Impact of Incorporation of Defatted Soyflour in Fast Food Recipes

By

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TO MY PARENTS ,

THE SUNSHINE OF MY LIFE.....

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ACKNOWLEDGEMENT

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INTRODUCTION

I. INTRODUCTION

"I have little doubt that if people understand the laws of dietetics and acted accordingly a tremendous economy of food could be effected".

MAHATMA GANDHI

For centuries, Soybean has formed a part of the chinese staple diet. Soy bean often is referred to as the 'Wonder Bean' and the 'Yellow Jewel' and 'Great Treasure' by the Chinese. Soy bean is an oilseed of great potential having about 40 percent protein. Soybean has also been referred to as 'Cinderella Crop' (Iswaramurthy,1988).

Today many people die on global basis of malnutrition caused disease This is because of the misuse and waste of available protein sources. Moreover people are so used to their eating habits,that they refuse to acknowledge the newer protein sources. According to the U.S. Presidential Commission on World Hunger (1985), People in the less developed countries consume only 54 g. of protein as against 97 g. consumed by the developed countries.

An Indian diet is usually insufficient in protein intake. It is reported that seven hundred and thirty million people do not eat enough to lead fully productive lives (Sadik,1990). Moreover of the present 5.3 billion people on earth, a billion live in poverty. (UNFPA, 1990).

The reason for this sad state of affairs is many . The main cause is lack of information and the inability to appreciate the importance of protein. Then the traditional sources of protein world wide-eggs and meat – are out of reach of the vast dominant vegetarian population. Milk alone is not sufficient to provide enough protein ; dals and pulses do have protein but that alone is not enough.

Soybean can solve this problem, mainly because it is not a new source of protein . The chinese have used it for thousands of years and it has been existent in many parts of the world as animal food. Defatted soyflour is derived from an age old natural source of protein.

Defatted Soy Flour is one of the processed products of Soybean. Defatted soy flour is defined as the screened, graded product obtained after pressing or solvent extracting the oil from sound dehulled soybeans . The term FLOUR generally signifies that the material has been ground finely enough to pass through 100 mesh (USA) screen (WHP Guide line, 1980)

Defatted soy flour is a common form in which soy proteins can be incorporated in various food preparations. Its use in bread , biscuits , chappathies , snacks and textured products have been successfully demonstrated. (Gurmukh Singh, 1987).

Soy flour therefore can lend itself to any preparation making it easy to incorporate it into any food recipes. Soy foods will find a place in our diets in the near future.

People are tending to increasingly eat outside like never before. They are going in for establishments offering Fast Food which can cater to their needs quickly, economically and tastily. Fast Foods are those which can be cooked quickly and can be sold in restaurant to be eaten quickly or taken away (Oxford's Advanced Learner's Dictionary, 1989)

The growth of Fast Food Industry has many reasons. The following are a few:

There are changes in eating habits from traditional Food items to a wider range of items.

Teenagers represent a significant percentage of the population in India. This age group is less conservative in its eating habits and are more likely to accept convenience and fast foods.

More women are working and convenience foods have experienced growth due to demand of food and women who do not have the time to prepare meals.

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More women are working and convenience foods have experienced growth due to demand of food and women who do not have the time to prepare meals.

During the last 10 years, property values, rents and rates of high street premises have increased substantially so that more interest has fallen on minimum space and fast Service.

The growth has been further boosted by the influence of the U S. firms which was the pioneer in fast Food Industry.

Fast Food and popular catering may be defined as that sector of the catering Industry primarily concerned with the preparation and service of food and beverages quickly, for immediate sale to the customer (Davis and Stone, 1989).

Examples of fast food and popular operations include take-aways such as hamburgers and fish and chip operations, coffee shop, snack bars, self service cafetarias, public house catering., The road side vending, tea stalls and snack kiosks are also modified fast food establishments.

The Tea stalls, mobile vendors, roadside snack bars all fall under the category of take-away operations or Coffee Shops.

These fast food operations cater mainly to the lower and middle 'mass' markets with lower prices being charged than those food in other establishments. Many of these operations are a form of self service and consumption of the food may be on or off the premises: less rigid meal times are observed with some form of menu available throughout the day (Davis and Stone, 1988).

In the Indian scenario, more and more women are working. Small family and working couples are common today, with scarcer domestic help and less time available for cooking and more and more people are eating outside. Compared to the foods prepared and eaten at home, the nutrient densities of foods eaten away from home during a three day survey was found to be lower in all nutrients (USDA, 1984).

People eat and experience new items in these restaurants and then go home and try to prepare them. Thus to popularise any new product the Fast Food Channel is the best and quickest. Soy flour can be introduced into the fast food recipes and tested for acceptability in the laboratory. It can then be popularized with the establishment owners. As a final stage, customer awareness can be gained through the sales of soy products in these establishments.

In India where per capita food supply is lower it is likely that in a large fraction of households, sufficient consumption of nutrients falls short (Gopalan, 1985). Malnutrition is therefore rampant among the lower income strata. Over forty per cent of our population lies below poverty line (Prasad, 1985).

The small scale establishments like tea stalls, mobile vendors, are frequented by the low income people. Thus, these establishments can serve as important outlets to make a change in the eating pattern of these people. Through these establishments, soy flour incorporated snack can be sold and thus popularized among the people who need soy protein the most.

