known from the time of *Glen* who described it as an ulcer or a tumour which does not heal in spite of treatment. No one knows why he selected the name of a crab. Perhaps, the clinging nature of the crab similar to the persistence of the growth of cancer might have drawn his attention. Anyway, even today, in spite of our modern knowledge of medicine, surgery, and physiology, we are not sure of the exact cause of cancer and its cure in advanced stage.

What is cancer ?

You are told in the beginning of this book that our body is made up of different kinds of cells and each type has a particular

function. In a normal body, the cells live up to a certain period and are constantly replaced by the new cells. In certain cases, the cells behave abnormally and cease to function and cling to their original place instead of being cast off. Due to this, the piling of the useless cells begins to take place resulting in a lump that resembles to a cauliflower. The useless cells take a different shape resembling to spindles and are deprived of manufacturing their own R.N.A. (Ribonucleic acid) the life material of each and every cell. In this condition, they behave like parasites and try to invade the other healthy cells to get their food. But as long as there is sufficient body resistance, the healthy cells form a defence against these abnormal cells and keep them where they are. However, this resistance does not last long, because, in the presence of abnormal cells, the function of the other healthy cells looses its balance and they finally yield to these parasite cells which begin to invade other healthy cells along with the blood stream in the form of lumps. The spread of abnormal cells from their original place is called *Metastasis*, and these cells are known as cancer cells[7]. When once this condition occurs it becomes extremely difficult and mostly incurable.

What causes Cancer?

The abnormality of normal cells takes place due to various factors, but we are not certain of one exact cause. However, after years of research and experience, scientists are certain that any constant chemical or physical irritation of the normal cells, is the fundamental factor that helps them to become cancer cells. Cancer cells may be formed in any organ and they are identified by their localisation. For example: cancer of the epithelial cells of skin, glands, membranes is termed as *Carcinoma.* If these cells are found in bone they are identified as *Osteoma* of the muscles, *Sarcoma* of the pigment cells of the skin, *Melanoma* and of the blood *Leukaemia*, and these growths are *Malignant.* There are other growths of cells too, but they are of their own kind. These lumps are called *Benign* that means the tumour is self limited in growth[7].

Which are the most common sites of cancer?

According to American Cancer Society's findings, the following organs become the victims of cancer cells. Nearly 50 per cent

of the cases of cancer are detected in the gastro-intestinal tract notably the stomach. The uterus in women and prostate gland in men come next. The breast is the third common area that comes under the influence of cancer cells. The other organs like mouth, tongue, throat, lungs, liver, gall-bladder, skin, the brain etc., also get affected by the cancer cells.

Who gets cancer easily?

Cancer is a disease of middle aged persons above 40, but there is an evidence of its presence even in children and young adolescents under 21. It is not infectious but a familial disease. Dr. D. M. Foubister of London the discoverer of *carcinocim* claims that cancer can be prevented by using *Cancer Nosode* in children born to parents suffering from cancer. For details write to Dr. D. M. Foubister: Dean, Postgraduate school of Homoeopathy, Blooms Burry, London, WC 2.

Is cancer curable?

Yes! all types of cancers can be cured if they are detected as early as possible, but unfortunately, very rarely this occasion comes, because, all cancers in the early stages are symptomless. Unless there is some discomfort, a person never thinks of consulting a doctor. Particularly in our country, approaching a doctor in time is out of question. After trying many home-remedies the ignorant victim consults the quacks, who in hope of getting some money promise to cure the ordinary ulcer and use some herbs and counter irritants which on the long run deteriorate the condition. When the patient starts suffering from pain, and if he is lucky he consults a local doctor who being helpless advises him to go to bigger hospitals where there are facilities to detect and cure cancer. Does all the patients take the advice of the wise doctor? I doubt, only few go and come home with a great disappointment that they are incurable and wait desperately in agony to welcome death.

How to detect early cancer ?

If you are wise, get these lines memorised and teach your children also.

1. Every man above 40 should have a yearly medical checkup even though there is nothing alarming.
2. Do not neglect an ulcer or a wound that refuses to heal in due course after proper treatment.
3. If you suffer from hoarseness that does not clear in two weeks consult an E.N.T. specialist immediately.
4. Any persistent bleeding from any part of the body.
5. Any persistent swelling or a painless lump particularly in the breast.
6. Any growth that resembles like cauliflower.
7. Persistent loss of weight.
8. Persistent difficulty in swallowing and indigestion.

These are the early signs and symptoms of cancer. If you are bold and wise, consult a surgeon and the chances of cure are great.

Since we are concerned with oral cancer, let us discuss something about its relation to *betel-chewing*. Scientists have been in constant search to find the exact cause of mouth cancer. It is found that in the mouth a number of substances and conditions can set up constant irritation. Among them, decayed and jagged teeth, tartar deposit on the teeth, faulty fillings, poorly-fitting dentures, excessive habit of drinking hot liquids etc., are some of the most common factors that cause cancer.

How betel-chewing causes cancer?[2]

The author examined more than 2000, persons during 10 years and divided them in 3 groups namely: *A*, *B*, and *C* as shown in the table below:

No. of patients	Males	Females	Age	Frequency of chewing betel leaves
1,000 A	700	300	20–60	2–5 times daily 10% with tobacco
700 B	525	175	30–70	5–15 times daily 35% with tobacco
560 C	400	160	40–80	10–25 times daily 75% with tobacco

Clinical findings in Group A

No damage of any kind either to the gums or teeth. However, the teeth were slightly stained but healthy even in late fifties. General condition of the majority of the patients was healthy except marked anaemia in females aged between forty and fifty years. About 10 per cent of the labourers chewed tobacco.

Group B

Majority of the male patients had teeth deformity with ebony black stain. Loss of the molars was more marked than the other teeth. Teeth were slightly loose, and the pigmentation of the mucus membrane was pinkish-yellow, sensitive and signs of papillomatous growth opposite to the molar teeth were found in 25 per cent of males and 10 per cent of females aged between 35 and 55 years. The gums were painful and contained tartar deposit on the incisors more inside than the out. Moth eaten gums with offensive pus was common in persons who had signs of papillomas. Surprisingly, there was no dental caries in any of these patients. 35 per cent of the patients chewed tobacco.

Most of the female patients were anaemic having various gastro-intestinal disorders like flatulence, constipation, dyspepsia. Anaemia was marked having 50 to 75 per cent haemoglobin. Males had anaemia, but they complained more of joint pain and insomnia. Two per cent of the females had thyroadenomas[2].

Group C

All the clinical findings of **Group B** were present in this group and 45 per cent of males and 15 per cent of females had malignant ulcers in various stages. Those who held the quid with tobacco while sleeping for more than 5 years were really serious with advanced cancerous growth. Most of the unfortunate patients were advised by their doctors, but they could not get proper treatment due to poverty and lack of medical facilities.

The factors that cause cancer by chewing betel leaves

1. Excessive betel leaves chewing, first, damages the gums by the corrosive action of slaked lime. Due to this, the

teeth become deformed and maladjusted. The defective position of the teeth come in contact with the inner cheek and due to constant friction, ulcers are caused.

2. The constant contact of the quid containing *slaked lime*, *areca nut*, *tobacco* and *betel leaves* now begins to play in two directions. One is direct irritation of the ulcers and the other is on the gums by making more retractions helping the pus causing germs to harbour resulting in pyorrhoea. It is an erroneous advice given by some of the dental mechanics who pose as qualified dental surgeons that, 'chewing betel leaves prevents pyorrhoea.' Actually it causes the incurable pyorrhoea. If chewing betel leaves is not given up and treated properly the ulcer becomes malignant.
3. Chewing betel leaves 3 to 10 times daily for more than 2 years regularly, develops addiction like alcohol or opium. It is therefore, the persons fail to give up the bad habit even if they are told about the fatal consequences.

How to prevent and cure oral cancer

Oral cancer can be prevented by avoiding the causative factors that are already described. Regular dental checkup by a qualified dental surgeon prevents many diseases of teeth and gums including oral cancer.

In early stages, treatment of oral cancer is 90 per cent successful if treated surgically or by radio-isotopes. But, in advanced stages with metastasis, no hope of complete cure is possible. It is during this stage, the patients seek treatment and return disappointed. Author is optimistic that oral cancer can be prevented by substituting a substance for slaked lime. The detail report will be published after this investigation is completed.[2]

Other uses of betel leaves

A teaspoonful of the leaf juice mixed with *honey* given thrice daily is a medicine for bronchitis, hoarseness, etc.

Fomenting leaves by smearing some *castor oil* over the abdomen expels the distended gas and cheers the crying infants due to flatulent colic. Inserting the stalk smeared with *castor oil* in the anus, relieves constipation and helps the child to pass the

stool without purgatives. It should be tried only when the child finds difficulty in passing stool or is having convulsions due to high fever caused by constipation. Its regular practice forms a habit in the children.

Few warm drops of the juice are instilled thrice daily in ears having the fungus infection with excellently good results. Application of the juice over the bleeding wounds stops the bleeding and prevents sepsis.

Syrup of the leaf juice 1 teaspoon given thrice daily is a cheapest substitute for vitamin A and calcium tonics.

REFERENCES

1. Balchandran, N. S., *Cancers of the Oral Cavity*, The Health, p. 272, Vol. 41, No. 12, (1963).
2. Aman, *Clinical investigation of oral cancer in betel-leaf chewers*. F. No. C.A. 132, (1957-1967).
3. Mathir Bin Mohammad, *The Betel-leaf Goes—Tooth Decay Increases*, The Health, p. 254, Vol. 43, No. 11, (1965).
4. Col. Ralfph, W. Mendelson, *Betel-nut Chewers Cancer*, U.S.A., A.F. Med. J. Indian Dental Review, June 1952, The Health, p. 191, Vol. XXX, No. 8, (1952).
5. The Oriental Watchman, *Cancer and Betel chewing*, The Health, p. 191, Vol. XXIX, No. 8, (1951).
6. You and Your Health Service, *The Fear of Cancer*, lesson No. 1, Oriental Watchman, P. Box 17, Poona 1 (1964).
7. Justus, J. Schifferes, *The Family Medical Encyclopedia*, p. 71, Pocket Book INC., U.S.A. (1964).
8. Dastur, J. F., *Medicinal Plants of India and Pakistan*, p. 131, (1965).
9. Hakeem Abdul Rahaman, *PAN, Shabistan, Urdu Digest*, p. 61 April (1968), Delhi.

263. COCOA

Cocoa: *Theobromatus semina:* (B.N.).

Family: Sterculiaceae.

Food Value per cup of cocoa (milk 8 ozs, cocoa 6 g. sugar 15 g.)

Carbohydrate	26.2	g.	Phosphorus	0.20 g.	
Protein	7.2	g.	Vitamin A	408 I.U.	
Fat	8.8	g.	Digesting Time	3 Hrs.	
Calcium	0.27	g.	**CALORIES**	**213**	

Medicinal Value

Cocoa trees are cultivated in Brazil, West Indies, Java, Ceylon and India for the very valuable fruits that are used in the preparations of many food beverages and sweets. The fruits resemble like a vegetable marrow or cucumber with ridges over them. They grow on the stem of the tree like jack fruit and contain a fleshy pulp in which several seeds are embedded. The seeds are separated from the pulp after the fruits are mature and accumulated in heaps for several days to ferment by the action of the yeast and sunlight and help the absorption of vitamin D.

When the pulp becomes loose and alters the bitterness of the seeds changing them into dark colour, they are then roasted to render them brittle and loosen the husk. This process helps the seeds to separate as *cocoa nibs*[2].

The nibs are exported and are used in the preparation of *Chocolate.* They are pressed in hot rollers to separate the fat (cocoa butter) and then the residue is ground into fine impalpable powder of light brown colour having a very pleasant aroma. *Cadbury's chocolates* and *Drinking chocolate, Bournvita* are some of the very famous preparations of *cocoa.*

Chocolate is prepared by mixing the cocoa powder with cocoa butter, sugar and vanilla flavour. Good chocolate is soft and melts in the mouth. Author found that children who ate chocolates regularly did not show any signs of dental caries. Whereas, chewing ordinary cane sugar sweets has a deleterious effect on

the teeth. Research is in progress and the author will report in detail after some time. However, excessive use of chocolate causes thirst and may produce urinary calculi.

Chemical Composition of Cocoa

The chief chemicals that are found in chocolate are *Theobromine* and volatile oil *Theobroma.* They resemble to *caffeine* of coffee and has a stimulating effect on the nervous system, but is milder than caffeine. It acts more on the muscles and kidneys and causes more excretion of urine by stimulating the renal epithilium. It is therefore, drinking a cup of cocoa once daily is recommended in general dropsy caused by congestive heart failure, cirrhosis of the liver etc. It is contra indicated in acute nephritis and renal failure.

Cocoa contains 2.5 to 3.5 mg. of magnesium and iron per 100 g. Therefore, combined with milk is a nutritive beverage better than tea or coffee.

REFERENCES

1. Swaminathan, M. and Bhagawan, R. K. *Our Food,* p. 71, (1966).
2. Hutchisons, *Food and Principle of Dietetics,* pp. 476-78, (1948).
3. *B.P.C.,* p. 1031 (1911).
4. Aman, *Effects of Chocolate in dental caries,* F.N. 170. I.A.H. Mysore (1965-68).

264. COFFEE

Family: Rubiaceae.

Zodiac: Sagittarius.

Food Value per cupful of coffee having 6 ounces decoction, 2 ounces milk and 15 g. sugar.

Carbohydrate	17.8 g.	Phosphorus	50 mg.
Protein	2.2 g.	Vitamin A	102 I.U.
Fat	1.8 g.	Digesting Time	3 Hrs.
Calcium	68 mg.	**CALORIES**	98

Constitution: Hot and Wet 2°.

Physiopharmacology and Therapeutics

The value of coffee was known by the observation of shepherds. They observed that the sheeps and goats behaved in a strange way after eating the crimson red berries of the small shrubs which grow on the steep slopes of a hill. This phenomenon was reported to the priest of a Mohammadan monastery in *Shehoded* in Arab *Yemen.* On hearing the strange news the abbot of the monastery gathered the berries and prepared a brew which he drank with his friends and felt a really strange feeling of liveliness associated with invigorating freshness, clarity of perception and semi-intoxication. From then onwards the usefulness of coffee in the form of *Qahvah* that is called *the Wine of Islam!* is in practice.

Today, coffee plants are cultivated in Brazil, Arabia and South India and produce one of the most paying commercial crops in the world. About 76,000 tons of coffee was produced in India during (1967-68).

It is indeed a great fascinating story that lies behind the introduction of coffee in South India. A great and Holy Muslim saint by name *Hazrath Syed Sha Jamaluddine Moggribi* (1600 A.D.) was living on the hills of *Chandragiri.* This place is now known as *Baba-Budhangiri hills.* It is 17 miles from *Chickmaglore town in Mysore State* and is a tourist and holy hill station having a fine motorable road up to the top. The holy saint, after defeating a pallegar decided to go to Holy City of Mecca on a pilgrimage.

He announced his departure and his followers, both Hindus and Muslims gathered to take his blessings. After blessing them the holy saint disappeared in the cave that is still on the top of the hill. His devotees watched and waited at the mouth of the cave for many months till the holy sage reappeared from the cave. It was indeed a very rejoicing moment for them to see their Guru once again and hear the good news of his bringing from the Holy land a most thrilling gift of seven seeds of a wonderful plant which would serve as a *Food and Drink* to them. The seeds were planted on the slopes of the hills and from there alone, coffee spread to many other parts like *Nilgiri hills*, *Coorg* etc. Even today Coffee from Baba Budhangiri hills is considered to be the best. It is erroneously believed that *Hazrath Baba Budhan Jan-e-Pak* was the saint who brought the Coffee seeds. This Holy Saint lived with *Hazrath Dada Hyath Qhalandar* or *Natharwali alias Tabal-e-Alam* (670 A.D.), whose shrine is in *Tiruchirapalli* in Madras State. Actually coffee was brought by *Sha Jamal Uddine* and not by *Baba Budhan.*

Coffee plants are grown mostly in the hilly regions where the rainfall is between 60-90 inches. Coffee plants grow luxuriously in the acidic loam with pH of 6.0, high concentration of potash and plenty of humus.

Usually coffee plants are grown in two well known species namely: *Coffee Arabica* and *Robusta.* The plants are cultivated under shade of other trees to prevent the extra photo synthetic activities of the plants. Physiologists believe that partial shading the coffee plants increases the coffee crop. However, it is a matter of contraversy because, almost one-half of the coffee in other countries is grown in full sunlight without having a significant change in quality and quantity.

The most important thing in coffee plant cultivation is the testing of the soil for its potash content and application of artificial fertilizers in different periods from the nursery. For the nursery N.P.K. (Nitrogen, Phosphorus and Kalium or Potash) in the ratio of 10:15:10 should be used in a small handful mixture around the seedlings four times a year.

After the transplantation N.P.K. should be used in the ratio of 10:10:10 or 10:5:10 at the rate of 1500 lb. per acre in four equal parts.

After the plants are three years old and start bearing, fertilizers in the form of N.P.K. at the ratio of 10:5:20 at the rate of 500 lb. per acre should be used yearly four times. The first application is prior to blossom development, when the plants are semidormant. The second application is generally a month after the development of the blossom. This is usually done to ensure the fruit setting. The third application should be after 3 months when the cherries are developing well. The final application of the fertilizer should be just prior to harvesting. This is done to help the plant to store enough food for the forthcoming crop. This method of coffee cultivation is found to produce 288 to 713 lb. of cherries per acre. However, for more details regarding manuring and pest control of coffee plants write to *C. O. Mathew, Dy. Chief Agronomist, Fertilizers and Chemicals Travancore Ltd or 44/2 Dickenson Road, Bangalore 1.*

Difference between C. Arabica and C. Robusta

Although there are other species of coffee like: *C. Excelsa, C. Liberica* and *C. Canephora; C. Arabica* and *C. Robusta* are very popular brands that are extensively cultivated in South India.