The objectives of the present Study can therefore be outlined as follows:

1. To gather information on snack foods most popularly sold in the fast food establishments.

2. To find out the acceptability of fast food recipes with the incorporation of soy flour in the laboratory.

3. To incorporate soy flour in fast food recipes and sell it through the selected establishments.

4. To popularise the use of soy flour among the community through this channel.

5. To create awareness among the public about the superiority of soy flour over all other flours.

6. To evaluate customer satisfaction of the products.

7. TO analyse the cost aspects of the soy flour incorporated recipes.

REVIEW OF LITERATURE

II.REVIEW OF LITERATURE

The related literature on the study "Impact of Incorporation of soy flour in fast food recipes" are reviewed under the following titles:-

I. The production of Soybean

II. Acceptability studies with Soya

III. The Health food - Soya

IV. Fast Foods - a means to popularize defatted Soy Flour.

SOYBEAN PRODUCTION

Human survival and evolution have been largely oriented by food availability. Present and future human welfare individually and socially is partly determined by the satisfaction of nutritional needs. The consumer in the industrialized as well as the developing world prefer animal protein and he is willing to pay considerably higher prices if he can afford it. The preference of animal over vegetable protein is partly derived from the consumers perception of quality and satisfaction nevertheless, nutritional

quality is a necessary condition in gaining consumer preference over time. (Ricardo Uaug and Enrique Yantz, 1983).

Presently more than 15 million die on global basis each year of starvation and malnutrition caused diseases. To overcome this grave situation a search for a new un-conventional source of protein is sought. Soybean which contains 40 percent protein, 10 percent oil holds a great promise to meet the present to meet the present day nutritional requirements of population group (Gandhi and Nawab Ali, 1987).

The demand for soy protein products is consistently increasing in India and other third world countries, as they have a great potential in solving the food shortage created by the ever demanding population (Nenwani et al, 1985). Thus soy protein has come as a boon to mankind, Soybean makes an important contribution to human nutrition in a world wide basis (Sattar et al, 1990).

Soybean have formed part of the staple diet in the Far-east for centuries, soybean accounts for over 50% of all oilseeds produced around the world, and currently 95M tonnes of soybean are produced annually in 40 countries around the world of course , a lot of this is animal feedstuff, but the percentage for human consumption is growing (Blankenship, 1985).

Martin (1985) calls it a soyabean miniboom in the U.S.A. and European Market. India produced 650 Metric tonnes which constituted 0.7% of the world production (1983, Soya Blue Book), In India, 980 tonnes soyabean has been produced in 1990 (Food Digest, 1990).

Soyabean is one of the cheapest source of protein available today. It can be easily cultivated in a short duration of 80-90 days and it grows well on almost all types of soil both under irrigated rainfed conditions (Jayalakshmi et al, 1987).

According to the All India Final Estimate Oil Seeds Crops (1988-87), soybean production was 1550.8 (in 1000 tonnes) for 1654.7 hectares (for 1000 hectares)

Acceptability studies with soya

"The proof of the pudding is in the eating"

The measurement of food acceptability is central within the whole area of sensory evaluation and food quality research and development. Measurement of sensory and other factors must be directed towards the ultimate aim of producing a product of maximum acceptance to the customer.

Measurement of food acceptability cannot be totally effective. However, unless one considers that the outcome is determined by many factors within the product and many factors with the consumer. Attitude, has been defined as an organisation of concepts, belief, habits and motives associated with the particular object. Attitudes are acquired, stable, cognitively and effectively loaded dispositions (Tourila 1989). Thus, sensory evaluation means that by the time the product reaches the consumer, its the right product (Tuley, 1990).

To test the acceptability of soy in diets many acceptability studies have been carried out.

Today soy is used in many forms both as a functional ingredient and as a meat replacer in the form of textured soy protein. As a functional ingredient, soy is highly successful. Soy protein has proved invaluable in a wide variety of food products including bakery products, confectionary, desserts, meats, fish products and snacks. In the case of a meat product for example, soy protein products can help maintain the flavour and prevent the loss of nutritional juices during cooking. Soy flour is widely used in baking for improving and conditioning bread (Byrne, 1988). A study was conducted and found that the nutritional quality of bread was found to be poor as compared to Soy Fortified bread (Dixit et al 1986).

Soyflour is highly blendable and thus can be used in many preparations. Soyflour could be blended with sorghum flour up to 50 percent levels for making deep fat fried items like methu Pakoda, Murukku, Upma, Sevai (Jayalakshmi and Neelakantan, 1987).

Potato patties can be made with defatted soyflour (Salamma, 1988). Soft chappathis can be made with 10 percent soyflour (Verma, 1987) wheat flour fortified with 11.1 percent defatted soyflour can be made into tortillas. These tortillas had a higher percentage of protein digestibility than 100 percent wheat flour tortillas (Gonzalez, 1988).

Noodles were prepared from semolina of durum and aestivum and 10 percent defatted soyflour. The sensory qualities showed that 10 percent incorporation was suitable (Singh et al, 1989). Satisfactory quality bread can be made from 5 percent level of full fat soyflour (Rastogi and Gurmukh, 1989) wheat flour incorporated at 10 percent and 20 percent levels with soyflour has an effect of softening the chappathies (Gandhi and Bourne, 1989) Soybean enriched wheat flour for use in chappathis is suitable (Rothod et al, 1983). Potato puree and wheat flour are blended with 2 parts by weight of soy protein concentrate and Faba protein. Two snack foods were prepared and deep fat fried (Youssef , 1988).

A study revealed that increasing levels of 5 percent and 10 percent 25 percent soyflour in Bread increased protein aminoacid, and ash content thus increasing the nutritional quality of bread (Dixit et al, 1986).

Soybean contains high percentage of relatively good protein quality and oil and is inexpensive. In fact, experience with INCAP have shown that a high protein quality food can be produced by cooking a mixture of corn and soy bean in the ratio 7:3 (Khan and Bressari, 1987).

Soybean diets are considered as the most appropriate alternative to cow's milk formula in respect to both flavour and cost (Hebel, 1988). High energy protein supplementary foods can be prepared from a combination of full fat soy flour with other Indigneous materials like rice, mungbean flour. Studies showed that the products have satisfactory nutrient and flavour stability after storage for six months at room tempreature (Nutrisyan, 1983).