C. Arabica

The plants of *C. Arabica* are medium in size having smaller leaves. It was the only known variety for the commercial production before *C. Robusta.* The plants grow well between the altitude of 2-5000 feet and bear fruits in 2-3 years. About 600-800 plants can be planted per acre. The cherries are susceptible to rust and the *Fansarium Root Rot* is common in the plants.

The seeds are long bluish-grey in colour. The number of seeds per pound is about 1200. The yield is 288 lb. per acre. The average *caffeine* content is 1.47 per cent.

C. Robusta

The plants of *C. Robusta* are smaller than *Arabica.* The leaves are elongated and also bigger than the former kind. The plants grow well at the height between 600-2400 feet and bear cherries in 3 to 4 years. About 400-440 plants can be planted per acre. The cherries are smaller than C. Arabica. They are

broad beans having greenish colour. If the harvest is good, about 713 lb. of coffee beans can be produced from an acre. The number of seeds per pound is 1600 approximately. Robusta coffee seeds contain 2.2 per cent of *Caffeine* and they are resistant to rust and *Fansarium Root Rot*. This variety of coffee is inferior to *C. Arabica*.

Chemical composition of coffee per cent

	C. Arabica	*C. Robusta*		*C. Arabica*	*C. Robusta*
Moisture	2.5	2.6	Tannins	2.33	3.18
Crude protein	13.6	14.9	Water extract	29.3	29.6
Crude fat	14.6	9.6	Total ash	4.2	4.45
Caffeine	1.47	2.2			

(By courtesy Coffee Board, Bangalore)

There are two methods of processing the coffee—*The plantation* or 'parchment coffee' and *The Cherry Coffee.*

The plantation coffee is processed by depulping the berries. Then they are fermented,washed and dried. This type of coffee is superior to the other.

The Cherry Coffee is processed by simply drying the beans in the sun. The proper blending of both the types of coffee will give a delicious drink without being too expensive[3].

Coffee can be easily adulterated with roasted date seeds, peas, tamarind seeds or shell of coffee husk etc. This adulteration can be detected by a simple test discovered at C.F.T.R.I., Mysore: A quarter teaspoon of the coffee powder is boiled in a cupful of water. After the powder has settled pour away the water. Allow the powder to dry and then sprinkle it on a white blotting paper so that each grain is separate. A solution of 2 per cent *caustic soda* is gradually dropped on the paper so that it spreads evenly on the coffee powder. If the coffee powder is adulterated with date-seeds or tamarind seeds, a pinkish or reddish marks will appear on the paper after five minutes. The testing kit is available at C.F.T.R.I., Mysore.

Coffee powder can be blended up to 50 per cent with the *Chicory root* which is permitted by law. It gives a strong decoction and the blend is known as **French Coffee.**

Roasting and grinding

The aroma of coffee never comes from the green unroasted beans, but gradually develops due to certain chemicals and volatile oils after roasting. So far about 30 of these chemicals are identified. It cannot be reproduced synthetically.

The roasting of coffee beans is really an art and the medium brown coloured roasted in an electric or charcoal roaster is considered as best.

The beans are ground and the powder is kept in air-tight glass jars but the aroma lasts only for a short time. Therefore, it is advised to buy the roasted beans and grind the required quantity sufficient to last for 4 days.

How to prepare good Coffee

(1) To prepare good quality coffee, use always fresh coffee.

(2) Use fresh water, and the coffee-maker must be washed and rinsed in clean fresh warm water. After the decoction is made, rinse it again in hot water and dry.

(3) Warm the jug over the fire. Put in the desired coffee powder. Good coffee is prepared by using 3 teaspoons of the powder for a cup of eight ounces coffee. Pour hot water which has just come to the boiling point over the coffee powder and stirr it with a spoon. Cover the pot and let it stand near the fire for about five to eight minutes. Then pour out the decoction through a fine sieve or cloth. Add milk and sugar to taste.

C.F.T.R.I. of Mysore has developed a good coffee filter, which gives quick and tasty brew. It is made up of brass and stainless steel in different sizes, if you are interested in one, just write to the Secretary, C.F.T.R.I., Mysore City.

The coffee filter consists of three parts:

(1) The outer jug which holds the filter and the plunger.

(2) The filter is a cylindrical body which, is perforated with holes at the bottom and are in a row along the side. It slides easily into the jug.

(3) The plunger slides with in the filter and rests-on the coffee powder inside.

Making coffee in the filter is very easy by putting the desired coffee powder and the plunger is pressed down lightly over the powder. The hot water which has come to boiling point is poured over the plunger in circular way and let it stand for seven minutes. The fine coffee decoction can be poured directly from the filter, the milk and sugar is added to taste.

Instant coffee can be prepared by putting a teaspoonful of *Nescafe* or *Bon* (Brook Bond) *Instant Coffee* in a cup and hot water is poured over it. It dissolves in the water forming a good aromatic decoction. Sugar and milk is added to taste.

Uses of Coffee

Coffee contains caffeine, adenine, xanthine, hypoxanthine, guanosine, proteids, sugar, legumin, dextrine, glucose and tannic acid.

The presence of these chemicals make it a very good nerve and cerebro stimulant, it acts on the intestinal sphere and promotes the peristalsis. It lessens tissue waste, stops the feeling of tiresomeness and decreases the excretion of urea.

A cupful of black coffee is a very good home remedy in exhaustion, colds, fevers, headache, chilly feeling in winter, scanty urination, syncope, congestive heart failure, dropsy, urinary stones, whooping cough, dysentery, hysteria, gout, diarrhoea, excessive sleepiness etc. It is a harmless and easily available antidote for alcohol and opium poisoning. It masks the taste of the nauseating medicines and cheers you up when you are morose. It reduces tension when used before and after child-birth.

Drinking weak coffee after breakfast and in the evening is not harmful, but, it must be avoided in all cases of gastric disorders. Children should never be given coffee in any form, as it acts on the metabolism of the body and retards their growth. However, drinking coffee is not advised by the leading physicians as it causes addiction, and ruins your good health. Remember coffee is a *Drug*.[4,5]

Bad effects of Coffee

Coffee is rich in CAFFEINE which is a very powerful nerve and heart stimulant. We use it to save a person if his heart fails

on the operating table. One dose of five to ten grains will act on the heart and make it to beat again by contracting. If the person has been drinking coffee; the injection of caffeine fails to work due to the resistence developed in the body by the constant use of coffee in large quantities daily. Therefore, value your life and be kind to it prevent such drug addiction.

Why you like to drink a cup of coffee when you are tired, is simply because your nerves are tired of work and they need rest and relaxation. In such a condition, if you drink a cup of coffee it stimulates them and whips them to work again when they are in need of rest and relaxation. This on and on stimulation of your nerves and muscles irritates them and they begin to use the body's reserve forces and finally your heart will be affected. It is equally true, after you drink a cup of coffee, you feel cheerful and energetic, but it does not last long. The excitation of the central nervous system is usually followed by depression. (Goodman and Gilman. The Pharmacological Basis of Therapeutics, p. 276.) To over come this depression you again take a cup of coffee and this process of repetition continues, and you become slave to the cup that cheers you up for some moments.

'You can see that what is happening is that we have stimulation followed by a "let down", and the "let down", goes down further each time in many cases. You are unable to use your nerves as God intended you should. You are making them to tell a lie. They are exhausted but they tell you, "No, we're fine" (Dr. Wayne McFarland and Philip Nelson, You And Your Health Poona, Les, 12, page 3).

Dr. David Starr Jordan says, 'Coffee and tea enable one to borrow from his future store of force for present purposes. And none of these make any provision for paying back the loan. One and all these various drugs tend to give the impression of a power, or a pleasure, or an activity, which we do not possess. One and all, the result of their habitual use is to render the nervous system incapable of ever telling the truth. One and all, their supposed pleasures are followed by reaction of subjective pains as spurious and as unreal as the pleasures which they follow. With each of them the first use makes the second easier. To yield to temptation, makes it easier to yield again. The weakening effect on the will is greater than the injury to the body' (A Spurious Basis for Happiness).

Drinking excess of coffee causes, high acidity of the stomach, gastric ulcer, loss of appetite, high blood pressure, craving for smoking tobacco, nervousness, insomnia, palpitation of the heart, excessive urination, damage to the kidneys and causes impotency, nervous tension, headache, excess of perspiration, neuralgia, intolerance to pain, over sensitiveness, uric acid diathesis, hysteria etc. It makes one a lier, thief and homosexual addict. It acts on the metabolism of the body and hastens oldage and cuts down the valuable days of one's life.

Drinking it as a *Bed Coffee* is equally harmful because, in the empty stomach the effect of the caffeine is very quick. It robs the health of the lining of the stomach and causes nervous dyspepsia. Finally, I conclude with the letter written by *John Wesley*, the founder of the Methodist Church. He wrote: 'After talking largely with both men and women leaders, we agree that it would prevent expense of health as well as time and money if the people of our society could be persuaded to leave off drinking tea or coffee. We resolved ourselves to begin and set example'.

Now, you are on the chair of decision. God has given you the power of judgement. Think, and do what best you can to avoid coffee drinking. If you are already an addict, never mind, make up your mind to stop drinking it. Take a hot bath every day, eat plenty of fresh vegetables, and fruits, have regular exercise, pray to God to help, to give confidence and power to overcome the desire to drink the poisonous liquid. Indeed, it is difficult in the beginning, but, as you go ahead, your difficulties begin to fade, you feel lighter, energetic and will conquer your enemy THE DESIRE.

REFERENCES

1. Prof. Manfred Frenkel, *Some facts about drug addiction*, Die Therapy-des-monats, p. 8, No. 5, 1959, C.F. Boehringer (Germany).
2. Abdul Wasih-Asri, *Dada, Hyath Qhalandar* Urdu, Chickmaglore, (1965).
3. Coffee Board, Bangalore, *Coffee-happy-drinking*, (1963).
4. M. Inder Beeck, *Coffee addiction and Caffenism* Medico Boehringer, p. 12, No. 6, (1962), Germany.
5. Kress, D. H. *Coffee is a Drug*, Oriental Watchman Jan. (1952), Poona.
6. Mathews, C. O., *Nutrients for Coffee*, p. 9, Deccan Herald Magazine Sunday 31, Oct. (1968).

265. HONEY

Honey: *Mel:* (Lat.); *Madhu:* (Sans, Hindi); *Shahad:* (Dak.); *Usel:* (Arab.); *Angabeen:* (Pers.); *Jaine tuppa:* (Kan.).

Zodiac: Virgo.

Food Value per 100 g. 5 tablespoons approximately

Carbohydrate	85 g.	Niacin	1.11 mcg.
Calcium	5 mg.	P.A.	0.55 mcg.
Phosphorus	10 mg.	Biotin	0.0006 mcg.
Iron	0.5 mg.	Folic acid	0.03 mcg.
Vitamin B_1	0.044 mg.	Digesting Time	½ Hr.
Vitamin B_2	0.26 mcg.	CALORIES	325

Chemical composition

Enzymes: Invertase, diastase, catalase and inulase.

Acids: Formic, acetic, malic, citric and succinic acids.

Alkalies: Carbonates of potassium, magnesium, silicates, sodium and calcium.

Carbohydrates: Dextrose, glucose, maltose, levalose, etc.

Constitution: Hot and Dry 1°.

Physiopharmacology and Therapeutics

Honey is a natural food of the bees. They suck the nectar of the flowers and fill it in the bucket like pouches under the belly and fly back to their hive. While they are flying the nectar is converted into predigested sugars by the enzymatic action of the saliva into pure ready to use *honey.*

After the cells are full of honey the bees seal the hexagonal cells with a thin film of wax and guard until the new bees are hatched and the stored honey is used to feed them.

The use of honey is known to Indians from the time of *Vedas* about 5000 B.C. It is believed that a sage *Agnivesha* (2500 B.C.) described the medicinal value of honey[7]. Even *Holy Quran* describes honey as a food and medicine for weak and sick men[2].

Honey is a thick syrup having different colours and flavour. The natural honey is thick, transparent and golden in colour. Honey collected during different floral seasons has different curative value. *Coorg honey* collected during orange and coffee blossom is praised for its flavour and curative value. ***Himalayan honey*** is slightly pale in colour and it is also considered as pure honey. Due to high concentration of *dextrose, glucose, levulose,* crystals of pure honey solidify at the bottom, which can be liquified by warming. Honey absorbs moisture from the air and looses its flavour and aroma if left open for a longer time and ferments if it is not properly pre-digested by bees.

Honey is the safest carbohydrate that supplies quick energy without undergoing the process of digestion and does not ferment in the alimentary canal. Since honey is rich in several minerals particularly, iron, copper, manganese, potassium etc., it is an ideal blood-forming tonic during all the time of life; in infancy, and childhood, in youth and oldage and in pregnancy and lactation. Honey has a great advantage over pure cane sugar:

(*a*) It does not require any process of inversion as other sugars like glucose, sucrose etc.

(*b*) It is non-irritating to the most delicate lining of the digestive tract. In fact, honey can be given immediately to infants seconds after the birth without causing the least harm.

(*c*) It is easily and rapidly absorbed in the blood and releases energy in the entire organism.

(*d*) It has got the laxative effect and can be stored for a long time without any contamination. It is a fact that honey acts as an antiseptic by drawing the moisture from the organisms by the chemical action of potassium. Foods and fruits preserved in honey remain fresh and it is one of the ancient method of food preservation.

(*e*) It is inexpensive and can be found everywhere in the world[2].

Honey is the best substitute for any artificial sugar and can be used in any disease except uncontrolled diabetes. Honey is particularly useful as an energy food in weak invalids suffering from debility, overstrain, loss of appetite, acidosis, bilious attacks myocardial ischaemia, coronary thrombosis, angina

pectoris, biliousness, all types of acute infectious fevers, insanity, mental strain, hypoglycaemia, surgical shock, morning sickness, toxaemias of pregnancy, vomiting after general anesthesia[3].

Drinking honey with *lime juice* is a refreshing energy-drink during summer.

A tablespoonful of honey given at bed time acts as an urinary sedative and controls the excessive passing of urine during the night. It is particularly useful in curing the bed wetting habit of children. Giving honey with each feed helps the growth of the babies and prevents them from infections[4].

After honey is mixed with equal quantity of *lime juice* and *Malt vinegar* and a teaspoonful of it, licked with good effects in nausea and vomiting due to biliousness, jaundice, indigestion and iron deficiency anaemia.

Drinking a tablespoonful of old and dark honey cures obesity, nervousness, and palpitation of the heart.

Honey is used as a linctus mixed with fresh *tulsi leaf juice* for colds, pharyngitis, bronchitis, and bronchiectasis.

Honey is given as a food to wrestlers and athletes. Its regular use increases the energy, produces endurance of strain, reduces fatigue, prevents cramps in the legs, early panting of breath, mobilises the tissue fat, keeps them slim, active, energetic and increases the sustaining effort[5]. Author recommends honey with vitamin C in the form of *Chewsee* (Lederle) 500 mg. and *Rovigon* (Roche) one tablet chewed with a tablespoonful of honey immediately before and after the sports to prevent fatigue and weakness. Drinking milk with the above mentioned preparations every night prevents all the infections, builds the body, increases longevity and keeps one virile even though dominated by grey thoughts. It is a medicine to prevent the feeling of nervous weakness after sexual intercourse, pre-mature ejaculation and impotency. It is an excellent sleep inducing medicine in nervous insomnia. It is a medicine for paralysis, Bell's palsy etc.

Honey is externally applied as a cosmetic to clear complexion. It is a soothing liniment for bee-sting, burns and scalds. Honey mixed with a little slaked lime is applied as a medicine over sprains, mumps, swelling of the joints. Application of pure honey before sexual intercourse acts as a safest contraceptive.

Honey comb

Honey comb is the chief source of bee-wax. Bee-wax is used as a base for many ointments and face creams. Melted wax is applied to fill the cracks of the heels. Mixed with warm *coconut oil*, and a little *camphor* or *turpentine* is applied as an effective liniment in pleurodynia, mylagia, fibrositis, pleurisy, rheumatism etc.

Chewing a bit of honeycomb is found to be effective in chronic rhinitis, hay-fever, nasal polypy[6].

REFERENCES

1. Jarvis, D. C., *Folk Medicine*, Pan Books London (1958).
2. Maulana Mohammad Ali, *Translation of Holy Quran Part XIV, An-Nahal.*, 68-69, pp. 272-73. Lahore (1928).
3. Ellison Hawks, *Seven Wonders of the World.*
4. Schultz, F. W., *et al.*, *Use of honey as carbohydrate in infant feeding, and bed wetting*, J. Paed. St Louis, p. 13, 465-473, (1938).
5. Lloyd Percival, *Experience with honey in Athlet's Nutrition*, Am. Bee Journal, Oct. (1955).
6. Capt. George D. McGrew. *Military Surgeon*, Col. 80, No. 5, pp. 371-72, 373 (1937).
7. Gulam Jeelani, *Materia Medica*, 1916.
8. Glucose D. Glaxo Literature.
9. Liebstein, A. M., *American Medicine*, 33, (1927).

266. KOLA

Kola: or *Garoonuts: Bissy nuts: Colavera, Schumann:* (B.N.).

Family: Sterculiaceae.

Medicinal Uses

Kola trees grow wildly in West Africa, Sierra Leone, Brazil, West Indies, Java etc. The fruits are large containing several seeds of crimson colour embedded in the pulp. The fruits are woody and form a very important source of commerce. The fruits are cut and their kernel is separated and sold. Kernel of the dry seeds is tasteless and odourless.

Chemical Composition

Kernel of the seeds contain *Caffeine (2 to 2.5 per cent)*, *Theobromine*, *Kolatin*, *Starch*, *Sugar*, *Lipase* etc. Hence it is commonly used in many stimulating beverages.

Liquid extract of *cocoa* and *kola* are combined in certain proportion and are used in the preparation of several soft drinks having sugar and aerated with carbon dioxide.

Drinking kola wards off fatigue and imparts a feeling of liveliness. It quenches thirst and acts as a sedative diuretic in fevers and congestive headache due to flu.

267. SAGO

Sago: *Metroxylon-sagu:* (B.N.); *Sago-dana:* (Hindi, Urdu, Guj.); *Segu akki:* (Kan.).

Zodiac: Scorpio

Food Value per 100 g. approximately

Carbohydrate	86 g.	Iron	1.6 mg.
Protein	0.3 g.	Vitamin B_1	9 mcg.
Fat	0.3 g.	Nicotinic acid	0.3 mg.
Calcium	21 mg.	Digesting Time	2 Hrs.
Phosphorus	11 mg.	**CALORIES**	**350**

Medicinal Value

The gruel made from sago is nutritious, demulcent and digestible. It is a suitable diet in the convalescent patients after long illness, jaundice, colititis, gastric ulcer, fevers, diarrhoea, dysentery, indigestion, bleeding from the lungs in tuberculosis, liver disorders etc. Cooked in milk and sweetened with honey is a very nutritious diet for the growing children.

268. SUGAR CANE

Sugar-cane, *Saccharum-officinarum:* (B.N.); *Ikh:* (Sans.); *Ganna.* (Hindi, Dak.); *Ne-shaker:* (Urdu); *Kabbu:* (Kan.); *Cheruku:* (Tel.); *Karumbu:* (Tam.); *Kayrumbu:* (Mal.); *Sherdi:* (Guj.).

Family: Gramineae.

Zodiac: Leo.

Food Value per 100 g. approximately

Carbohydrate	54 g.	Vitamin B_1	12 mcg.
Protein	0.2 g.	Nicotinic acid	0.6 mg.
Fat	0.2 g.	Potassium	360 mg.
Calcium	74 mg.	Sodium	20 mg.
Phosphorus	22 mg.	Digesting Time	2½ Hrs.
Iron	6.4 mg.	**CALORIES**	218
Vitamin A	188 I.U.		

Medicinal Value

Sugar-cane is cultivated all over India for its valuable sweet juice. Sugar, sugar-candy, jaggery, molasses, alcohol etc., are made from its juice. India is the largest sugar-cane growing country. It is cultivated in more than 62,87,000 acres of land i.e., ⅛ of the total acreage of the world and the annual output exceeds more than 12,21,27,000 tons. Out of this 25 per cent of cane is used for making *Sugar.* The total yearly production of sugar in India exceeds more than 33,00,000 tons which constitutes 10 per cent of the world's total sugar. *Hawai Island* produces 84.4 per cent of sugar but India is the lowest having 9 per cent output.

Juice of fresh sugar-cane is a very nutritious liquid food. It strengthens the stomach, liver, kidneys, heart, eyes, brain and increases the sex desire. Chewing it cleans the teeth, kills the harmful germs in the mouth, hardens the gums, stops bad breath, and increases dental life.

Drinking machine pressed juice is not good for health; it causes heat in the body, burning sensation in the soles and palms.

This bad effect can however be rectified by adding the juice of *fresh lime, ginger and cardamom* in it.

The fresh juice mixed with *lime juice, ginger juice* and *tender coconut water* is a valuable drink in fevers, thirst, scanty urination, gonorrhoea, enlarged prostate, cough, cystitis, indigestion, constipation, gout, rheumatism, urethritis, burning micturation due to high acidity, constant discharge of the prostatic fluid, spermatorrhoea, palpitation of the heart, nephritis, urinary calculi, gall-bladder infections, gastric ulcer, weak memory, anaemias, delayed child birth.

The dew which collects on the long leaves of sugar-cane is instilled for cataract, weakness of the vision, burning of the eyes, roughness of the eye-lids and conjunctiva, photophobia, eye strain after reading etc. (Dhanavanthra).

269. SUGAR

Sugar: *Cheeni* or *Shakar:* (Urdu, Hindi, Dak.).

Sugar is the most common sweet carbohydrate used all over the world. It supplies the body with heat and energy. However, its excessive use is very bad for health. It damages the heart, increases the fatty tissues, causes diabetes, acidosis, obesity acidity of the stomach, nervous break down, indigestion, caries of the teeth etc.

Taking sugar as it is; causes dysentery, diarrhoea, typhoid, cholera, and other infections of gastro-intestinal tract due to its contamination with the respective disease germs. Therefore, it must be boiled in water before it is used. It is best advised to put the required sugar in the required quantity of water and boil it for five minutes and then mix in any beverage.

Sugar has many medicinal properties too. Its powder which is exposed to strong sun light for half an hour and put in a sterilized tin, is used as a styptic. It stops bleeding from the cut wounds. The powder is mixed with a little slaked lime and honey and applied for mumps, abscess and other painful conditions of the skin. *Prof. Trilbert* says, 'Burning of sugar in the sick man's room disinfects it by producing the fumes of Formic acid'.

The poultice made by mixing it with soap is applied over burns and scalds with good results. Sterile 3 per cent sugar solution is put in the eyes to cure tiredness, burning, itching and redness of the eyes. Application of sterilized sugar heals bed sores.

Sugar-candy: (Misri) is of two kinds: the pinkish-red and the white. The former is prefered for medicinal use.

Sucking a piece of sugar-candy is a remedy for cough, sore-throat and thirst due to excessive sweating. Mixed with the *fresh juice of the tender stem of sugar-cane, cardamom, the sap of the Banyan tree* and *almonds* is a excellent remedy for sperma-torrhoea. It should be used once daily for a month for the complete cure.

Jaggery: Is made by boiling the fresh sugar-cane juice in large iron pans. When it forms a thick syrup calcium chloride and other bleaching agents are added and poured in the moulds of desired sizes and shapes and then allowed to cool.

Jaggery is a good source of cheap sweetening substance. It is nutritious and contains valuable minerals and vitamins.

Eating jaggery with fresh *coconut, pea-nuts* or with *bananas* is a cure for protein deficiency diseases. The jaggery poultice made by heating it with ghee or with *castor oil* is applied to cure boils, tooth ache, sprains and abscesses with good results.

Molasses is made from the sugar-cane juice which resembles like honey. It is uncrystallized syrup produced from sugar in the process of making as a by-product with alcohol.

Molasses is a very rich source of iron and vitamins. A table spoonful of molasses stirred in a glass of milk supplies all the required amount of iron per day. It is a tonic for all the iron deficiency anaemias, goitre, palpitation of the heart, sprue, in-digestion, anaemias of pregnancy and childhood, breath catching syndrome in children, mental weakness, pain in the heart on exertion, brittle spoon shaped nails, throbbing-headache, im-potency, liver disorders, uterine inertia, painful child-birth, tuberculosis, painful menstruation, nervous tension, etc. It is superior to all the table syrups made from cane sugar. Drinking it every day with skimmed milk, makes you look very charming and helps you to sleep very comfortably.[2, 3]

270. TEA

Tea: *Camellia-theifera:* (B.N.); *Chai:* (Hindi, Urdu, Dak.); *Tea:* (Kan.).

Family: Ternstroeminaceae.

Tea plants are cultivated on the hilly slopes of Darjeeling, Assam, Nilgiri hills, Ceylon, China etc., where the climate is cool and the rainfall is high. The leaves are broadly lanceolate, firm in texture, tapering at the end. The upper surface is glossy and the under surface is pubescent when young and glabrous as they grow older. The leaves may grow upto 15 to 17 cm., but before they grow to a size of 5 cm. they are plucked for commercial use.

Tea-leaf buds, together with two or three young leaves are picked by hand and collected in baskets. The leaves are sent to nearby curing house where the leaves are subjected to a process of fermentation. Later, the leaves are roasted lightly. New methods of roasting and curing the leaves are discovered nowadays.

There are two varieties of tea, namely *the green* and *black tea*, and both the varieties are graded into:

Pekoe—large leaf (or unbroken tea)

Broken pekoe—medium broken leaf.

Fannings—small pieces of broken leaf.

Dust—smallest grainy particles of tea.

The tea which we usually drink comes in various flavours. Pekoe is thinner but more flavoursome than other varieties. Fanning and dust gives a quick and strong brew in three minutes.

India is exporting tea from 1850 A.D. and now it is one of the chief items of export.

How to prepare good tea

Tea making is an art and no two teas are similar. To get the best results follow these instructions:

1. Buy fresh tea and store in an air-tight container. Tea absorbs strong flavours, so do not keep it in the kitchen near the cooker. It is best to store away from the kitchen. Always buy tea sufficient to last for only two weeks. Selection of tea is left to ones own taste. However, *Lipton* and *Brook Bond* tea is very popular in India. *Kandy, Uva, Dimbula, Nuwara Eliya* etc., are some of the finest brands of Ceylon tea. *Black leaf, Red leaf, Green* tea are the best ones of China.

2. (*a*) Fill the kettle with fresh water and heat it to a boiling point.

(*b*) Warm the teapot and put the required tea in it and slowly pour the steaming water in the pot and cover the lid—and allow it to brew for few minutes. Never use stale decoction.

(*c*) Some people like tea without sugar, some pour milk before tea is poured and some after tea is poured in the cup. In any case the result is the same. Some drink their tea with a slice of lemon, but for this purpose the tea should be very light. A good quality tea decoction should form a thin scum on cooling it and it should become cloudy and opaque. It should become pale-yellow from reddish brown. If your tea does this, be sure that it is of fine quality[4]. New process of preparing instant tea is discovered at C.F.T.R.I., Mysore.

Uses of Tea

Tea contains 1 to 5 per cent *Caffeine*, 7 to 24 per cent *tannin* and traces of various volatile oils, theobromine and theophyline. It is therefore advised as a medicine for tiredness, scanty urination, congestive heart failure, asthma, and excessive sleepiness. It contains plenty of magnesium supplies the daily requirement. Particularly, it is a boon to Westerners who are deficient in magnesium. A cup of tea banishes boredom. *Pepys* aptly said:

'Home and found my wife drinking tea,
A drink which Mr Peeling
The potticary tells her is good for
her cold and delusions'.

(Samuel Pepys, 1667)

'Drink tea that tells your mind may
be lively and clear'.

(Sung dynasty proverb)

A cupful of strong tea decoction given with *banana* cures dysentery, and diarrhoea. Drinking hot tea with *lime juice* is a medicine for prickly heat in summer. It quenches thirst, imparts a feeling of coolness in the body and keeps fresh all over the hot day. Author claims that tea drinking with foods rich in vitamin C is a prevention from common cold. A steaming cup of tea is a spirit elevator in winter.

Washing ulcers with warm tea decoction heals them quickly. Applying the discarded tea leaves after preparing the infusion is a medicine for chronic eczema, acne, etc.

Bad effects of drinking Tea in excess

Like coffee, and other beverages containing *caffeine* and *theobromine*, excessive drinking of tea causes similar neurological disorders. Particularly it increases the *Fluorides* in the body. Various brands of tea contain *30* to *60* (*ppm*) which exceeds 29 times more than the normal. The other foods rich in *Fluorides* and their limited use with tea prevents dental caries and bone deformities. But, excessive use of these foods causes a great damage to both teeth and bones if the concentration of *Fluoride* exceeds 1-1.5 (ppm).

Foods rich in Fluorides (Dry foods ppm)[7]

Rice	1.00	Dextrose	0.50
Corn	1.00	Honey	1.00
Corn (canned)	0.20	Cocoa	0.50-2.00
Dates	1.30	Milk chocolate (Plain)	0.50
Crushed Oats	0.20	Cabbage	0.31-0.50
Dried Beans	0.20	Lettuce	0.60-0.80
Buck Wheat	1.70	Spinach	1.00
Wheat bran	1.00	Tomatoes	0.60-0.90
Wheat flour	1.30	Turnip	0.20
Biscuit flour	0.00	Milk	0.07-0.22
Flour	1.10-120	Cheese	1.60
White-bread	1.00	Beef	0.20
Ginger biscuits	2.00	Liver	1.50-1.60
Rye bread	5.30	Veal	0.20
Gelatine	0.00	Mutton	0.20

Chicken	1.40	Butter	1.5
Pork	0.20	Pork Chop	1.00
Potatoes (white)	0.20	Frankfurters	1.70
Potatoes (sweet)	0.20	Round Steak	1.30
Apples	0.80	Oysters	1.50
Carrots	0.20	Herring (Smoked)	3.50
Pineapple (canned)	0.00	Sardines (canned)	7.30-12.50
Oranges	0.22	Fresh fish	1.60-7.00
Egg white	0.00-0.60	Mackerel	26.89
Egg yolk	0.40-2.00		

How hyperfluoridation occurs

Excessive quantity of fluoride in foods and in water though rarely causes toxic signs and symptoms but still many cases of hyperfluorosis are reported in many parts of the world[9].

Signs and Symptoms of hyperfluorosis

If the foods and water concentration of fluoride exceeds 1-1.5 (parts per million) and such foods are regularly used for more than 3 to 4 years one begins to feel a sort of discomfort and pain in the joints mostly in the fixed joints of spinal column. The pain becomes intense while rising from sitting position and squatting on the floor, on turning the head. There may be loss of intercostal flexibility that causes abdominal breathing. The sensation of pins and needle in the limbs and paraplegia due to deformed bone pressure on the spinal nerves is often complained of. Hypercalcaemia of the ligaments with abnormal osteophytic outgrowths is also seen[7, 8, 9].

Hyperfluoridation causes mottling of teeth associated with chalky patches in transverse bands staining the dental surface with yellow or black spots. Even animals are subject to the hyperactivity of the fluoride[7,8].

Defluoridation of water

Defluoridation of drinking water is a matter of public health engineering. In spite of many efforts, a successful method of making the water safe is not yet in sight. However, much work is being done by my friend *T. M. Ameer Ahamed* in this field. The best method of preventing hyperfluoridation is to restrict the excessive use of water and foods rich in fluorides.

REFERENCES

1. B.P.C., p. 1033, (1911).
2. Ryoyasu Saijo and Yoshio Kuwabara, *Formation of volatile compounds during black tea manufacture*, Agric. biol. Chem. Japan, 31, 4, 98 (31967).
3. Ryoyasa *et al.*, Agric. biol. Japan, 31, 11, 1265, (1967).
4. Ceylon teas with Golden taste, *Woman and Home*, p. 25, December 1967, London.
5. Life-Saver-Tea, *Times of India*, (1.10.1966).
6. J. A. M. A. Editorial, *The Modern Reading of Tea-leaves*, (17.5.1965).
7. Franz Maier, *Manual of water Fluoridation Practice*, p. 53, (1963), McGraw Hill Book Co., U.S.A.
8. Public Health Engineering Manual and Code of Practice Section I.A. p. 171, Ministry of Health, New Delhi (1962).
9. Ameer Ahamed, T. M. *Engineering Aspects of Defluoridation*, Dept. of Civil Engineering College, Bangalore 1. (1969).

271. VINEGAR

Vinegar or *Sirka.*

Vinegar is prepared by the fermentation of any fruit juice which contains 10-12 per cent sugar. Usually, apples, grapes, mango, dates, sugar-cane, oranges etc. are used in the production of vinegar.

The juice of any these fruits is extracted and its sugar content is adjusted to 12-15 per cent of sugar by using a Brix hydrometer.

Then the juice is heated to almost boiling point to kill all the micro-organisms and then it is poured into a sterilized glass carboy or a jar adding a piece of pure *wine yeast* which is available in any winery. The mouth of the jar is plugged with a clean cotton plug and allowed to ferment maintaining the temperature between 80-85°F as best as possible.

When all the sugar is converted and reduced to 0° or 1 Brix, the fermented juice is stored for 1-2 weeks for sedimentation. Then the clear fluid is decanted into another clean and sterilized jar and unpasteurized mother vinegar in the ratio 1:10 is added. To give full aeration for better fermentation; two holes are made in the cork of the jar. For good result the jar should be kept in the same temperature as said before and it should not be disturbed for 8 to 10 weeks. The clear vinegar is syphoned and strained through folded cloth.

The clear vinegar is poured in the bottles and are boiled in water for 20 minutes. The pre- and post-sterilized bottles of vinegar are kept for some time for ageing as this process improves its flavour and aroma. (Home-scale fruit and vegetable preparation series, Leaflet No. 30) C.F.T.R.I., Mysore.

In India, *Dyer Makin's* (*Mohan's*) fermented Vinegar is found to be the best available in the market. Cheap synthetic vinegar can also be prepared by adding one teaspoon of concentrated *Acetic acid.* (Alembic & Co., Baroda), in 12 oz., of water and burnt sugar is added to get the desired colour of the natural vinegar. However, the natural vinegar is best advised instead of cheap synthetic vinegar.

Use of fermented vinegar with sliced onion increases the appetite, kills all the harmful bacteria contained in the food and draws more water from the blood to the intestines to flush the food quickly from the intestines. It maintains the correct pH value of blood to keep one healthy.

Vinegar is applied over shingles, urticaria, scabies and ringworm with very good results. According to *Dr. Jarvis* Apple-cider-vinegar is supposed to be the best for health.

272. YEAST

Yeast: *Cervisi-aefermentum:* (Lat.); *Youmadhpheen:* (Sans.); *Khamir:* (Urdu); *Ragoot-ul-mazer:* (Arabic).

Food Value per 100 g. approximately

Carbohydrate	38 g.	Vitamin A	108 I.U.
Protein	38.3 g.	Vitamin B_1	5962 mcg.
Fat	0.7 g.	Vitamin B_2	3999 mcg.
Calcium	434 mg.	Nicotinic acid	44 mg.
Phosphorus	1480 mg.	Digesting Time	2 Hrs.
Iron	44.7 mg.	**CALORIES**	**318**

Medicinal Value

Yeast is a protein found on the inner surface of the vats of beer as a Fungi (Saccharomycetas). Therefore, it is commonly called as Brewer's Yeast.