Soybean infant formula are an advantage in developing countries for exploiting local resources and at generally reduced costs (Nicola, 1988). Soybean formulated products like bean and Tufu, Furu and Futsu can be easily obtained. (Chu, 1981). Thus soy protein is an essential element in man's diet.

The Health food - soya

Soy protein can be used in vegetarian families in which animal protein feeds are not desired, in the management of galactosemia, primary intolerance, because these foods are the most available foods not containing lactose (U.S.A. Academy of Pediatrics Commitee, 1983).

Substitution of soy protein for casein significantly reduced plasma triglycerides in men with Hypertriglyceridemia (Centre of Human Nutrition, 1983). Soybean can be efficiently labelled with radio-labelled Iron. Bio-availability of Iron from defatted soyflour was relatively high (Weaver et al, 1984). The Bio-availability of Iron in a diet based on extruded maize- soybean (70:30) was studied. In view of the wide dissemination of maize - soybean mixture, their fortification could be used in food aid programme, particularly in regions with a high prevalence of Iron deficiency (Moron et al, 1989). Further, high protein labelled soy protein fortified foods offer a highly acceptable method for providing a balanced menu while reducing caloric intake (Volgarev et al, 1989).

Soy protein based diets have been shown to have a substantial serum cholesterol lowering effect in hypercholesterolemic subjects, and the major decrease is in low density lipo protein (LDL) cholesterol (Widhalm, 1986).

Wolfe et al (1986) reported that the substitution of soy protein for meat and dairy products resulted in a substantial lowering of mean serum cholesterol in healthy adults of both sexes. Van Raaij et al (1981), reported that substitution of 65 per cent soy protein for casein in diets containing 13 per cent of total calories from protein resulted in a marked decline in LDL cholesterol and a weaker but still significant increase in high density lipoprotein (HDL) cholesterol. because soybean diets are finding increasing use in human diets, carefull consideration between soy protein intake and trace element nutrition in human subjects is essential. A study conducted suggested that iron in the soy protein isolate is readily acceptable and that the protein source does not reduce the availability of dietary zinc (Young, 1991)
It has also been studied that for most humans, there are no apparent inmunological consequences consuming a high intake of soybean protein (Goulding et al, 1983).

A study showed that soy protein consistently reduced incidence of gallstones. Switching over to a soy based diet after induction of gallstones resulted in dissolution of a significant percentage of gall stones. The reduction in lithogenicity associated with soy protein seems to be mediated primarily through decreased secretion of cholesterol intake. (Weber et al, 1987).

Soy flour is of great importance in the Diabetic Dietary. Its starch content being quite negligible and its saccharides low it is most suited to diabetic patients. Soybeans contain abundance of phosphates so that it can be used with advantage for the cure of the Nervous System. Some medical authorities have used them for the treatment to cure Rickets, Pulmonary diseases, Anemia with great success (Kale, 1985).

Replacement of dietary animal protein has been reported to reduce serum cholestrerol in hyperlipideamic humans in several studies (Wolfe et al, 1981).

Thus, soy products are very essential for normal healthy living. Soybean makes an important contribution to human nutrition on a world wide basis (Neelofar and Akthar, 1990).

FAST FOODS-A MEANS TO POPULARIZE DEFATTED SOYFLOUR

As food culture improved culinary skills emerged and food became more than a means of survival, it became central to the society as a means of cultural and social expression and became an important part of the fabric of life style(Jo Rogers,1986).

Demographic, economic and social change have been the important determinant of the food we eat. In the last 30 - 40 years greater affluence, more working wives and mothers, smaller families and an increase in the percentage of one and two persons house holds have resulted in more food being eaten away from home, the use of convenience food and more casual meals

and snacking (Mc. Kenzie, 1972)

Food service and sales are expected to reach 241.3 billion in 1990, a real dollar growth of 1.8 percent over 1989 according to National Restaurant Association. Food service Manufacturer's Association (IFMA) predict that Food Service will hit 244.9 billion in 1990. Sale at limited menu restaurent which includes fast food establishments will have increased over all other segments of the food service industry with a 3 percent real growth to 70.4 billion according to the National Restaurant Association. According to IFMA the stronger segment of the food service industry are separate eating places including fast food outlets, retail hosts example convenience stores and recreation. (Swienstek, 1990)

Thus, this segment of the food industry already provides much of our food and it must be included in any health promotion or disease prevention programme (Jo Rogers, 1986).

Nirula (1980) defined Fast foods as foods which can be served fast and which can be consumed fast.