Yeast is composed of Nucleic acid which is the chief constituent of all the cells of living bodies, white blood-corpuscles, thyroid gland, milk, white of an egg etc. Liberal use of the yeast therefore, increases the resistance of the W.B.C. and thus the invading bacteria in the blood stream are killed by the phagocytic action of the W.B.C. It increases the Opsonic Index of the blood by liberating the Opsonic matter in it. The Opsonic matter is very essential in the blood, which acts on the Acid-Fast Organisms; particularly the tubercular germs and makes the fatty cells of the germs absorbable by the W.B.C.[1]

Taking yeast regularly keeps one healthy, increases life's span, retains all the charming characters of ones youth in oldage and helps one to live cheerful. It should be regularly used during the treatment of infections, notably tuberculosis[5, 6].

Taking yeast mixed with fresh *amla juice* and *honey* is a prevention against heart failure, diabetes, obesity, pre-mature oldage and infection. Yeast is the richest source of *calcium, iron,* and *Vitamin B-complex.*

Caution

Simply taking yeast or any other food product as a specific medicine is very dangerous. All the foods are a shield against the diseases during health. Once the disease establishes; proper diagnosis, effective treatment, good nursing, and suitable diet is very much essential.

Live yeast cells provide a *Skin Respiratory Factor* (*Bio-dyne*). It consists of magnesium, calcium, potassium, sodium, copper, zinc, manganese, iron, molybdenum, boron and silicon. Beside these minerals, it also contains several amino acids, desoxyribonucleic and ribonucleic acid, riboflavin, niacin and thiamine[1]. When locally applied in the form of *Medithane ointment* Geoffry Manners Co., Bombay) promotes healing of the injured tissues particularly in hemorrhoids and other anorectal disorders and shrinks the engorged veins. It stops bleeding, itching and relieves pain. It can also be used in burns and prevents keloid scars[2, 3, 4].

REFERENCES

1. Best, C. H., Taylor, N. B., *The Physiological Basis of Medical Practice*, The Williams and Wilkins and Co., Baltimore, p. 385, 6th Ed. (1955).
2. Cook, E. S. *et al.*, *Studies Inst. Divi. Thomas*, 2, 23, (1938).
3. Welsh, T. F. P., *et al.*, South Med., 105, 341, (1943).
4. Thomas, G. W., J. A. Pharm. Ass. (Scient. ad.) 34, 143, (1945).
5. Dr S. Narayan Shetty, Retd. Sup. of P. K. Sanatorium, Mysore, (1968).
6. Aman, Yeast and its effects on Koch's bacilli, F. No. 20, I.A.H., Mysore, (1967).

273-75. OYSTER

Oysters, Mushrooms and **Shell-fish** are also used as food. But in this country they are not so popular as in Western countries. There is no appreciable food value in these foods and the author has no knowledge of any medicinal value of them. *Toadstool* mushrooms are poisonous and only edible mushrooms should be consumed.

276. POPPY SEEDS

Poppy Seeds: *Khashkhash:* (Urdu, Hindi); *Tuqme-koknar:* (Pers.).

Poppy seeds are also used in many culinary preparations. Milk of the seeds one ounce mixed with sugar is used as a medicine for dysentery, diarrhoea, insomnia, dryness in the chest bronchitis etc.

Poppy seed oil applied over the scalp and soles induces very good sleep. A teaspoonful taken every night relieves constipation and imparts sound sleep.

277. COMMON SALT

Common Salt: *Sodium chloride: Lavana:* (Sans.); *Namak:* (Urdu, Hindi, Persian); *Uppu:* (Kan.).

Common salt is not a food, but it is one of the most commonly used things in the kitchen and the cheapest of all food commodities; without it the food tastes insipid.

Common salt is used as a preservative from ancient times. It prevents the putrefaction of fish, meat and pickles. A teaspoon of salt dissolved in a glass of water is gargled for sore throat, tooth ache etc. Drinking concentrated salt solution is one of the safest emetic. Dissolve a crystal of salt in a teaspoon of water and put few drops in the nose to cure congestive headache, cold and syncope. Application of salt stops bleeding caused by leach bite. Massaging gums with salt and pepper strengthens them. Washing the hair with week solution of salt cleans the scalp, cures dandruff and prevents hairfall.

For redness of the eyes with excessive watering, pain in the eyes on reading or doing needle work, dryness of the eyes, corneal injuries of the eyes etc., drink half a teaspoon of powdered common salt (better use rocksalt) dissolved in a glassful of water thrice daily with gratifying results. It is also useful as a cure for cramps in the calf muscles, excessive tiredness during summer, sun stroke, flatulence, colic, and as an antidote for silver nitrate and quinine. Dissolve a teaspoon of salt in an ounce of water and mix it in equal quantity of *til oil* and heat it gently to evaporate the water. Apply this oil to cure scabies, neuralgia, chopped hands and skin, ulcers etc. Sucking a crystal of salt with a *clove* acts as an expectorant in bronchitis, pneumonia, asthma and stops bad breath.

Fomenting the salt is a time honoured remedy for painful conditions particularly for lumbago, pleurisy, rheumatoid arthritis, orchitis, trauma etc. Excessive use of salt causes obesity, and water retention in the body therefore, it is contraindicated in diseases of kidneys, heart, liver, scabies etc.

278. WATER

Water: *Aqua:* (Lat.); *Jal:* (Sans.); *Pani:* (Hindi, Urdu, Dak.); *Aab:* (Pers.); *Ma'a:* (Arab.); *Neeru:* (Kan.); *Tannee:* (Tam.).

Millions and millions of years ago, our earth was mere a fire ball spinning around the sun. As years rolled into millions, it began to cool, the surrounding gases around the earth such as: Oxygen and Hydrogen got mixed in the proportion of two parts of Hydrogen and one part of Oxygen and the water was formed which even today has remained unchanged. That was

the beginning of the existence of water millions of years ago. The water that poured from the sky took the shape of the seas and the cycle of evaporation, formation of the clouds and the rain commenced. As long as the seas and the Sun exist, this life-giving cycle continues.

This is clearly revealed in *Holy Quran* as: 'Before the creation of the earth, it was surrounded by mist and clouds' (32:10).

According to Geologists, the life originated from the sea in the form of unicellular amoeba about 5 million years ago. This fact is once revealed by *Manu*, the father of Indian Mythology, 'The creation of the earth was from an egg, then the water was created and from the water alone the male was created. By the division of this male, the female took the shape'. (Manu Shastar, part one, 32 Hymn).

The same idea is expressed in *Holy Quran* too as: 'And He it is Who created the heavens and the earth in six periods and His throne (extends) on the water. And We have made of water every living thing'.

> It means, all life is produced from water, and hence the special mention of the extension of God's throne on waters along with the creation of heavens and earth, because, without water life would have been impossible, (Translation of Holy Quran, 11:7 and 21:30 by Md. Ali, M.A., LL.B., pp. 223).

Water is the cheapest and one of the most essential things that God has created for the existence of all the living things. No living being will survive if it is not given for a week, but life can be prolonged for about two months on mere water. Even plants will die if the water supply is cut off from their roots.

Though water does not contain any food but, without it no food will be absorbed in the animal or plant body.

In human body, the function of water is the same as in all animals; to be frank, 60 to 70 per cent of the body is nothing but water. Even the solid bones contain 20 per cent water!

The physiological functions of water in the body

1. Water helps the absorption of the food materials through the intestinal tract.

2. It keeps the blood in a liquid state and makes it to circulate easily in the tiniest blood vessels.
3. It maintains the body temperature constantly at, 98.4°F in all weathers and keeps the skin moist and cold.
4. It helps the kidneys to remove the unwanted body wastes like urea, salts etc., in the form of urine. Lungs remove it as water vapour and from the skin it is excreted as perspiration. It is estimated that as much as 37 gallons of fluids are daily filtered off from the blood and restored to the body by the kidneys only when there is proper proportion of water in the blood.
5. It keeps the mucus membrane always moist and helps to secrete different fluids in different glands of the body. It guards all the vital organs from external shocks and maintains the pH value of the blood and other body fluids.

Daily requirement of water

Physiologists have found that a healthy adult requires about 90 ounces of pure water and a child 2.5 ounces/kg. body weight to upkeep the body functions smoothly. About 60 ounces of water is supplied in the form of various liquids and the remaining quantity of 30 ounces are compensated in the form of solid foods. Though these foods look solid, but, they contain enough water in different proportions. Out of this total quantity of water, the body excretes 45 ounces of water laden with all the unwanted harmful body wastes in the form of urine. The remaining quantity of water is excreted from the body in the form of water vapour and perspiration. However, the quantity of water excretion through these excretary organs alters according to environmental temperature. In summer, the water loss will be more through skin and lungs, whereas in winter it is largely excreted in the form of urine. The automatic control of water-distribution in the body is controlled by certain inorganic salts like: *sodium chloride*, *sulphates of sodium* and *potassium* etc. The proper proportion of these life-giving salts keep the brain well informed about the concentration of water in blood. If the water level falls below the normal proportion, the automatic control sends a flashing message to the brain, which immediately

alerts the control in the brain that maintains the thirst sensation in the throat and make one feel thirsty, the mouth parches and one restlessly asks for water. As soon as water is drunk sufficiently, the thirst flashing signal goes off and makes one cheerful.

In certain diseases like severe vomiting and diarrhoea, water from the body is severely lost causing a state of DEHYDRATION. If this condition is not immediately treated by rushing the water in the form of *normal saline* through a vein; death overpowers very quickly. With all these life giving tips, one should therefore, drink at least *six* to *eight* glasses of pure fresh water, whether one feels thirsty or not. However, it is bad to drink excess of water also because it weakens the kidneys and stomach. Feeling excess of thirst and passing large quantity of urine is not a healthy sign. One must therefore, ask a doctor to check the urine for sugar and get the blood tested for *G.T.T.* (Glucose Tolerance Test). Drinking excess of water along with meals is not healthy for it weakens the digestion therefore, water should only be drunk after the meal is finished. Drinking a glass of water early in the morning after mouth-wash, prevents one from stomach disorders and constipation.

Drinking water and its purification

For drinking purpose, *rain water* is the best, however, purified water from a river, spring, well and a lake is equally good.

In our country, only in the big cities and towns purified and filtered water is available for drinking. But in villages the source of water is from wells, rivers, tanks and chanels. Water from these sources is highly contaminated with various disease causing germs due to washing dirty clothes, animals, bathing etc. Therefore, infectious diseases like: dysentery, enteritis, typhoid, cholera, etc., are very common in such places where the water is drunk directly from these sources.

In such conditions it is essential to boil water for ten minutes in a clean vessel and if water is very muddy a pinch of alum powder should be added and the solution allowed to stand over night. Clean water is decanted and kept in clean pots for drinking purpose. Boiling water kills all the germs and makes it safe for drinking. Some persons do not like the taste of boiled water, which can however be rectified by pouring it from one vessel to the another

as if you cool your tea or coffee. This process helps it to reabsorb the expelled gases during boiling and once again the flat taste disappears.

Hydrotherapy (treatment of diseases with water)

Fever

Application of cold water to the body has very effective healing power in fevers.

When cold water is applied over the body, due to its cooling effect the blood vessels under the skin contract. As a result, the blood is rushed in the deeper layers leaving the upper surface in a state of bloodlessness. The superficial nerves send the flashing signals to the brain to overcome this and the brain directs the nervous system to redirect the blood by dilating the contracted blood vessels. This action and reaction in the body stirs the blood cells, by bringing out more of the waste materials to the surface with water and the quick evaporation taking off much heat. Particularly, children, who cannot tolerate the high temperature of the body and go into convulsions; application of the cold water over the back bone, forehead and head controls fits in a very short time. Putting cold water pad is an universal method practised all over the world in all kinds of fevers. It reduces the congestion in the brain and lessens headache. In all fevers, when the body temperature shoots above 102°F, you must put the cold water pad over the forehead. Simply putting the cold water over the body or over the head is not a cure for any fever; one must be treated by a physician.

Sun-stroke

In India, sun-stroke is common in some places where the temperature exceeds 118°F. In such places, puting a water pad over the neck before going in the sun is a sure protection against the stroke. During stroke, pouring cold water over the head and the neck is the best and very effective means of saving the patient.

Appendicitis

Appendicitis is an acute inflammation of the vermiform appendix; a blind tube situated in the right iliac fossa. The

inflammation may be caused by the impact of pomegranate, or guava seeds or direct infection in the tube etc. In this disease, the shooting pain starts insidiously and the right lower abdomen hurts when touched or pressed with vomiting and slight temperature. In all such cases, application of cold water pad over the painful tender area, is worth life saving until the patient is immediately put in the hands of a good surgeon. The patient must be operated within twenty four hours to be saved and avoid further complications. How cold water helps in this condition is; it checks the increased circulation and prevents the spread of the infection to the neighbouring organs.

Nausea and vomiting

Application of the cold water over the pit of the stomach is a great boon to the patient. It brings immediate relief.

Hysteria

In young girls who suffer from hysteria, put a tablespoonful of common salt in a tub of tap water and give a bath every morning for two weeks regularly. You will be surprised to see the grand improvement in the behaviour of the patient.

Nervousness and impotency

Take a handful of common salt and rub it over the wet body until it glows. Then take cold water bath every day early in the morning for about forty days; better make it a habit. It retones your nervous system, improves the entire circulation and keeps you young.

Athlet's Foot

This fungus infection which commonly occurs in between the fingers of the feet causes intense itching and bad cheesy smell. It can be prevented by frequent daily washing the feet in cold water. Applying '*Multifungin*' (Knoll) powder or cream after the wash is an effective cure for this fungal disease.

Falling of the hair

Wash your hair every morning with cold water without using any soap or shampoo. Brush the hair after drying. Cold

head-wash increases the circulation and strengthens the roots of the hair, prevents dandruff, blackens and lengthen the hair.

Insomnia: (Sleeplessness)

Taking cold water bath before you go to bed is a very effective water treatment for sleeplessness. It prevents mosquito bites.

Ice

Ice is prepared by lowering the temperature of water in a refrigerator.

Ice is used for preservation of the foods, vegetables and fruits. Application of ice is a very good natural remedy for lowering the body temperature, and congestion of the superficial blood vessels. Sucking ice bits is a time honoured remedy for nausea and vomiting. It is applied over the painful condition of the appendicitis, congestive headaches, meningitis, tired and painful eyes etc.

Drinking iced water is not healthy as it weakens the coating of the stomach, harms the teeth and retards the function of heart by sudden chilling the stomach. It should be particularly avoided during summer when one is heavily perspiring and thirsty. Chances of contamination are great due to unhygienically storage of the ice and it is contraindicated in heart patients.

Note: Cold bath should be taken only by healthy adults who are used to it from a long time. Persons suffering from heart diseases are contraindicated.

Hot water therapy

Application of hot water having 95°F to 105°F, to the body enhances the superficial circulation by dilating the blood vessels. It opens the minute sweat holes, and brings the waste matter to the surface. It cleans the skin and keeps it healthy.

Taking a warm bath early in the morning is a very effective natural tranquilliser. It cheers you up, banishes all the tiredness and drowsiness of the sleep and prepares you to work energetically.

Taking a very hot bath above 115°F, is bad for health. It causes syncope by driving the cerebral blood, loosens the hair roots, and if you expose to cold winds after such bath; it makes

you sick by catching cold and some times it causes pneumonia and bronchitis. Putting hot water over the scrotum, makes you impotent and your sperms become less motile. Such sperms fail to get fertilized following male sterility. Therefore, wash your scrotum only with cold water, even if you take a warm bath.

Hot water bath is very relaxing after a day's work. It imparts good sleep. It aids the healing of colds, mumps, epilepsy, inflammation of the eyes, insanity, melancholia, painful micturation, painful menstruation, delayed labour etc. (For all such complaints water must be 105°F to 110°F hot).

Hot water fomentation with the help of hot water bag filled with 125°F of water is very useful in pneumonia, pleurisy, painful menstruation, lumbago, colic, superficial congestions, boils, lowered temperature and cramps due to dehydration, chill and cold, pain in the heart due to angina pectoris, congestion in the pelvic organs etc. The hot water bag must not be applied for a long time in one particular area. *Sister Kenney's* method of hot water application in the treatment of poliomylitis has won the praise of the world.

Sitting in a hot water tub up to your back; (Sitz Bath) is effective for pelvic inflammations, urinary calculi, and retension of the urine, chest colds, sleeplessness, painful menstruation etc.

Drinking hot water after fatty foods prevents the sick feeling and eases digestion. Drinking hot water with a pinch of salt is a medicine for bronchitis, asthma, difficult expectoration etc. It helps you to sleep well during summer nights by keeping the skin cold and prevents mosquito bites. Hot salt water garlging is a time honoured remedy for acute pharyngitis, relaxed throat etc.

279. SOFT DRINKS

The twang of the aerated bottle (Soda bottle) brings forth a foaming and bubbling water, and one takes an exhilarating sip of the drink and burp with a great satisfaction. Of course it has a biting taste and one drinks it as an aid for digestion. There are other sweet drinks with various flavours of oranges, pineapple, lime, etc., prepared by various firms. Among all of the most commonly known drinks are *Coca-Cola, Fanta-Orange* etc. These sparkling liquids are known as soft drinks that are free from alcohol and other habit forming drugs.

The story of the soft drinks is indeed very fascinating. Since the beginning of the life the most pressing needs of all living things is food and drink. Every living object struggles for existence to get these basic needs. The birds fly miles and miles in search of food and water, the animals roam untiringly in plains and jungles with just an only aim of the struggle for existence. The pre-historic man's struggle for existence was extremely difficult, for, he had to roam in search of food and water cautiously, because of being an easy bait for other carnivorous animals. One can actually see these difficulties in a film ONE MILLION YEARS B.C. As years passed into thousands, luckily man learnt to pin his dwelling around the places where water was abundant and began to grow his food by cultivating grains.

Even plants depend on these basic needs. The roots of a tree pierce the hardest soil and shoot in search of water and store it in various parts of the tree. The huge trunk of *Australian-bottle* tree provides an enormous amount of sweet refreshing juice from the inner bark and stem. In California, Mexico and Arizona, the giant *Saguaro cactus* stores up more than 5000 gallons of water during the rainy season so as to use it during summer. The *milk-tree* of Central and South America provides milk like sweet juice when it is cut open. The spongy sweet water melon, the fresh and sterile water from tender coconuts are some of the wonders of nature for providing water in the form of liquid food.

Man learnt the secret of these sources from animals and substituted them as an additional pleasant aid of drink beside water.

As civilisation progressed, the man's knowledge of understanding the nature increased. He discovered many ways of living comfortably and tried to imitate nature in preparing certain things and used them at his will instead of a laborious search. For example, in medieval times it was common to take certain special waters of certain known places to retain health and longevity. The most famous of these was at a town in Belgium by name *SPA*. People thronged from far and wide to get the benefits of the health giving natural spring water.

On knowing the beneficial effects of these natural spring water which contain minerals, man tried to prepare a similar water but failed. Failure is the stepping stone of success in science and finally one young English chemist named *Joseph Priestly* succeeded in 1772. He managed to combine carbon-dioxide with water and artificially produced aerated water bubbling with gas as if it has just come from a natural spring.

The news of the wonder discovery spread like fire and many parched mouths began to drink the *spa* away from Belgium. On the request of *Dr Phillip Syng Physick*, a local chemist *Tounsend Speakman* imitated *Priestly's* discovery and used fruit juices sweetened with sugar for flavour and energy. This used to be sold at the counters of the bar and one had to go there to drink. It was indeed another disadvantage. Many scientists tried to bottle it but again there was a failure. The syrup used to ferment and get spoiled if left for some time. With the discovery of bacteriology, finally this drawback was conquered in 1899. In the beginning the soft drinks notably *Coca-Cola* etc., were bottled in air tight wire fastened bottles. Then changed to marble bottles that are still common in bottling aerated water. Then the sealed crown capped bottles came into existence.

Today, the aerated water industry is fastly growing on the demand of man's need to quench thirst. Since the contamination easily takes place by bottling aerated waters unhygienically, it is advised to drink only such soft drinks from a reliable firm. The most commonly available safe soft drinks are *Coca-Cola*, *Fanta-Orange*, *Fanta Soda*, *Gold Spot*, *Parle*, *Kismet* etc., that can be drunk without any fear of contamination. 'It is a fun to be thirsty.' Mineral waters are useful in gout and arthritis.

REFERENCES

1. Wilson, *et al.*, *Principles of Nutrition*, pp. 203-209, 2nd Edn. Wiley Eastern Publishers, Delhi, (1968).
2. Benjamin Miller and Ruth Goode, *The Sea within us*, Human body, p. 291, 1st Edn. Reader's Digest (1964).
3. Lindlahr, H., *The practice of Nature cure*, Poona, (1948).
4. Biological Science, *An enquiry into life*, Indian Edition N.C.E.R. and T. New Delhi, (1964).
5. Bible Society of New York *Things in which it is impossible for God to lie*, (1965).
6. Lois M. Marsilje, *et al.*, *A New Text Book for Nurses*, Vol. 1, (1961). C.M.C.H. Vellore.

PART XII

IDEAL DIET

What should be your Ideal Diet

Although there is a controversy about an ideal diet, but the most useful diet should be according to the needs of an individual. There cannot be one universal menu for every one. However, it is proved beyond any doubt that a normal adult requires about 490 g. of carbohydrate, 70 g. of protein and equal quantity of fats in the ratio of 9:4:4 to librate 2500 calories per day. Mere liberating enough calories are not enough; there must be sufficient requirement of all the minerals and vitamins to aid the proper distribution of the liberated energy. For this purpose one is advised to eat several varieties of foods, because eating only one type of food causes dislike and makes its taste insipid. There is a wisdom in eating the food sensibly as advised by *Charaka* 'One who eats his food sensibly will never get sick'. Eating insensibly either liberates low energy or high energy and both the cases make one sick and die a pre-mature death. In the former case you have already known by reading page 5, and the later makes you overfed. However, after years of investigations scientists have found a proportionate body weight for individual age, and height as shown in chapter *What should be your ideal weight* and the required food described in *Your Ideal Diet Chart* (p. 769).

If your weight is constant and normal thank God, you are healthy. If it is little low by five to ten pounds: thank your lucky stars, as there is nothing serious and you can gain it by eating foods rich in proteins, fats, minerals and vitamins. If you fuss about to have some patent medicines and tonics to increase your weight; you can take a tablet of *Live-52* (Himco) or *Livomyn* (Charak) with a tablespoon of *Provitex* (T.C.F.) in a glass of milk sweetened with honey before you go to bed. Continue it for a month and compare your weight. If there is no change, take the advise of your doctor.

To be in the limits of normal weight is the blessing of God,

because, such persons will have very good health and live longer than those who are too lean or too fat.

In case, if you are gaining excessive weight, compare your present weight with the normal weight in the chart. If there is a little difference of five to ten pounds more, there is nothing to worry, but, if the difference is more, stop to gain further. Remember, every pound of extra fat in the body robs one valuable year of your life.

It is proved beyond any doubt that gaining abnormal weight is caused by living a lazy life, eating excess of fats, sweet things, drinking alcohol and improper function of endocrine glands. Hence, in all cases of obesity, a thorough medical examination is very essential before any attempt to reduce the weight is made.

Puting extra fat is really dangerous to health, because, your heart has to exert more by pumping more blood to the extra fat tissues. If you continue to be a fat person for a long time, the constant circulation of certain fatty acids like cholesterol etc., act on the interior walls of the tiny blood vessels and begin to get deposited in thin layers, narrowing the lumen of the vessels which is known as *Arteriosclerosis*. In this condition your heart finds difficult to push the blood with normal force and to compensate, it increases its pumping force to over come the resistence caused by the narrowing of the blood vessels. The elevation of extra pumping pressure of the heart is known as Hypertension or High Blood Pressure. The working of the heart under tension for a considerable time makes it to dilate and the heart gradually begins to loose its potential power and finally fails. Also, the excess of fat and fatty acids in the body, increase the chances of plugging the blood vessels and check the free supply of blood to the organ that is connected to the blood vessel. If, any one of the arteries going to the heart muscle is plugged, the blood stops immediately resulting in *Coronary Thrombosis*, or *Ischaemia* the common cause of sudden heart failure. If any one of blood vessels is blocked in the brain, the person becomes unconscious and his limbs get paralysed. The break down of any blood vessel due to hypertension also causes paralysis and unconsciousness resulting in death due to *Cerebral Haemorrhage*. It is proved that, having excess of weight increases the chances of developing *Diabetes-Mellitus*. With all these considerations, please be kind

to your body and your family and be in the border of your normal weight. You must realise how important is your presence to your family.

How to reduce weight

To reduce the extra weight is really a difficult job. It requires great power of determination, self control, great desire to live healthy, extreme love to family, and devotion to bring happiness to society.

Having a N.A.D. (nothing abnormally detected), report from your doctor, follow the advice as given below to reduce your weight successfully:

1. Take your weight without clothes and note it down with date in your note book which is kept separately for this purpose only.
2. Stop eating all the foods, rich in fats, sugar, ice cream and other starches. Eat only what I have described in the weight reducing diet.
3. Get up before sunrise and go for a long walk not less than three miles at a stretch.
4. Take regular daily warm-bath after you return from the walk.
5. Never eat anything in between your meals and stop taking alcohol and smoking.
6. After your weight has come back to normal continue to keep it constant and compare how wonderfully you feel.
7. If there is no marked change by following the above advice, consult your doctor.

At present, there are various drugs such as *Dexdrine*, *Thyroid*, *Formode*, etc., that are prescribed by medical men to reduce the weight. But, all of them are interested from clinical point of view. We prescribe them only in certain cases of obese heart patients under strict supervision. Self administration of such drugs are not free from dangerous effects. Drug treatment of

obesity is usually unsuccessful. Because it is aimed to curb the feeling of appetite without altering the cause of obesity. Eating a sensible diet having low calories and occasional fasting is however, the most sensible and harmless method of reducing the weight gradually. Author found that serving little quantity of food on the table helps the obese to eat less and reduce the weight. Drinking a cup of strong unsugared tea or coffee after eating a handful of roasted peanuts half an hour before eating also checks the desire to eat more and naturally helps one to reduce the weight. Beware, sudden reduction of weight is bad for health.

Healthy Weight Chart

Men—25 Years and Older (With shoes 1 inch heels)

Height inches	*Small Frame lb.*	*Medium Frame lb.*	*Large Frame lb.*
62	112-120	118-129	126-141
63	115-123	121-133	129-144
64	118-126	124-136	132-148
65	121-129	127-139	135-152
66	124-133	130-143	138-156
67	128-137	134-147	142-161
68	132-141	138-152	147-166
69	136-145	142-156	151-170
70	140-150	146-160	155-174
71	144-154	150-165	159-179
72	148-158	154-170	164-184
73	152-162	158-175	168-189
74	156-167	162-180	173-194
75	160-171	167-185	178-199
76	164-175	172-190	182-204

Women—25 Years and Older (With shoes 2 inch heels)

Height Inches	*Small Frame lb.*	*Medium Frame lb.*	*Large Frame lb.*
58	92-98	96-107	104-119
59	94-101	98-110	106-122
60	96-104	101-113	109-125
61	99-107	104-116	112-128
62	102-110	107-119	115-131
63	105-113	110-122	118-134
64	108-116	113-126	121-138
65	111-119	116-130	125-142
66	114-123	120-135	129-146
67	118-127	124-139	133-150
68	122-131	128-143	137-154
69	126-135	132-147	141-158
70	130-140	136-151	145-163
71	134-144	140-155	149-168
72	138-148	144-159	153-173

What should be your ideal weight

Boys—Two Years and Older. (Weight in pounds with clothes)*

Ht. in".	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19 Years
33½	22½																	
36½		30¾																
38			34															
38				34	34													
39				35	35													
40				36	36													
41				38	38	38												
42				39	39	39	39											
43				41	41	41	41											
44				44	44	44	44											
45				46	46	46	46	46										
46				47	48	48	48	48										
47				49	50	50	50	50	50									
48					52	53	53	53	53									
49					55	55	55	55	55	55								
50					57	58	58	58	58	58	58							
51						61	61	61	61	61	61							
52						63	64	64	64	64	64	64						
53						66	67	67	67	67	68	68						
54							70	70	70	70	71	71	72					
55							72	72	73	73	74	74	74					
56							75	76	77	77	77	78	78	80				
57								79	80	81	81	82	83	83				
58								83	84	84	85	85	86	87				
59									87	88	89	89	90	90	90			
60									91	92	92	93	94	95	96			
61										95	96	97	99	100	103	106		
62										100	101	102	103	104	107	111	116	
63										105	106	107	108	110	113	118	123	127
64											109	111	113	115	117	121	126	130
65											114	117	118	120	122	127	131	134
66												119	122	125	128	132	136	139
67												124	128	130	135	136	139	142
68													134	134	137	141	143	147
69													137	139	143	146	149	152
70													143	144	145	148	151	155
71													148	150	151	152	154	159
72														153	155	156	158	163
73														157	160	162	164	167
74														160	164	168	170	171

* By Courtesy of The Life Insurance Corporation of India.

Girls—Two Years and Older. (Weight in pounds with clothes)*

Ht. in".	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18 Years
33½	28½																
36½		29½															
38			33														
38				33	33												
39				34	34												
40				36	36	36											
41				37	37	37											
42				39	39	39											
43				41	41	41	41										
44				42	42	42	42										
45				45	45	45	45	45									
46				47	47	47	48	48									
47				49	50	50	50	50	50								
48					52	52	52	52	53	53							
49					54	54	55	55	56	56							
50					56	56	57	58	59	61	62						
51						59	60	61	61	63	65						
52						63	64	64	64	65	67						
53						66	67	67	68	68	69	71					
54							69	70	70	71	71	73					
55							72	74	74	74	75	77	78				
56								76	78	78	79	81	83				
57								80	82	82	82	84	88	92			
58									84	86	86	88	93	96	101		
59									87	90	90	92	96	100	103	104	
60									91	95	95	97	101	105	108	109	111
61										99	100	101	105	108	112	113	116
62										104	105	106	109	113	115	117	118
63											110	110	112	116	117	119	120
64											114	115	117	119	120	122	123
65											118	120	121	122	123	125	126
66												124	124	125	128	129	130
67												128	130	131	133	133	135
68												131	133	135	136	138	138
69													135	137	138	140	142
70													136	138	140	142	144
71													138	140	142	144	145

* By Courtesy of The Life Insurance Corporation of India.

INFANTS*

At birth	19½″	7¼	lb
1 month	20½″	8½	,,
2 months	21	10¼	,,
3 months	22	12	,,
4 months	23	13¾	,,
5 months	23½	15	,,
6 months	24	16	,,
7 months	24½	17	,,
8 months	25	18¼	,,
9 months	25½	20	,,
10 months	26½	20½	,,
11 months	26½	21	,,
12 months	27	22½	,,

* By Courtesy of The Life Insurance Corporation of India.

Weight-reducing and diabetic diet

Monday *Breakfast* *7 a.m.*

Wheat Idli. Medium size 4 oz.
Sambhar, or coconut chutney. 3, T. Spoons.
Tea or coffee. (Without sugar) One cup.

Lunch. *1 p.m.*

		Salad
Wheat Chapaties (2)	2 oz.	Tomato (Ripe) Slices.
Green plantains Paliya	4 oz.	Onion (one) 2
Ragi-ball (1)	4 oz.	Lemon (½) Juice.
Cooked Rice	2 oz.	Malt Vinegar. one T.S.
Pumpkin Curry	6 oz.	Table salt (to taste)
Butter-milk	6 oz.	
Curds	3 oz.	
Tomato Rasam (Soup)	4 oz.	

After-noon Tea. *4 or 5 p.m.*

Biscuits (Salted) 4
Coffee or tea. (Without sugar). Saccharine 1 gr. may be added.

Dinner *7 or 8 p.m.*

Cooked Rice	2 oz.
Radish with Dhal curry	6 oz.
Vegetable soup	6 oz.
Butter-milk	6 oz.

One *Multibay* capsule, 4 Yeast Tablets with a glass of water.
(Supplies 1500 calories per day approx.)

Tuesday *Breakfast* *7 a.m.*

A glass of fresh water from tap. 6 a.m. (Walking for one hour).

Wheat Chapaties 4	2 oz.
Ash-gourd Bhajiya or paliya	4 oz.
Coffee or tea (Without sugar)	1 cup

Lunch. *1 p.m.*

Wheat Chapaties 2	2 oz.	
Mashed potatoes with beans	4 oz.	*Salad*
Ragi-ball	4 oz.	Cucumber slices 4 oz.
Cooked rice	2 oz.	Carrot 1 medium size
Sprouted green-gram with potatoes and brinjal curry	6 oz.	Onion 1 sliced.
Curds	2 oz.	Tomato 1 sliced.

Butter-milk	6 oz.	Malt vinegar 1 teaspoon
Pickles (any kind)		Table salt to taste

After-noon Tea *4 or 5 p.m.*

Wheat uppitu. (Uppama) 2 oz.
Coffee or tea (with 1 gr. Saccharine per cup).

Dinner *7-8 p.m.*

Wheat chapaties 2	2 oz.	
Bitter gourd or Knol-kol paliya	4 oz.	
Rice	2 oz.	
Brinjal with dal curry	6 oz.	Amla or any other pickles to taste
Tomato soup	4 oz.	
Butter-milk	6 oz.	

Theragran (Squibbs) One, Yeast Tablets 4 with water one hour before going to bed.

(Net Calories per day 1600)

Wednesday *Breakfast.* *7 a.m.*

A glass of fresh water from tap 6 a.m., (Walking for one hour).
Cabbage Bhat with sambhar. 6 oz.
Tea or coffee. (Two teaspoons of pure honey).
A glass of orange juice with one *Vimisules* (Martin & Harris) Capsule. (without sugar). 10 a.m.

Lunch. *1-2 p.m.*

Wheat chapaties 2	4 oz.
Rice	2 oz.
Drum-stick curry or sprouted Bengal-gram with Brinjals	6 oz.
Curds	2 oz.
Butter-milk	6 oz.
Salad of your choice	4 oz.

Pickles of your choice.

After-noon Tea. *4-5 p.m.*

Tea or coffee with two biscuits.

Dinner *7-8 p.m.*

Wheat chapaties 3	3 oz.
Rice	2 oz.
Bitter gourd curry	6 oz.
Curds	2 oz.

Banana 1 medium size

A glass of skimmed milk with two teaspoons of honey and yeast 4 tablets half an hour before going to bed.

(Supplies 1800 calories per day approximately)

Thursday *Breakfast* *7 a.m.*

A glass of fresh water. 6 a.m., (Walking for an hour)
Chapaties with an egg omelet, or ladies finger and ridge gourd paliya.
Tea or coffee. No sugar.
A glass of fresh tomato juice or pineapple juice. (Salted). 10 a.m.

Lunch. *1-2 p.m.*

Ragi-ball or two chapaties	2 oz.
Rice, with Bottle gourd-dal curry	6 oz.
Curds 3 oz. Butter-milk	6 oz.

Tomato, Onion, Carrot, Vinegar salad.

Pickles. (Mango).
Any available seasonal fruit ½ must be eaten every day.

After-noon Tea

Coffee or tea with three biscuits.