MASLOW'S ORDER OF PRIORITY

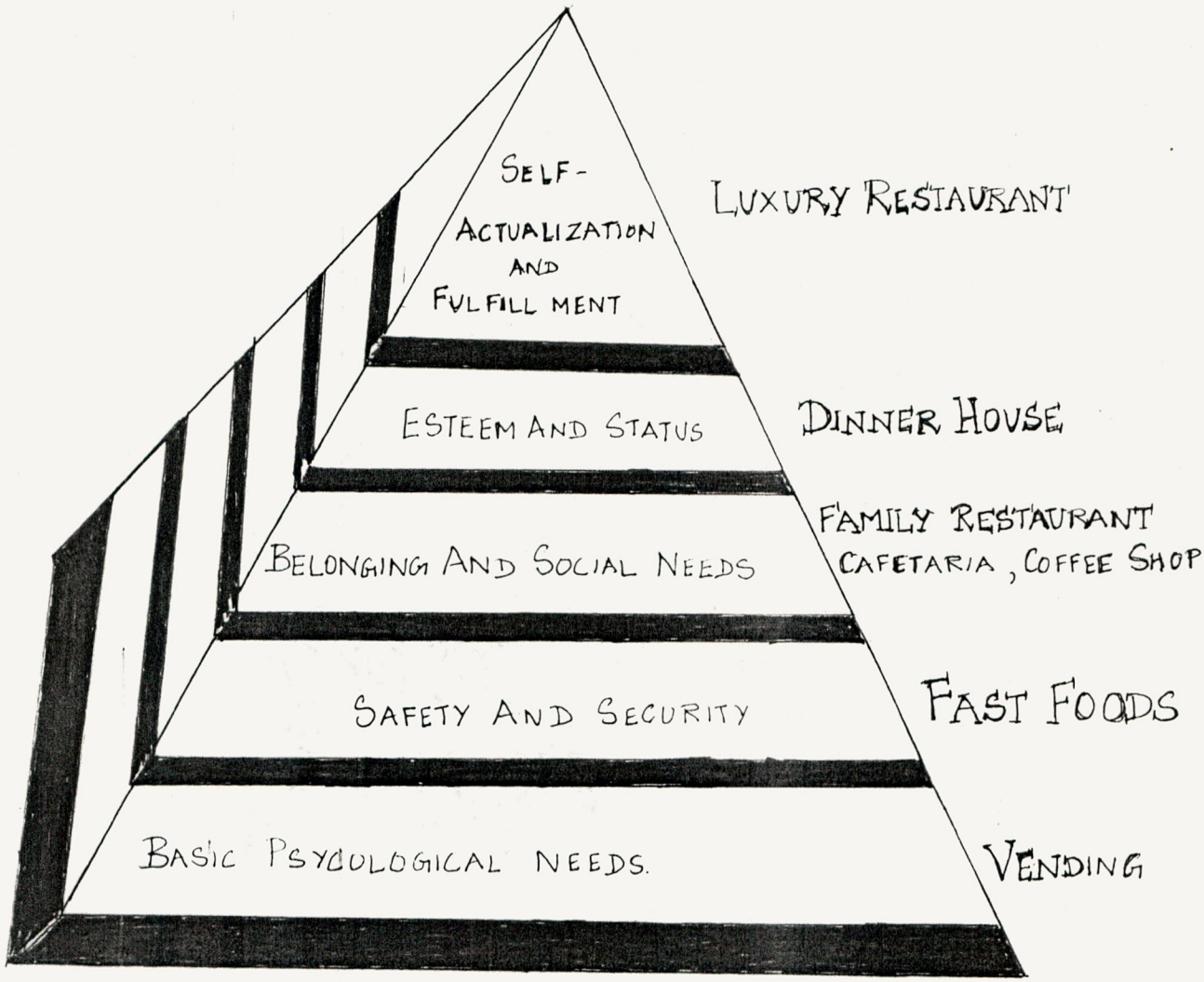


Figure : 1

There is a general belief that fast foods are not nutritious and are unhealthy. Conveience and fast food does not deserve the terrible reputation, some people give them. There is no such thing as a food that is bad (or good) for your health only your diet taken as a whole can be healthy or unhealthy (Food Manufacture, 1985).

It is not possible to say what contribution foods prepared away from home make to the nutrition of humans. In general, these foods are reported as energy dense and high in fat particularly saturated fat. They are high in sodium and deficient in Vitamin A and C (Rogers,1979).

To rectify this nutritional inadequacy, soyflour can be utilized in fast food recipes. Moreover at present, there is not enough meat in the world to supply the world's nutrition needs for protein at prices the consumer can afford to pay (Stainkraus, 1985).

In the U.S.A., convenience soy foods such as spreads, dips,tofu, pizzas, played a major part in increasing sales and the glamour element of products such as Toffuti Icecream has helped (Martin 1985).

The incorporation of soy in Fast Food started as far back as the 1970's. The Red Owl Retail Food stores on March 11,1973 in Minneapolis introduced a retail product named Juicy Burger II. It was a mixture of fresh red beef and textured soy

protein. Then similar products proliferated across the nation under the names Burger Pro, Plus burger and Proteen; Mixtures were in the range of 75% ground beef and 25% hydrated soy products (World Soy Protein Conference 1973).

Soy foods will increasingly find a place in our daily diets. A lot of people experience new foods in restaurants or Take-Aways and then use them at home, so changes in eating patterns can come about from 'away from home'eating and even in the institutional market (Houterman, 1985).

There is potential for incorporating soy foods into popular foods such as Burgers and Pizzas as well using them for ethnic dishes. U.S.a market has accepted soy product in convenience foods because of the health Boom. Products such as soy milk shakes, yoghurt,soy icecream can be popularised as low cost, low calorie, cholesterol free alternative to meat.(Chen,1985).

In India, the situation is almost identical. The cornucopia on the shelf is to reduce the drudgery related to cooking. The sales of idli, dosa, vada, dhokla, ragde, upattu, bhelpuri, pavbhaji rasgulla and fish curry has increased like never before. Fast food places are mushrooming in many metropolitan cities in India, the raison d'être of the Fast food industry is to cater to the food needs of people in places where life is fast, highly mechanised and industrialized; food on the Fast Food counter must be wholesome, nutritious and economic as we move towards the twenty first century (Nagar sekar, 1987).

Soybean textured protein are already in the market. With the recent boom in soybean processing, several soy bean flour, protein isolates and concentrates, meat analogues, soy based beverages should be on the shelves (Nagarsekar, 1987).

Studies have been done with defatted Soy flour to improve the nutritional status of children, in infant formulas and in disease condition. However, defatted Soy flour has not been yet incorporated in South Indian Fast Foods to improve the nutritional status of the community. Hence, Fast Food establishments can serve as important avenues in introducing Soy flour to alleviate the existing protein gap.