Dinner. 7-8 p.m.

Chapaties 2 oz.
Rice 2 oz.
Sprouted horse gram curry with potatoes and brinjals. 6 oz.
Curds 3 oz. Butter-milk 6 oz.
Amla pickles.
Skimmed milk 6 oz. with yeast tablets 4 and one *Vimisules* capsule one hour before going to bed.

(Supplies 1900 calories per day approximately)

Friday *Breakfast 6 a.m.*

Bread Toast 2 slices. (Water and walking as usual)
Egg prepared as per your choice.
Coffee or tea (With saccharine).
A glass of fresh orange juice. (salted) 11 a.m.

Lunch 1-2 p.m.

Wheat chapaties 2 or ragi-ball 4 oz.
Rice, with vegetable curry 2 and 6 oz.
Butter-milk 6 oz.
Salad of your choice.
Pickles, (Lemon or mango).
A glass of fresh tomato juice, with a pinch of pepper and salt.

Dinner 7-8 p.m.

Chapaties 2 2 oz.
Rice with mixed vegetable curry 3 oz. and 6 oz.
Curds 3 oz.
Carrot, onion, cucumber, tomato salad.
Pickles to taste.
A glass of butter-milk with yeast 4 tablets and *Multibay* (Bayer) or *Neoviton* (Neo-pharma) 1 capsule before going to bed.

Saturday *Breakfast 7 a.m.*

A glass of cold water 6 a.m., Walking for an hour.
Wheat Uppitu 4 oz.
Pickles to taste.
Coffee or tea.
(Fast if you can, until lunch time without breakfast)

Lunch 1-2 p.m.

Ragi-ball 4 oz.
Chapaties 2 2 oz.
Rice with Bitter gourd curry 2 oz. and 6 oz.
Curds 2 oz.
Salad of your choice.
Pickles of your choice.

After-noon Tea 4-5 p.m.

Coffee or tea with Biscuits.

Dinner 7-8 p.m.

Rice 6 oz.
Methi-potato curry 6 oz.
Butter-milk 6 oz.

Pickles to taste
Salad of your choice
A glass of skimmed milk, with two teaspoons of honey, yeast 4 tablets and *Vitaminets forte* (Roche) one tablet.
(Supplies 1700 calories per day approximately).

Sunday *Breakfast* *6 a.m.*
Water and walking as usual.
Toast 2 slices with egg omelet.
Tea or coffee with saccharine.
A glass of any fruit juice of your choice. 11 a.m.

Lunch *1-2 p.m.*
Wheat chapaties 2 2 oz.
Rice with mutton or vegetable curry 8 oz.
Butter-milk 6 oz. and curds 2 oz.
Salad of your choice.
Pickles of your choice.

After-noon Tea 4-5 p.m.
Coffee or tea without sugar. Use saccharine if you like.

Dinner *7-8 p.m.*
Rice with curry of your choice. 6 oz.
Cucumber, tomato and carrot salad.
Curds 2 oz.
A glass of milk with honey and four tablets of yeast and one *Vimisules* and *Rovigon* (Roche) at 10 p.m.
(Supplies 1800 calories per day approximately)

Note: Any one of the multivitamin preparations should be used daily if other brands are not available.

Bread 4 oz., meats or fishes, 4 oz., one egg once daily can be substituted for rice or ragi if they are not available and if one desires a non-vegetarian diet.

Continue to eat the reducing diet with *Obenyl* (Charak) 2 tablets 3 times daily until your weight becomes normal and remains constant for at least a month. Then, you can eat the normal balanced diet as described in the chart 'Balanced Healthy Diet'. Have a constant checkup of your weight and try to keep it stationary by control of your diet.

Reducing weight by fasting

Fasting is the most wonderful, harmless and natural means of reducing your over-weight. It guards your health, increases longevity and develops spiritual power. Because of these good benefits; FASTING is practiced by all the major religions of the world.

Vedas, the oldest ethics of Hindu religion; put more stress on the practice of fasting. *Jesus Christ*, (Peace be on Him) and his followers advise fast as a means of spiritual salvation.

In *Islam*, fasting is strictly observed every year for the whole month in Ramzan. During this month, fasting is very strict, as one should abstain from any food or drink from dawn to sunset.

Regarding fasting, *Holy Quran* says, 'O you who believe! fasting is prescribed for you, as it was prescribed for those before you, so that you may guard against evil' (2:183). In Quran, those who fast are called 'SPIRITUAL WAYFARERS'. Prophet Mohammad (Peace be on Him) said, '*Illumine* your hearts by hunger and strive to conquer yourself by hunger and thirst, continue to knock at the gates of paradise by hunger'. (Studies in Religion and Philosophy p. 8 by Dr Habibunisa Begum, M.A., Ph.D. Manasagangotri, University of Mysore.)

When you are fasting, physiologically your body is put in a negative phase. In the absence of food, it begins to utilize the stored energy by melting the extra fat you have. The gradual loss of the fat reduces your weight and nourishes the body. That is the reason why fasting is the best and a harmless way of reducing the abnormal weight.

'Fasting is undoubtedly one of the most potent and incidentally the cheapest of all the natural remedies. The reason why it is not more universally applied is that laity at large as well as the medical profession, are under the impression that the interruption to eat even for a brief period will greatly reduce the vitality of the individual'.

'This popular fallacy is caused by the belief that food and drink are the only source of strength. The life force which is the real source of our vitality or strength is entirely independent of our material bodies (Physical and Spiritual) and of food, drink, medicines, tonics and stimulants; that this life force flows into us from the source of all life, intelligence and creative force in the universe; from which we variously call God, Nature Universal intelligence the Oversoul, the will to live and by many other names. If people fully realized this fact they would not be in such great fear of missing a few meals or of undergoing a more or less prolonged fast' (Dr Henry Lindlhar, M.D. 'Practice of Nature Cure', p. 116).

When a fat person is asked to fast, he will have a shock, because he has no power to control the habit of eating. He has no courage to do that. He would rather die digging the grave by his teeth instead of loosing the pleasure of eating. It

is therefore difficult to uproot the habit of eating which has become the instinct of this unfortunate man.

How to Start Fasting

To reduce your weight, you need not fast or completely obstain from food as is done in religious fasting. If you are religious minded you can fast as per your own religious ethics. However, you can begin fasting by taking a tomato or a glass of some fruit juice of your choice.

Drink a glass of lemon juice sweetened with honey at 12 noon. A glass of butter milk at 2 p.m., a glass of tomato juice at 4 p.m., a glass of orange juice with honey at 8 p.m., and a glass of carrot juice at 10 p.m.

No doubt, you will have some difficulty in the beginning; but, when once the eliminative force begins to set, it gradually becomes easier to tolerate the hunger pangs and finally, you will begin to realise the inner uplift.

After you are used to it and your weight is gradually reducing, you are advised to continue to eat the balanced diet to safeguard your health and happiness. Blessed are those who are desirous to live healthy and help their fellow men in distress.

Diet in Gastro intestinal diseases

(*a*) *Infective diseases:* Colitis, diarrhoea, dysentery, gastro-enteritis, typhoid etc.

(*b*) *Non-infective diseases:* Constipation, dyspepsia, flatulence, gastric ulcer, malabsorption syndrome etc.

All infective diseases of gastro-intestinal tract should be properly diagnosed and treated with specific drugs such as: *Furoxsone, Chloromycetin, Terramycin* etc.

The author has been using the following food articles in these diseases with excellent results without any complication.

Morning:	A glassful of *orange juice* with *honey*.
10 A.M.	*2 mashed bananas* in a glassful of *butter milk* and 2 tablespoonful of *honey*.
12 Noon:	A glassful of *orange juice, glucose* and *Redoxon Q.S.*—1 Tablet.
2 P.M.	*2 bananas*, 1 teaspoon of *ovaltine* in a cup of weak *tea*.
4 P.M.	A glassful of *orange juice* with *glucose* and *Redoxon—Q.S.* Tablet
8 P.M.	*2 bananas* mashed in *butter milk*.

Continue this diet for 4-5 days or until the infection is cleared and the temperature has settled down for at least 5 days. Change to a bland diet consisting of soft boiled *rice* or *'Idli'* with *curds* or *butter-milk, chicken soup, banana, apple, biscuits, Ovaltine, Harlicks* etc. Also take a capsule of *Becosules forte* (Dumex) with a teaspoonful of *Protein hydrolysate* or *Protinules* (Alembic) thrice daily for a fortnight or more to recover from the weakness.

Non-infective diseases: Constipation

Constipation is caused by sedentary habits, lack of sufficient water, fiberous foods etc.

Constipation can be cured by eating plenty of green leafy vegetables, whole bread, nuts and long walks early in the morning after drinking a glassful of warm water. Excessive use of tea, coffee, alcohol, should be cut short. Taking *Glaxsenna* (Glaxo) or *Herbolax* (Himco) twice weekly in the beginning helps to relieve constipation. *Do not use purgatives regularly.*

Dyspepsia

Dyspepsia or lack of appetite may be caused by several factors and one is advised to get a complete medical checkup. If there is nothing serious, chew a piece of fresh *ginger* or a pinch of *ajowan* half an hour before meals. Do not eat sweets or anything or drink strong coffee or tea and do not smoke in between meals. Eat only when you are hungry and your food should be light consisting of soft boiled *rice, curds, mutton soup, fresh carrots, radish, papaya,* etc. Do not eat highly smoked or fried foods, sweets, condiments, etc. Take a teaspoonful of *Digiplex* (T.C.F.) or a tablet of *Garllil* (Charak) and *Berin* 50mg immediately after food. Drink plenty of *butter milk* with a teaspoonful of *Vitazyme* (E.I.P.W.).

Flatulence

Flatulence is usually caused by eating unchewed food consisting of pulses, leafy vegetables, fried meat, habitual constipation, etc. Pyorrhoea and other diseases of gums may also play a major part in causing flatulence. The fermentation of the undigested food takes place due to bacterial activity and various gases are liberated to cause flatulence.

Flatulence can be prevented by avoiding the above mentioned foods and drinking plenty of butter milk with lime juice. Taking

a tablet of *Acidol-pepsin* (Bayer) or *Combizym* or *Unienzyme* or *Gasex* (Himco) immediately after food is very useful.

Gastric Ulcer

Gastric ulcer is caused by several factors, notably: excessive use of alcohol, tea, coffee, highly seasoned, spiced and fried foods, mental stress, etc. When once the ulcer is formed one suffers from stabbing pain in the stomach before or after taking the food associated with heart burn, excessive watering in the mouth and vomiting. Many persons neglect these early symptoms by using home remedies like *soda bicarb*, *Eno's Fruit Salt* etc., and satisfy themselves when there is slight relief of pain and help indirectly to form an ulcer. Such patients are advised to consult a physician and get properly diagnosed with the help of *Barium Meal X-ray*, *Fractional Test Meal* (F.T.M.) and *Occult Blood Test* (O.B.T.) before commencing the treatment. However, treatment of ulcer in the earlier stages is safe and simple when proper mental and physical rest along with antacids like *Pepsemar* (Dyes), *Aludrex* (John Wyeth), *Digene-gel* (Boots) with antispasmodic drugs such as: *Antrenyl* (Ciba), *Probanthine* (S.K.F.), *Monodral* (Dyes) etc., should be used promptly two hours after food. Supplementing the preparations of vitamin B-complex (*Becosules forte* or *Multibay*) one capsule two to three times daily with milk are used with excellent results. If there is constipation *Olive oil*, 1 tablespoonful should be given before going to bed after food for atleast three months.

The diet of an ulcer patient must be bland consisting of *milk*, *bananas*, *sweet grape juice*, *meat or stomach soup*, *half boiled eggs*, *honey*, *soft boiled rice* etc. It must be used regularly in lesser interval.

If this treatment does not give any relief within a fortnight, a surgeon must be consulted immediately. Remember neglecting a gastric ulcer endangers life by causing perforation. Sometimes it turns into stomach cancer.

Malabsorption Syndrome

Malabsorption syndrome is caused by excessive excretion of fats, in the intestines. It checks the free absorption of amino acids, minerals, vitamins and water resulting in malnutrition of these food factors, notably the deficiency of proteins, calcium, iron, vitamin B complex, B_{12}, folic acid etc.

The successful treatment of malabsorption syndrome is to rectify the underlying cause and supplement the nutrition in the form of *Inj. Hepatex T.* or *Neo-Hepatex* (Evans) 2 ml. plus *Folic acid* (T.C.F.) 5 mg. and *Redisol-H* (M.S. & D.) 500-1000 mcg. once daily or alternately for 2 weeks. Orally, *Maxaform* (Ciba) or *Quixalin* (Squibbs) 2 tablets 3 times daily for 5 days and then reducing the dose to 1 tablet 3 times daily for 15 days with *Campoferron* (Bayer) or *Plastules with* B_{12} (John Wyeth) one capsule three times after food should be continuously used. Wheat and its products should not be used due to gluten that is contra-indicated in this diseases. All foods rich in protein, calcium, iron vitamin B complex and B_{12} folic acid are advised to be eaten regularly.

Diet in heart, liver, and kidney diseases

The causes of all the diseases of these vital organs are many and it requires an expert physician to diagnose and treat them.

Usually the foods rich in *sodium, potassium saturated* and *unsaturated fatty acids* are contra-indicated in these diseases. Author found that the use of onions roasted on fire are useful in chronic ischaemia of the heart, and their regular use prevents coronary thrombosis. However, research by author is going on and the results will be published after some time.

Foods rich in fatty acids (*Per 100g ether extract of or crude fat*)

Food	Saturated Fatty Acid			Unsaturated Fatty Acid		
	Total[a]	Palmitic	Stearic	Total[a]	Oleic	Linoleic
ANIMAL PRODUCTS						
Meats:						
Beef ...	48	28	19	47	44	2
Buffalo ...	66	34	28	30	24	1
Deer ...	63	24	34	32	24	3
Goat ...	57	26	24	37	33	2
Horse ...	30	24	5	60	30	6
Lamb ...	56	29	25	40	36	3
Luncheon ...	36	24	11	59	45	7
Pork:						
Back outer layer ...	38	26	12	58	46	6
Bacon ...	32	21	9	63	48	9

Food	Saturated Fatty Acids			Unsaturated Fatty Acid		
	Total[a]	Palmitic	Stearic	Total[a]	Oleic	Linoleic
Liver ...	34	13	18	61	27	5
Other cuts ...	36	21	13	59	42	9
Rabbit domesticated ...	38	28	4	58	35	11
Milk Fat:						
Buffalo (Indian) ...	62	29	15	33	26	1
Cow ...	55	25	12	39	33	3
Goat ...	62	27	8	33	25	5
Human ...	46	22	7	48	34	7
Poultry and Eggs:						
Chicken ...	32	24	7	64	38	20
Turkey ...	29	22	6	67	43	21
Chicken eggs ...	32	25	7	61	44	7
Fish and Shellfish:						
Eel, body ...	23	17	2	73	...	36 (−2.6 H)
Herring, body ...	19	11	1	77	...	19 (−3.5 H)
Menheden, body ...	24	15	3	71	15	3
Salmon, body ...	15	12	2	79	...	26 (−2.8 H)
Tuna, body ...	25	18	3	70	...	25 (−3.2 H)
Turtle ...	44	16	7	51	...	31 (−2.6 H)
Separated Fats and Oils:						
Butter ...	55	25	12	39	33	3
Lard ...	38	31	7	57	46	10
Codfish liver ...	15	12	1	81	...	25 (−3.3 H)
Halibut liver ...	17	13	Trace	72	31	...
Whale blubber ...	15	9	1	41	...	21 (−2.4 H)
Plant Products:						
Corn meal (white) ...	11	8	1	82	34	44
Millet (Foxtail) ...	31	10	14	61	20	35
Oats, rolled ...	22	13	4	74	32	41
Rice ...	17	12	2	74	39	35
Sorghum ...	12	7	5	81	37	44
Wheat flour, white ...	14	10	4	76	31	42
Wheat germ ...	15	11	4	77	23	48
Fruits and vegetables including seeds:						
Avacado pulp ...	20	18	2	69	45	13
Cantaloupe seed ...	15	10	4	79	26	53
Chickpea ...	9	4	2	87	50	36
Chocolate ...	56	23	33	39	37	2
Olives ...	11	9	2	84	76	7
Pigeon pea ...	33	...	...	57	6	46

Food	Saturated Fatty Acid			Unsaturated Fatty Acid		
	Total[2]	Palmitic	Stearic	Total[3]	Oleic	Linoleic
Pumpkin seed ...	17	9	8	78	37	41
Rape seed ...	6	2	2	89	16	14
Sesame seed ...	14	8	4	80	38	42
Soybean ...	20	11	7	75	16	52
Squash seed ...	18	12	6	77	35	42
Watermelon seed ...	17	10	6	78	18	59
Nuts and Peanuts:						
Almond ...	8	7	1	87	67	20
Beechnut ...	8	5	3	87	54	31
Brazilnut ...	20	14	6	76	48	26
Cashew ...	17	6	11	78	70	7
Coconut ...	86	10	2	8	7	Trace
Filbertnut ...	5	2	2	91	54	16
Hickory ...	8	6	1	87	68	18
Peanut ...	22	11	4	72	43	29
Peanut butter ...	26	11	6	70	45	25
Peacan ...	7	6	1	84	63	20
Pistachio ...	10	8	2	85	65	19
Walnut (English) ...	7	5	2	89	15	62
Separated Fats and Oils						
Cocoa butter ...	56	23	33	39	37	2
Corn oil ...	10	8	2	84	28	53
Cottonseed oil ...	25	22	2	71	21	50
Margarine[4] ...	26	21	3	70	57	9
Olive oil ...	11	9	2	84	76	7
Palm oil ...	45	39	4	49	40	8
Peanut oil ...	18	8	6	76	47	29
Safflower oil ...	8	3	4	87	15	72
Sesame oil ...	14	8	4	80	38	42
Shortening (animal and vegetable) ...	43	27	12	53	41	11
Shortening (vegetable)	23	14	6	72	65	7
Soybean oil ...	15	9	6	80	20	52
Sunflower oil ...	12	6	5	83	20	63

[1] To calculate fatty acids in foods, multiply amount (gm) of fat in food portion by value of each fatty acid. Trace is used to indicate values of 0.5 or less.