DESIGN OF THE STUDY

III. DESIGN OF THE STUDY

The experimental procedure pertaining to the study on "Impact of incorporation of soy flour in fast food recipes" is discussed under the following headings:

A. Selection of the flour

B. Selection of Establishment

C. Collection of Data

D. Conduct of Acceptability trial

1. Selection of recipe

2. Selection of panel

3. Criteria for evaluation

E. Incorporation of soy flour in fast food recipes

F. Evaluation of the soy flour incorporated recipes

G. Cost Analysis of selected soy flour incorporated fast food recipes.

H. Analysis of the Data

A. Selection of Soy Flour

Soy bean is a protein and also contains 20 percent oil (Patel and Nawab Ali, 1989) soy is progressively becoming a world potential source of major nutrients required for normal diet. Moreover, soybean is totally acceptable to Hindus and Buddhists as a substitute for fish and meat. So, defatted soy flour which can greatly improve the nutritional status of the community was

chosen as the suitable material for the study. Defatted soyflour, a processed product of soy flour was obtained from Sakthi Soyas Limited which is a major supplier of soy flour and incorporated in various fast food recipes.

B. Selection of establishments

South Indian Fast Foods like Bajji, Bonda are mainly sold in tea stalls which are in fact, small fast food establishments. Moreover, tea stalls are often visited by the lower income strata who are the most vulnerable in our community. There was a decreasing trend in the intake of energy and protein among all the age groups with decreased economic levels (Visweswara Rao, 1987). The diets of these people were found to have calories, vitamins and minerals, lower than the minimum requirements (Thimmaayamma et al, 1982). Thus these establishments were selected to improve the communities' protein requirements through the incorporation of soy flour in fast food recipes.

An initial survey was conducted in fifty establishments. These establishments were chosen on the basis of their location and the co-operativeness of the owners. These establishments were situated in market places, business areas, heavily populatedareas and in cross roads, bus stops, where there is

always a heavy traffic of people. Catering establishments are usually sited either in town centers such as in high streets, near cinemas, sports centres etc. which are primarily aimed at passing traffic or situated in residential areas which rely heavily on local and passing trade (Davis and Stone, 1988).

From the initial survey, the sub samples were selected at random. The term simple random sample of 'n' items means a sample selected from a population in such a way that each possible combination of 'n' units has a same chance or probablity of being selected. (Leabo, 1972).

C. Collection of Data

An interview schedule was drafted by the investigator to elicit information from the establishment owners. Data pertaining to items served, cost and special items prepared were collected. The interview schedule is an effective method for collecting information . The interview schedule used for collecting data from the owners is presented in Appendix I. An opinioner was also done for the customers. this was to draw information about their age, occupation, who and when they visit the establishment, the items preferred and their level of acceptablity of soy flour. Allport (1979), classically sums up an opinioner as follows:

"If you want to know how people feel, what they experience and what they remember, what their emotions and motives are like, and reasons for acting as they do-why not ask them?".

The opinioner used to elicit information is given in Appendix II.

Another interview schedule was formulated to elicit information from the establishment owners to find out the product acceptance after incorporation of soy flour by the customers. The interview schedule is presented in Appendix III.

The survey was conducted in Coimbatore City and data from fifty fast food establishments were collected. Out of this, ten establishments were selected at random, taking into consideration their co-operation and their dispersion.

D. Acceptability Trial

Selection of the recipe- The recipes selected as per the survey was bajji, pakoda, bhoondhi and bondas as they are

common fast foods popular in the establishments. The standard samples were prepared with 100 percent bengal gram flour. The experimental recipes were prepared with 50 percent soy flour and 50 percent bengal gram flour. The oil used for frying was refined oil.

A score card was prepared for the judge panel to evaluate the prepared samples. Sensory evaluation is important from the point of view of processing of a product and the customer acceptance of the product. Consumer acceptance is judged by the eye, smell and taste showing the consumer satisfaction and then satisfies the values of the processed products (Hogg and Samundoen, 1983). The model of the score card used is given in Appendix IV. The recipes for the preparation of the items is given in Appendix V.

Selection of the Panel - A suitable panel was selected to evaluate the samples. According to Piggot (1984), a panel is a group of assessors chosen to participate in a sensory tool. The panel consisted of four lecturers and three students. The lecturers were selected because of their past experience, training, and knowledge in the field of food science. The students were selected because they are less conservative and unbiased. The panel members were kept consant for all the

three consecutive experiments. The panel was not informed of the incorporation of defatted soy flour, but were just presented the samples and were asked to score them. Individual judging was allowed in a suitable environment to avoid bias.

Criteria for evaluation - The mean scores of taste, colour, flavour, texture were found. The comparison of the mean scores of both the experimental and standard sample gave the most acceptable samples.

Incorporation of soy flour in fast food recipes

The surveyed establishment were studied and details of customer turnover, items output, flour needed per day were collected. Then defatted soy flour was distributed according to the need for incorporation. The incorporation of defatted soy flour was carried for a period of seven days. The 10 establishments incorporated the defatted soy flour in different level of 10 , 25 , and 100 per cent.

F. Evaluation of the soy flour incorporated recipes

The defatted soy flour was incorporated into various fast food recipes and sold for a period of seven days. An opinioner

PLATE 1 - FRYING BONDHAS

PLATE 2 - PREPARATION OF BAJJIS

was prepared to evaluate the customer acceptance, with the help of the opinioner, information like why the customers come to the establishment, the age group of the customers, the income level of the customers, what items they prefer and their acceptance of the soy flour incorporated recipes. The owners were also given an interview schedule to collect information like peak hours of sales, customer preference, their acceptability of the taste, colour, flavour and texture of the soy flour incorporated recipes. The owners were given the interview schedule at the end of the seven day study.

G. Cost analysis:-

The cost of Bajji and Bonda with soy flour and without soy flour were analysed to find the profit margin in the various establishments. The cost aspect of defatted soy flour was compared with the other available protein sources like egg, meat poultry etc.

Analysis of the Data:-

"Analysis of the data refers to seeing the data in the light of hypothesis or research questions and the prevailing theory and drawing conclusions that are as amenable to theory formation as possible (Gatlung, 1979).

After all the data was collected, consolidation and interpretation was done.

RESULTS AND DISCUSSION

IV. RESULTS AND DISCUSSION

The results of the study "Impact of incorporation of Defatted Soy Flour in Fast Food recipes" are discussed under the following sub titles:

1. Selection of the Establishments
2. Nutritive Value of soy flour
3. Incorporation in Recipes
4. Acceptability by the owners
5. Customer age and income level
6. Preference rating of the customers
7. Frequency of visit, Timing, Reason for Patronisation.
8. Impact of incorporation among customers
9. Cost analysis.

Selection of the establishments

The sector of Fast Foods and Take-Away is concerned with the preparation and service of food and beverages quickly for immediate sale to the customer for consumption either on or off the premises (Davis and Stone, 1988).

In recent years the roadside catering units have grown in large numbers and cater to a large clientele. These units are actually modifications of the fast food restaurants which fit in very well to the particular local set ups (Aruna, 1983).

Thus for the study, fifty tea stalls which are small scale fast food establishments were selected. Table I shows the type of establishments surveyed.

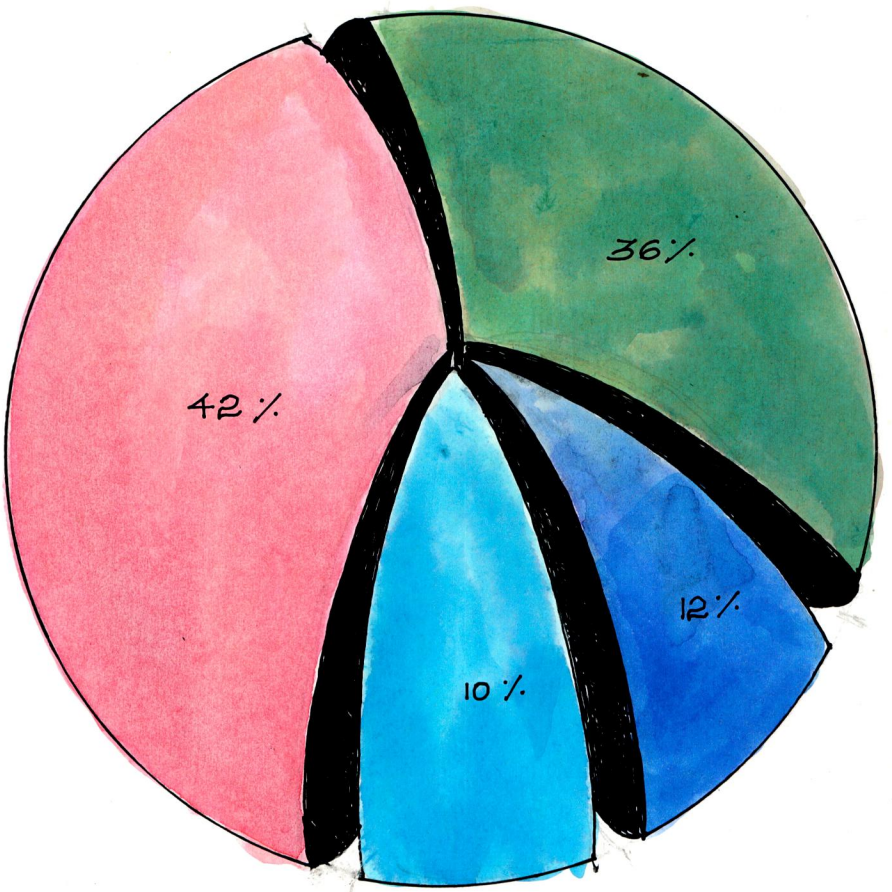
TABLE I

TYPE OF ESTABLISHMENTS*

Type	Number of Establishments N = 50
Road side Establishments	6
Established Restaurant	18
Tea Stall	21
Mobile	5

* FIGURE 2

ROAD SIDE	12 %
ESTABLISHED RESTAURANT	36 %
TEA STALL	42 %
MOBILE	10 %



PERCENTAGE OF TYPE OF RESTAURANTS SURVEYED

Figure - 2

Among the Fast Food Establishments surveyed 6 were road side establishments, 18 were established hotels, 21 tea stalls and 5 were mobile catering units.

Mobile Catering has become extremely popular in the last decade. In fact, it is gradually becoming popular with office goers, who prefer to pick up a hot packed meal for lunch, instead of carrying snacks, lunches, or eating in office canteens everyday(Sethi and Malhan, 1987).

There are many fast food items which are popular in south India. The fast food items commonly sold in these establishments are given in Table II.

TABLE II

FAST FOOD ITEMS COMMONLY SOLD IN THE VARIOUS ESTABLISHMENTS

FOOD ITEMS	NUMBER OF ESTABLISHMENTS No=50
Medu Vadai	11
Masal Vadai	25
Bajji	37
Bonda	32
Pakoda	4
Boondhi	2
Vegetable Puffs	7
Sweet Puffs	3
Samosas	3

From the Table II, it is evident that more establishments serve Bajji (37), next is Bonda (32), Masal Vadai (25). The other items sold are medu Vadai (11), Pakoda (4), Boondhi (2) Vegetable Puffs (2), Sweet Puffs (2) and Samosas (3).

Nutritive value of soy flour

Poverty has remained the biggest challenge in India's developmental efforts to being about perceptible change in the quality of life of million. Poverty is a complex phenomenon; some factors responsible for poverty are internal to a poor person such as low calorie intake, malnutrition, sickness and hence low production capacity (Mukerjee, 1990). This condition can be alleviated to a certain extent by one of the protein rich foods. It is an established fact that soybean contains more protein when compared to meat, egg, dals and grams. It is the best source of protein (about 40 percent) from the Vegetable Kingdom (Bhat, 1985). Defatted soy flour can be incorporated into any recipe.