[2] Includes other saturated fatty acids in addition to palmitic and stearic.

[3] Includes other unsaturated acids in addition to oleic and linoleic.

[4] Varies widely depending on fats used. (From Fatty Acids in Food-Fats. U.S. Dept. Agri., Home Econ. Res. Rept. 7, 1959). 'Principles of Nutrition'. Pp. 35-37. 2 Edn. (1968).

Diet in Gout and Rheumatoid Arthritis

Gout is usually a hereditary disease that is mostly common in males. The uric acid content of the blood rises due to unknown factors and the extra acid in the form of urate settles in the cartilages and articular cartilages of the joints of the fingers and toes causing swelling and pain.

In gout avoid all foods rich in *purine bodies* (See page 17). Drink plenty of plain or aerated water and eat purine free foods (See page 17). Taking a tablet of *C. Cincovit* or *Deltabutazolidone* (Giegy) etc., thrice daily under the supervision and advice of a physician is recommended.

Rheumatoid arthritis is a crippling disease caused by many factors such as low body resistance to infection of gums, throat, kidney etc. However, a definite cause is not fully ascertained. The author believes that it may be either due to dryness or the deficiency of a jelly like lubricating substance in the joints. Most of the crippled patients are found to be dyspeptics and highly irritable. Therefore, it is infered there may deficiency of vitamin B_1, C and other enzymes which are hitherto unknown. It cannot be assured that rheumatoid arthritis can be completely cured when once it is established, but can be prevented by regular medical checkup and keeping the good health. However, the pain can be alleviated by using *Aspirin* 5 to 10 grains three times daily with milk. Regular use of *lady's fingers*, *bitter-sweet leaves*, *brahami leaves*, *dantu* etc., with complete bed rest checks the frequent episodes of pain. Cortisones and other toxic analgesics should be temporarily used only in severe conditions under the strict supervision of a physician. Beware of all such drugs which act only for a short time and spoil your health if self administered. **(For details of other diets in other diseases read author's book, 'The Practice of Dietetics'.** *Under preparation.*)

PART XIII

WHAT SHOULD BE YOUR IDEAL DIET

There is a controversy about the superiority of the *vegetarian over non-vegetarian diet* or *vice versa.* However, if you ask my advise, I will certainly say, to follow the path of your parents.

As a physician, I will certainly prefer to be a vegetarian than a non-vegetarian. However, some animal proteins are also essential for the maintenance of good health. But, eating excess of flesh food is certainly injurious to health, as it produces high acidity in the organism causing serious diseases like high-blood pressure, heart-failure, baldness etc.

If you study the anatomical and physiological structure of man and his organs of digestion you will come to a conclusion that he is both herbivorus as well as carnivorus. Because, he can eat and digest both the kinds of foods. But, in the beginning man was purely a vegetarian; as *Holy Bible* tells that God created the world in six days. 'The seventh day God rested and established it as a memorial of His creative power. At the end of that week He gave for food, fruits, grains and nuts'. (Genesis 3:22-24). Then, a little later, the 'herb of the field' or vegetables were added. (Genesis 3:18). On this diet men lived and their lives span was counted in hundreds of years. In this course of time, *The Bible* points out, the wickedness of man became so great that God destroyed people by a universal flood. *Noah* and seven other persons survived in this flood because God warned him to build a large boat or ark to ride upon the waters. When the water subsided, the ark landed in the mountains of Ararat'.

'With no plant life available, God gave men the permission to eat meat. From that time on the span of the life was shortened and by the time of Christ it had dropped to seventy years'. (Dr W. McFarland and Dr Philip Nelson, M.D. 'You And Your Health', Lesson 11, Voice of Prophecy, Poona 1, India). The same statement of Noah's Flood is also narrated in *Holy Quran.* 2: 172-174. 11:25-36-49.

Some think that vegetarians are weaker than the non-vegetarians. It is an erroneous belief. *Dr Irving Fisher* and many other

eminent scientists; who carried out number of series of experiments with vegetarians and non-vegetarians, say, 'It is a very remarkable fact that the vegetarians always win in endurance test; than the flesh eaters'.

Another scientist *Dr Henry C. Sherman* says, 'It was found that as vegetables and fruits become more prominent, there was increase in the energy, phosphorus, calcium and iron values, and we may infer, in vitamin A, C, and G values also, of the diet, while the protein remained practically unchanged. This increasing use of vegetables and fruits seems to improve the food value of the diet at every point'. (You And Your Health. Lesson 10, page 3, V.O.P. Poona 1).

Dr Jean Bogert of America says, 'The legumes and nuts are vegetable foods richest in proteins, and the amount they contain compare favourably with the protein content of the meats. . . . Most of the nuts furnish complete proteins. . . . The pea-nut, soya bean and pea have proteins which are adequate for both maintenance and growth. . . . The dried legumes are about the cheapest source of proteins'.

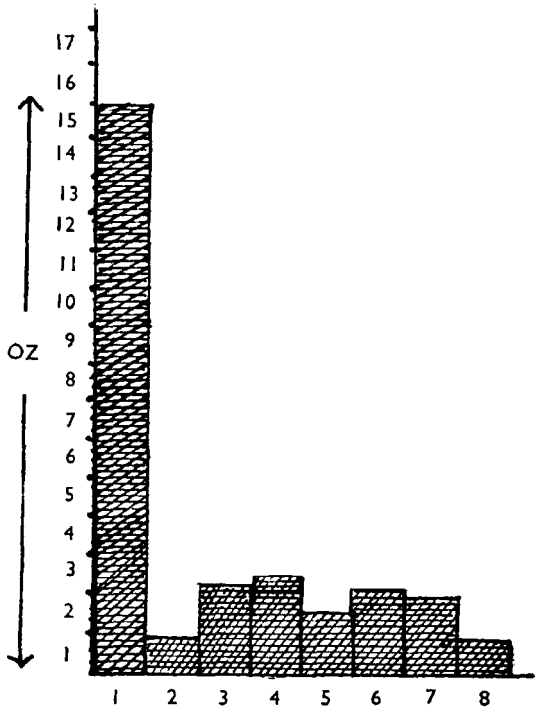
With all these authoritative statements the selection of an ideal diet is left to one's own discretion.

Some golden tips about eating

1. Eat only when you are hungry.
2. Wash your hands and nails cleanly with soap and water.
3. Before you eat; say, I commence in the name of God. Who is more merciful and benevolent.
4. Eat with your hand instead of fork and spoon. Eating with your hand helps the digestion of the food, as it has a sort of bio-current which on contact to the food acts as an enzyme to digest it quickly in the stomach. This is the reason that hand touched food gets easily spoiled. However, eating with fork and spoon is a good hygienic habit if the food is cooked well and nutritious.
5. Stop all your mental engagements before you sit to eat. Be cheerful and in a relaxed state of mind and body.
6. Listen to light music while you are eating.

7. Have the walls of the dining room painted with rose pink colour. It gives a cheerful feeling and aids in your digestion.
8. Rise from the table when you have some desire to eat. Because over loading the stomach acts on the heart, causes indigestion, and sleeplessness. *Aviceena* says, 'The stomach is the house of disease and the diet is the head of healing; for the origin of the sickness is INDIGESTION'.
9. Take a little nap after your food and never try to hurry up immediately to go out or catch your bus. Many persons, who have some hidden heart troubles drop dead on the road by their haste with loaded stomach.
10. Never eat stale food. Gently request your wife to cook always fresh food. Tell her with love to serve, fresh, clean, tasty, aromatic, eye-catching and a different kind each time.
11. Appreciate her cooking and give her some encouragement.
12. Dear house wife, please wear a crown of cheerfulness when you serve your husband and wear clean dress with pleasing colours.
13. Keep your kitchen surgically clean, cover your food to avoid exposure and try to learn new recipes. Remember, your husband's health depends on your cooking. Also, your love makes a tract to his heart through his stomach.
14. Gentleman, eat wisely and grow healthier live younger and longer.
15. Live not to eat, but, eat to live.

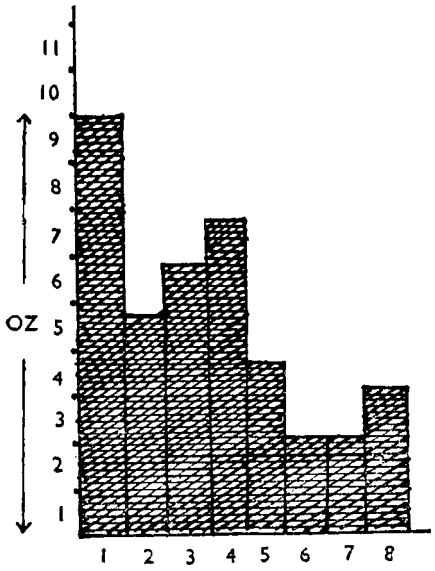
Your Ideal Diet Chart



Indian Diet Per Day

1. Rice
2. Millet
3. Pulses
4. Non-Leafy Vegetables
5. Leafy vegetables
6. Milk
7. Fats and Oils
8. Sugar

	Supplying
Protein	38 G. Vitamin A. 500 I.U.
Fat	19 G.
Carbohydrate	357 G. Vitamin B_1 0.5 mg.
Calcium	0.16 G.
Phosphorus	0.60 G. Vitamin C. 15 mg.
Iron	9 mg.
	Calories 750 per Day.



Balanced Healthy Diet

		Supplying
1. Rice	Protein	73 G. Vitamin A. 5000 I.U.
2. Millet	Fat	73 G.
3. Non-Leafy Vegetables	Carbohydrate	445 G. Vitamin B_1 1.5 mg.
4. Leafy Vegetables	Calcium	1.5 G.
5. Milk	Phosphorus	1.4 G. Vitamin C. 100 mg.
6. Fats and Oils	Iron	60 mg.
7. Sugar		**Calories 2795 per Day.**
8. Pulses		

By Courtesy of Drs. W. R. Aykroyd, V. N. Patwardhan, and S. V. Ranganathan, Health Bulletin, No. 23, 5th Edn., Govt. of India Publication, Ministry of Health, New Delhi, India.

PART XIV

FOOD POISONING

Food poisoning means developing of toxic symptoms like vomiting, diarrhoea, abdominal pain, respiratory failure and finally ending In death due to dehydration and shock after eating putrified foods, foods contaminated with certain chemicals mostly used as insecticides and foods cooked in copper vessels which have poor tin plating inside.

These contaminated foods, either transmit germs such as: *Salmonella Typhimurium*, *Claustridium Botulinum*, *Staphylococci*, *Streptococci*, *Shigella*, *Welchi bacilli*, *Escherichia coli* etc., or chemicals which irritate the entire intestinal tract and set a state of Gastro-enteritis and cause food poisoning.

Salmonella

Salmonella germs are usually found in the intestinal tract of cows, sheep, dogs, cats, horses, ducks, chicken etc. They mix in the soil and remain there in theform of spores and keep on floating in the air along with the contaminated dust. Certain foods like meat, cooked duck eggs, milk etc., are very favourable as a bait and these germs are attracted to these foods which are left exposed to the dust and flies. The germs remain there in an idle state till they enter the human digestive organs where they start growing in millions. Due to action of the secretions of these germs known as toxins which start circulating in the blood and cause lethal effects.

Symptoms

After six or eight hours of eating the contaminated food with these organisms, the infected person feels a sort of taste in the mouth with excessive salivation. There will be mild pressing headache in both the temples and he hears rumbling sounds in the tummy. After an hour, he feels crampy abdominal pain and

starts passing stools. He sits in the lavatory hugging with intense gripping pain in the abdomen. He presses with both of his hands over it to get little relief and passes a very bad smelling green semi solid stool mixed with blood and mucous. After some time, the frequency of passing stools becomes intense and he developes severe vomiting and loose watery cholera like motions. Due to excess of fluid loss by vomiting and diarrhoea, he feels intense thirst, his eyes go deep in their sockets, he becomes restless and weak. If, he is not properly treated, he dies due to *Dehydration, fear* and *shock.*

Prevention

The best and the cheapest method of prevention of this type of infection is; not to eat any food which is stale, exposed to dust and flies and is stored in dirty place. Salmonella infection runs in epidemic form, therefore, drink only boiled water and eat only in your home when it is still hot. Never save the left over food or eat after reheating it, because, certain toxins are unaffected by ordinary heating. Taking a teaspoon of pure *malt vinegar, raw onion, fresh mint* along with food is the best food antiseptic during the epidemics. Chewing the *ajowan* seeds is also a safe prevention of this infection.

Treatment

As soon as you see a person suffering from diarrhoea and vomiting, try to inform the health officer of your locality and get the excreta examined for Cholera and Salmonella organisms. If you have an Isolation Hospital, never waste your time in trying some home remedies. Instead, please, send the patient to the Isolation Hospital as early as possible. If you do not have such facilities, keep the patient isolated from the other members of the healthy family. Never allow anyone to enter his room and collect all his excreta in a vessel having some antiseptic like *Dettol* or *Phenyl.* Pour boiling water in it before you drain it in a pit and the mud is immediately covered over it.

During the acute phase of the disease, please, encourage your patient and put him in the hands of a qualified doctor. Give him only tender coconut water mixed with a fresh lime juice and he

must sip it little at a time. Continue the same liquid for three to four more days even after the recovery.

The treatment of Salmonella infection has become very simple after the invention of antibiotics like; *Terramycin*, *Chloromphenical*, *Furoxsone* etc. In severe dehydration, the former two antibiotics are injected intravenously along with Normal Saline to replace the lost fluid and to combat the infection. Orally, 2 Capsules of *Terramycin* or *Chloromycetin* or *Chlorostrep* or tablets of *Furoxsone* along with the tender coconut water under the supervision of a physician is recommended with excellent results. The symptoms of Cholera and Salmonella are so alike that it becomes difficult to identify them without the microscopic examination of the stools. In case of cholera infection, which is more severe and the mortality rate is higher than the other, all the persons residing in the locality should be inoculated against cholera and the public places where the food products are sold should be closed for at least two months and all the fairs should be stopped.

Claustridium Botulinum

Food poisoning due to these germs, is also fairly common and they are also inhabitants of the intestinal tracts of the animals. They remain in the soil in the form of spores and enter the human digestive tract along with the vegetables like; string-beans, peas corn etc. They also get into the digestive passage after eating the home made preserved non-acid canned foods which should be properly sterilised by boiling for at least fifteen minutes.

Symptoms

The spores begin to multiply in the digestive tract after twelve to twenty four hours or even they take as long as three to four days and start mixing their toxins in the blood stream. (G. M. Dack).

Due to circulating toxins, the infected person feels tired and exhausted due to abdominal pain, vomiting and diarrhoea.

After four or five hours of the appearance of these symptoms, the intensity of the pain, vomiting and diarrhoea becomes more. In addition to these symptoms, the person begins to see double objects, giddiness, difficulty in breathing and speech. Because. the toxins act on the C.N.S., particularly, the 3rd Cranial Nerve,

and if the person is not properly and immediately treated, death takes place due to pharyngeal muscle paralysis and dehydration.

Prevention

1. Avoid eating any food which emits rancid smell.
2. Cook all the foods properly, preferably in a pressure-cooker and eat them when they are still hot.
3. Never eat any stale food or the food which is reheated during epidemics. Usually there is no running epidemic of this type of food poisoning.
4. Boil all tinned foods for at least fifteen minutes before they are opened. If there is any bad smell or any gas, BEWARE IT CARRIES DEATH with it.

Treatment

The treatment and the nursing is same like Salmonella-Food Poisoning. There is no specific drug against these organisms (G. M. Dack).

Staphylococci

The germs which cause boils, tonsillitis, septicaemia and the formation of pus are known as staphylococci. These germs are found floating in the air and if the foods particularly, the meat, egg, milk preparations, salads, custard, boiled ham etc., are exposed to them; they settle on them and remain there in a quiscent state.

If you eat such exposed foods, these germs enter in your digestive system and get activated by the favourable surrounding body temperature. The secreted toxins act as poison and develop all the common symptoms like excessive salivation, diarrhoea, vomiting, thirst, abdominal pain. These symptoms become worst if proper treatment is not given in early stages and the patient dies due to dehydration and circulatory failure.

Prevention

Follow all the precautions described in other types of food poisoning. The toxins of these organisms are heat-resisting and the poison is not destroyed in the food, even after boiling it for more than half an hour. Therefore, ordinary cooking is not safe except, cooked in pressure-cooker.

Treatment

There is no specific treatment for this type of food poisoning, however, fluid replacement and cardio stimulants are life saving.

For other kinds of food poisoning, please refer any standard text book of medicine.