Ries et al. (1987) reported the nutritive value of foods consumed at restaurants, fast food places and snack bar, in grocery and drug stores. Nutrient densities were lower for practically all nutrients in these foods than in food eaten at home except for fat which was higher in the foods eaten "out". To rectify all this nutrient deficiencies, defatted soy flour with its 50 percent protein can be incorporated in-to fast food recipes the nutritive value of Bajji, Pokado, Boondhi and Bondha were calculated for the bengal gram sample and soy

flour incorporated samples. Nutritive value was calculated from "Nutritive Value of Indian Foods" (1989) for bengal gram flour sanples. For soy flour incorporated samples, nutritive value was calculated from Foods and Nutrition Bulletin (1980).

Table III

PRODUCT - BOONDHI 100 G. Serves 4

NUTRIENTS	DEFATTED SOY FLOUR INCORPORATED SAMPLE	STANDARD SAMPLE
Crude fat g.	8.8	10.6
Moisture g.	14.9	9.8
Protein g.	34.4	20.8
Crude Fibre g.	2.4	1.2
Ash g.	4.9	2.8

Table IV

PRODUCT - BHAJJI 100g. Serves 4

NUTRIENTS	DEFATTED SOY FLOUR INCORPORATED SAMPLES	STANDARD SAMPLE
Crude fat g.	8.9	10.7
Moisture g.	31.7	30.6
Protein g.	35.5	21.2
Crude Fibre g.	2.8	1.5
Ash g.	4.7	3.05

TABLE VI

PRODUCT- PAKODA 100 g.SERVES 4

NUTRIENTS	DEFATTED SOY FLOUR INCORPORATED SAMPLE	STANDARD SAMPLE
Crude fat g.	9.4	10.4
Moisture g.	31.5	56.4
Protein g.	35.8	21.5
Crude fibre g.	2.6	1.5
Ash g.	4.5	3.1

It can be seen from the tables III,IV,V,VI that the fast food items prepared from 50 percent soy flour are far better in the nutritive value than those items prepared from Bengal gram flour alone.

The increased frequency of eating away from home and increased snacking practices appear to have affected nutritive quality of diets in a negative way (Commitee on Diet and Health 1989). Moreover, a study shows that an average of the days calories and a higher proportion of carbohydrate than fats or protein is provided by snacks (Commitee on Diet and Health 1989).