REFERENCES

1. Davis, A. F. and Southworth, W. H. *Meredith's Hygiene*, 5th Ed., New York, The Blakiston Co. Inc. 1954.
2. Dack, G. M., Cecil, R. L. and Loeb, R. F. *A Text Book of Medicine*, Philadelphia, W.B. Saunders & Co., 1955.
3. Dack, G. M., *Food Poisoning*, 3rd Ed., Chicago University Press, 1956.
4. Therapeutic Notes. Parke-Davis & Co. Med. Jour. No. 1, 1961, India.
5. *Text Book of Medicine*, By Dunlop. Text Book of Medical Jurisprudence. Tylors Ed. T. Stevenson, M.D., F.R.C.P., J. A. Churchil Publications London.
6. Galeota, W. R. and Moranville, B. A. Student Med., 7, 241 (1959).
7. Rettig, J. H., Scientific Exhibit, A.M.A. Annual Meeting Atlantic City N.J. (1959).
8. Fournier Villada, R. *et al., Paper read at the World Congress of Gastro-enterology*, Washington, D.C. (1958).
9. Massa, A., Brit. Med. J., 11, 1063, (1959).
10. Calesnik, B., *Scientific Exhibition*, A.M.A. Annual Meeting Sanfransisco, Calif.
11. Mintz, A. A., *Antibiot. Med.*, 7, 481, (1960).
12. Baddeley, H. *et al., Med Press.* 242, 172, (1959).
13. Musgrave, M. F. and Arm, H. C., *Antibiot. Med.* 7, 17, (1960).
14. Arora, V. D. and Rodrigue, P. F. *Current, Med. Prac.*, 11, 103 (1967).
15. News Item (F.P.J.) on Aug. 4 (1957).
16. W.H.O. Export Committee on Cholera T.R.S. No. 352 (1967).
17. Parke-Davis Dept. Med. Service Information 'Gastroenteritis and Cholera in 1967-68'. Aug. (1967).

PART XV

FOOD ALLERGY

Food allergy means, a kind of sensitivity of particular individuals to some specific food or any other substance. In such persons, if a substance or any particular food is given; marked sensitive symptoms like intense itching, appearance of rashes over the skin, urticaria, eczema, rhinitis, asthma like breathing and influenza like catarrhal symptoms will appear. After years of clinical research, it is concluded that certain *proteins*, *chemicals*, *carbohydrates*, *pollens*, *vegetables*, *fruits*, *hairs*, *feathers*, *smoke sunlight* etc., produce hypersensitivity due to which the body releases a kind of antidote which is known as *Histamine*. The allergic manifestations are found to be caused by the excessive release of this chemical in the body. Scientists have proved that the administration of *anti-histamine* drug like; *Chlorpheniramine*, *Buclizine HCl.* etc., help magically by the eradication of all the allergic symptoms. Administration of anti-histamine drugs has become one of the emergies in the practice of medicine.

Allergens (Substances that cause allergy)

(1) *Proteins*

Milk, meat, eggs, fishes, liver extracts, meat, crabs, lobster, etc.

(2) *Chemicals*

Lead paints, cosmetics, lipsticks, snow, perfumes, penicillin, procaine, streptomycin, arsenic, plastic materials etc.

(3) *Carbohydrates*

Starches, cereals, potatoes, sugar, etc.

(4) *Pollens*

Pollens of timothy grass, zinnias, flocks, crysanthums.

(5) *Vegetables*

Onions, garlic, beans, asparagus, celery, brinjal, peanut, cashewnut, hazelnut, chestnut, pepper, mustard, chillies etc.

(6) *Fruits*

Bananas, grapes, butter-fruit, oranges etc.

(7) *Hairs and Feathers*

Some persons are very sensitive for cat's hair, woollen clothes and goods horse hair and feathers of birds.

(8) *Smoke and Sun-light*

Smoke of certain grasses, direct exposure to sun-light, direct heat radiation from fire etc., also cause allergy.

There are certain other allergens which also cause allergy on having direct contact with them. For example, Poison Ivy, stinging-nettle etc. Some times some spring water may also cause allergy.

If you are a sensitive person to any one or more of the above mentioned substances, try to avoid them. If by chance they cause allergy, and the symptoms are mild, take one or two tablets of any one of the following Anti-histamine drugs like: *Avil*, (Hoechst), 50 mg. per tablet, *Benedryl*, (Parke-Davis), 25-50 mg. per capsule, *Sovental*, (Knoll), 25 mg. per tablet. *Synopen*, (Giegy) etc. Take one dose every four hours until the symptoms disappear. In severe reactions call your doctor immediately. He may prefer to administer these anti-histamines by injection and use some potent Cortesone preparations.

There are some very effective external applications in the form of creams and jellies such as: *Caladryl Cream* (Parke-Davis & Co.), and *Sovental Jelly* (Knoll) for the treatment of acute allergic manifestations of the skin. It is advised to avoid application of oily substances in such skin allergies. Because they are harmful and retard the quick action of the anti-histamine drugs. For allergic eczemas, contact dermatitis etc., daily application of *Nebacortril Ointment*, (Pfizer) gives immense relief and cures it.

Desensitising Method

If you know about a particular allergen which causes allergy in your body, take the advice of your doctor. There are number of test allergens, which produce antibodies in your system after they are administered in minute quantities by injection and make you less sensitive to the particular substance.

PART XVI

FOOD CONTRACEPTIVES AND FAMILY PLANNING

'The procreation of children has to be undertaken with a full sense of responsibility. The mother should know what is her duty from the moment she conceives right up to the time the child is born. And she who gives intelligent, healthy and well-brought up children to the country is surely rendering a service.'

MAHATMA GANDHI.

The present day achievements of human beings have made them to control many aspects of life hither to unknown and considered impossible. After the second world war many scientific inventions, particulary in the field of surgery, medicine, aeronautics etc., have left the unerasable imprints on the sands of time. One of the most thrilling advances among them is the *'heart transplant*, performed by a South African Surgeon *Dr Christian Barnard* upon the Dental Surgeon *Dr Phillip Blaiberg* the only living man in the world with a borrowed heart. This wonderful drama of life was played on 2nd Jan. 1968 at *Groote Schuur Hospital* at Cape Town. Another aeronautic feat that surprised the world was America's Appolo-8 space craft manned by *F. Borman, J. Lovel* and *W. Anders*, encircled just 70 miles from the moon and the safe return of these three Americans to the earth on 27th December of 1968 is really a remarkable event in the history of the world. It is highly delighting that man's progress is attaining the zenith. At the same time in certain other areas of life, he has remained unprogressed. The most important among them is the *food, housing* and *unemployment.* In spite of the most energetic attention to solve these problems by the developing countries the progress seems to crawl at the snail's pace. Do you know the reason of this slow progress? It is the *crazy growth of over population.* The scientific discoveries have reduced the mortality rate and have helped the man to live longer by increasing his life's span in India from 27 to 56 years. Before the world war many under developed countries had very

high mortality rate and after the discovery of wonder drugs this death rate has enormously reduced resulting in population explosion. In India, every day about 41 children per thousand are born. The statistics show that at this rate it will be about 17,000 babies per day. If something is not done to control this explosion imagine, what would be the population after 10 years time.

From 1963, the Government of India is trying its best spending over Rs 280 millions per year to cut down the birth rate from 41 to 25 per thousand. In spite of this struggle for the last five years the birth rate has not declined appreciably! This has created a doubt among many family planning authorities whether will it be possible for India to bring down the birth rate by spending Rs 2,500 millions in 20 years time unless we Indians decide and determine to plan to limit our families. All the developed countries are helped by their people and these nations are in the forefront of progressive line. Japan, U.K., Denmark, Germany, Canada, U.S.A. are examples. Pakistan is also trying to lead with these countries in spite of many difficulties. Why should we not also try to become a prospective nation.

Our agricultural statistics show that we are producing more than 98 million tons of food, and still are short of it. Therefore, we depend solely on the mercy of other countries to feed us. *Prof. Paul Erlich* said: 'In another 10 years it would take the entire grain production of the United States to save India from Famine' our education facilities have been increased by 300 per cent in between 1951 and 1966, and in spite of it more than 63.8 million children are today out of school. In 1951 there were about 3.5 million unemployed persons. To help them the Union Government created 30 million additional jobs between 1951 and 1965. But, unfortunately, unemployment has gone up more than four fold all due to over population. If this population explosion continues at this rate for another 8 years, the Indian population would reach 620 to 640 million mark.

Scientists after years of research have discovered a number of safe and simple methods for *birth-control.* In India, we have the opportunity of getting these benefits under the able leadership of *Dr S. Chandrashekar* an authority on population control. Yet our people are sunk in many religious and social beliefs in a land of hunger, disease, human agony and malnutrition, that family planning is not meant for Indians!

Influence of food in over population

After years of clinical investigations the author found that the type of food that we consume has an influence on increasing or decreasing the fertility in human beings. It is noted that excessive consumption of rice, fish, tapioca, carrots, lady's fingers, cotton seed oil, palm jaggery, liver of beef etc., *increases* fertility factor in males and females. It is also found that daily use of turmeric and its application over the body and eating certain spices regularly by females and taking daily hot bath and wearing tight underwears by males *decreases* fertility[1]. However, application of scientific methods of *birth control* help one to live happy without all these fuss about food.

What are the scientific methods of family planning

Many years of research in this field has proved that the practice of the following effective methods put the power in your own hands to limit your family and you can have a child at your will.

1. Safe period method

Many physicians and physiologists believe that conception does not occur if conjugal union takes place three days before and three days after *ovulation.* In a young healthy lady ovulation takes place on the 11th day of menstruation and continues upto 16th day. *Ten days* after the commencement of menstruation and 10 days after the lapse of 5 days in between are considered as *safe period.* After my 20 years of association in contraceptive field, I am doubtful and will refrain from advising my patients to practice this method. Because, the young couples are never safe and I have come across many young ladies who became pregnant after having intimacy during this *supposed safe period.* Moreover, this method produces *foetal deformities* if conception takes place.

2. Withdrawal method

This method insists that the husband should withdraw his organ from the vagina just before the seminal emission to prevent the spilling of semen inside. It is widely practiced in England and other developing countries.

I would certainly caution you against such a practice. Because the experience of many researchers confirm that this method is often unsafe and causes tension, depression, pre-mature ejaculation, impotency and anxiety in both the partners. Sometimes few sperms crawl along with the prostatic fluid and get deposited during the act even if the semen is ejaculated outside. *Dr. Hannah M. Stone*, an authority on contraception, writes, 'The act of withdrawl itself and the constant tension and anxiety on the part of both mates lest it be delayed too long, interferes seriously with the normal physiological processes of the sexual relation and may give rise to organic or emotional disturbances. Furthermore, if withdrawal occurs too soon it may prevent the woman from experiencing an adequate response and thus effect her sexual reaction.

Dr. Marie Stopes an another English authority on the birth control methods says, '*Coitus Reservatous* and *Coitus Interruptus*' popularly called withdrawal method are harmful to nerves as well as unsafe and very likely to fail. Therefore, this method is also not so popular with the young.

3. Surgical methods

(*a*) *Husband Sterilisation*

Before you read this chapter please familiarise about the male and female reproductive organs by reading some text book on Anatomy.

With the idea to avoid the sperms to reach the seminal vessicles, the spermatic cord is cut and its both ends are tied securely by opening a half an inch on either side of the scrotum above the testicles. This surgical operation is very simple which any competent surgeon can perform in his office under local anesthesia and send the patient home. This operation is technically known as *Vasectomy*.

It is a very effective and permanent method to fathers who have more than 3 children. It is erroneously believed that after this operation one becomes weak and impotent. On the contrary, one becomes more virile and less tensive after *vasectomy*. Progress is made to reconstruct the cut vasdeferens and you can have children again if you like.

There are many cases of recanalisation of the cut tubes, though rare, hence, it is always suggested to get a periodical seminal examination for the presence of sperms. The stagnant sperms in the testicles after vasectomy find no passage to get out, hence, remain there and die. The dead sperms are reabsorbed without harming the body. If you are a father of 3 healthy children, lose no time and get the vasectomy done. *It is simple, effective, painless, and increases virility.*

(*b*) *Wife Sterilisation*

The same principle of vasectomy is applied in women. Here, instead of seminal tubes, the fallopian tubes which transmit the fertilized egg are cut and tied so as to prevent the ova getting fertilized by a virile sperm. This operation is usually performed after the 3rd day of the child-birth by making a small incision over the lower abdomen under local anaesthesia. The patient is sent home in the usual time without any danger. This operation is called *Salpingectomy.*

Every woman who has 3 children and desires to see her husband live happy, healthy and long should undergo this operation. Many women are afraid of complications like obesity, severe menstruation etc. These are only imaginary fears. You are fully assured that there is no danger in undergoing such an operation. You will realise the truth only after this operation and it will not be worth listening to the advice of enemies of reform, and ignorant housewives. After this operation, you will never become pregnant, but, will live healthier, happier and longer in the company of your beloved husband and children.

(*c*) *Intra uterine contraceptive device* (*I.U.C.D.*)

The insertion of a foreign body in the uterine cavity is not new. It was first suggested by a German physician *Grafenberg.* But due to the irritating effect of the metalic ring, its popularity went down and was completely forgotten. Once again the idea of inserting a non-irritating metal in the uterine cavity introduced *Dr. Lippes* of America to try this method. Experiments were carried on several animals and human beings and finally the researchers found that insertion of a plastic spiral in the form of a loop in the uterine cavity increases the uterine contractions

and helps the release of unfertilized female egg, which enters the uterine cavity within 5 to 6 hours after getting released from the ovary instead of its usual three days time in the unlooped uterus. The loop alters the pH value and prevents the nidation of ovum even by chance if it gets fertilised. However, the one definite universal law plays a major role that 'two things cannot occupy simultaneously the same space.' The loop and the foetus will never exist simultaneously.

The insertion of loop is a simple technique, but it should be inserted only by a trained medical and para-medical staff after a complete gynaecological checkup including the test for cancer. Insertion of a loop in the presence of pregnancy, malignancy or other infections is contra indicated. If loop is not properly inserted there may be severe bleeding accompanied with back ache and fever. Due to faulty insertions, the popularity of the loop is loosing its ground in India.

Considering the failure of loop propaganda, I tried this method of loop insertion and found it to be very effective.

All the poor patients who were admitted in my hospital were fitted with a loop of 27.5 mm. size on the 11th day after delivery without the patient's knowledge and the nylon thread was left uncut and they were supplied Iron-tablets *Caldeferrum—Glaxo* to be taken 1 tablet two times daily for a month. After the checkup at the end of a month the thread was cut and continued Iron-tablets for six more months, advising the patients to come every month. In about 2 years time I have inserted 360 loops in this manner and kept a constant watch for any abnormal change. To my great surprise 75 per cent of the patients remained asymptomatic. There was no discomfort, menstruation was normal and there was no conception. The remaining 25 per cent of the patients found the loop in the vagina one or two months after the insertion. The loop was reinserted without telling its purpose. However, 15 per cent of patients again found the loop expelled with severe bleeding after 2 months.

On complete examination after D. & C., the endometritis was found. They were treated and advised to use chemical and mechanical contraceptives. Those who had no iron therapy complained of excessive bleeding and backache which subsided on

giving *inj. Imferon* I.M. 2 ml. daily for 5 days and *Caldeferrum* 1 tablet twice to continue. In such cases iron deficiency played a definite role in causing severe bleeding after the insertion of a loop. Encouraged by this method I suggest a fair trial of this method in all the low income group patients who attend the government hospitals for deliveries without telling the patients that a loop is inserted. Because many of the patients are scared of loop and this fear will always discourage them to have one. Let them get used to it first and then even if they are told they do not mind. Free supply of iron and multivitamin tablets should be regularly continued with a periodical checkup so as to confirm that the loop is *in situ*. Care must be taken to insert the loop after child-birth by fixing it in a retracting uterus. During this sterile period after the child-birth the woman will become used to this device and feel usual when the ovulation restarts. Once the patient is used to it, cut the nylon thread after checking the loop. Practice of this method carefully will certainly make the family planning a success in low socio economic group and those who start menstruating within three months after child birth.

In some rare cases extra-uterine pregnancy occurs in loop fitted persons. This is however a surgical emergency. If you miss one or two periods after fixing the loop and suddenly feel an intense pain with profuse perspiration, never loose time to remain at home trying medicines. Get admitted into the nearest hospital and submit entirely to the will of an attending physician. If there is an extra-uterine pregnancy it must be immediately removed surgically to save you from death caused by internal haemorrhage and shock[18].

4. Mechanical methods

The mechanical methods consist of wearing a rubber device in the form of a condom by male or a rubber cap by the female.

The condom is a thin rubber rolled over a rubber ring. It is covered over the male genital organ before the intercourse. The ejected semen is collected in the condom and prevents the sperms from entering the uterus and avoids pregnancy. Condoms in the name of **Nirodh** are freely available everywhere at the rate of 15 paise for 3. After once using **Nirodh** never use it again. Some times even a pin puncture may end in failure. Therefore it

is always safer to use some contraceptive jelly like: *Ortho-gynol*, etc., to be cent per cent safe. Since the use of condoms is very simple and does not require any medical help or advice, it is therefore, best suited in developing countries. Condoms are helpful in newly wed couples and those who desire to space the child-birth.

My opinion about the use of condoms for a long time is not in favour of it. Because, a large number of persons are found to develop anxiety and tension due to deprivation of natural contact during the conjugal union and they prefer normal contact rather than the use of condoms. Many women expressed that they felt an exhilarating feeling after the spilling of semen inside and felt depressed when condoms were used.

To prevent this I would suggest to get a suitable cap fitted in the vagina by a trained person. This of course is a very reliable method that is practiced all over Great Britain and other advanced countries. But, it requires a planned desire and adequate training in self insertion. This method has failed in India, because neither the advisor nor the recipient is interested in such things. The rubber cap with a spring ring fixes over the mouth of the uterus and prevents the entrance of the sperms. Even such caps should also be used with some spermacidal jelly to be hundred per cent safe. A good brand of cap can be left inside till morning after having the normal bliss of coitus and getting fully exhilarated. It cheers the husband too. The cap can be removed in the morning and kept for further use. Each cap can be used for more than 2 years if carefully looked after. It is advisable that every educated woman who desires to plan her family should learn this method and practice. It saves all the botheration of other methods and helps her husband to live fearlessly closer to her bossom. This method of *birth control* is ideal and most reliable in middle class educated families and those who desire to have a child at their will. Family planning advice should be given even when one is pregnant and after the child-birth she may continue to give a spacing. Because many women become pregnant even before 3 months after child-birth.

5. Chemical methods

These methods are devised to kill the sperms in the vagina and prevent their entry.