COMPARISON OF PROTEIN VALUES OF BENGAL GRAM FLOUR AND SOY FLOUR INCORPORATED RECIPES

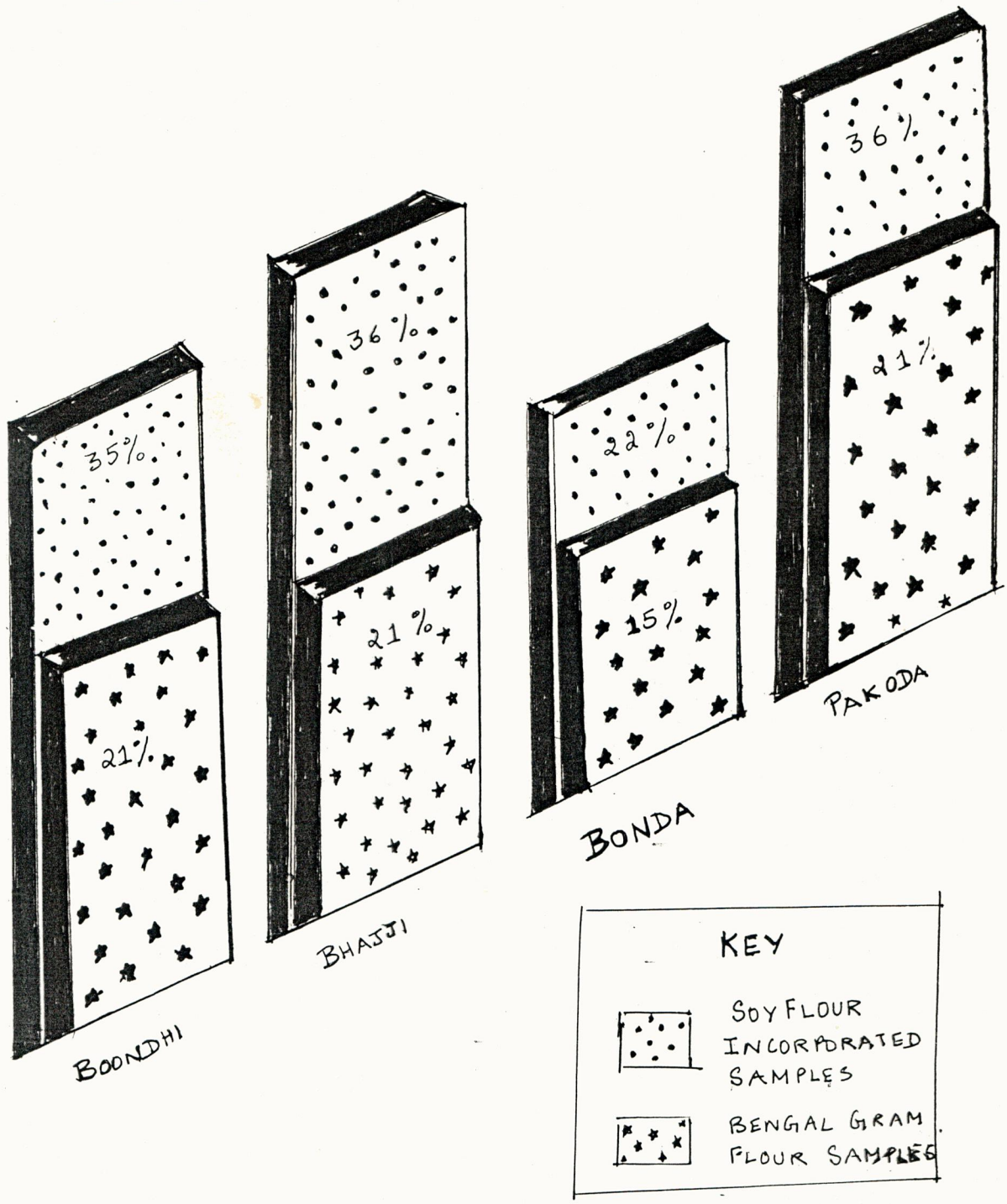


Figure. 3

Therefore, soybean and its dhal and flour should be used in smaller percentages in place of the existing popular pulses, dhals and flours and later increase the quantity for complete replacement wherever acceptable. The quantity of protein in soybean is so high that even a substitution of 20 percent in place of any cereal and 25 percent in place of any pulse will double its said nutrients.

(Vaidehi and Vijayakumari 1981)

Figure III gives the comparison of protein values of the products.

Acceptability trials with soy flour incorporated Fast Foods

Based on the survey conducted on establishments, an acceptability trial was conducted under Laboratory conditions with incorporation of soy flour in Fast Foods. A Score Card was used to evaluate the recipes. Mean scores obtained for the recipes prepared are presented in Table VII.

TABLE VII

MEAN SCORES OF THE RECIPES WITH STANDARD DEVIATION

QUALITY	PAKODA		BOONDHI		BAJJI		BONDA	
	STD.	EXP.	STD.	EXP.	STD.	EXP.	STD.	EXP.
COLOUR	4.3±	4.7±	4.1±	4.7±	4.4±	3.3±	3.9±	3.2±
	1.25	0.49	1.21	0.48	1.13	1.38	1.35	1.57
FLAVOUR	3.71±	4.6±	4±	4.2±	4.1±	3.9±	4.9±	4±
	0.76	0.53	0.58	0.49	0.69	1.06	0.76	0.57
TEXTURE	3.9+ −	4.4+ −	3.4+ −	4.7+ −	4.3+ −	4+ −	4.6+ −	4+ −
	1.06	0.79	0.79	0.76	0.76	1.53	0.78	1.41
TASTE	4.6±	4.7±	3.5±	4.4±	4±	3.9±	4.3±	3.9±
	0.63	0.48	1.13	0.79	0.82	1.06	0.76	0.89

STD - Standard

Exp - Experimental

The most common technique used in food related studies are the ones given by Lickert(1932). In this method, verbal statements,attitudes are derived from many sources and the respondents evaluate the statements on a scale (Tourila,1989). Evaluating the quality of dishes served to the customers must be a continuous process which helps to improve the product progressively. The sensory methods involve setting up taste panels consisting of people who are highly sensitive to slight changes in taste, flavour,odour,colour of foods. Some aids to evaluating foods are the use of score sheets for each dish (Sethi and Malhan, 1987). Allowing judges to make simultaneous evaluation of multiple sensory evaluation on individual evaluation test stimuli may make the most economical use of resources. Such concurrent procedures may be a valid as well as an efficient method of collection of this type of sensory data (Tantillo & Tiecco,1988).

Sensory evaluation showed that in colour, the soy flour incorporated recipes were found to the superior to the standard (prepared from Bengal gram flour) in Pakoda and Boondhi. In qualities like flavour, texture & taste also the soy flour incorporated recipes were found to be superior to the standard for Pakoda & Boondhi.

In the case of Bajji and Bonda the standard was found to be superior to the soy flour incorporated recipes in all qualities like colour, flavour texture and taste.

Details of the Establishment

The range of hot take away foods available is increasing rapidly and varies from traditional items such as fish and chips to chinese food. The major attraction of these fast foods is that they preserve family meal tradition without requiring the same kind of effort for perparation or serving. (Richardson,1971).

Reason for Popularity, Portioning and storage of the Item.

Twenty three establishment owners felt that their unique method of perparation was the cause for the popularity of the fast food items. Twenty one owners felt that the taste of the items they perpared was the cause of popularity. The rest six owners felt that their items were popular because of the cost aspect.

Most of the establishments served one item per plate(45). Only 3 served 2 items per plate. In case of items like Pakoda, Boondhi which were sold in Kilo basis, the portioning was different. Items were sold were sold on the basis of their weight say 100gms 500gms, and 1kg. and above. The establishments offered Fast Food items like pakoda and Boondhi in Kilo baisis.

Forty Eight establishments had no storage facility for the items perpared. The left overs or the remaining items were consumed by the workers or taken home and consumed by the owners. Items like pakoda and Boondhi were however stored in glass cases by two of the establishments.

Incorporation of soy flour in fast food recipes :

More than half of the establishments (27) had agreed to incorporate soy flour in their fast food recipes and sell it through their establishments. The rest (23) were apprehensive of any modifications and refused to try out the soy flour incorporated recipes in their establishments.

None of the establishments had heard of soy flour before the incorporation.

TABLE VIII

ACCEPTABILITY OF THE SOY FLOUR RECIPES BY THE OWNERS OF THE ESTABLISHMENTS

	QUALITY	NUMBERS OF OWNERS N = 10
	TASTE	
	Very Good	-
	Good	7
	Fair	3
	COLOUR	
	Very Brown	1
	Brown	9
	Golden Brown	-

QUALITY	NUMBERS OF OWNERS N = 10
TEXTURE	
Hard	2
Crisp	-
Soft	8
FLAVOUR	
Good	7
Fair	3
Poor	-

Table VIII shows the outcome of the incorporation of soy in fast foods for seven days. Eight of the owners agreed to incorporate in fast foods for seven days 25 percent soy flour and prepare the fast food items. One establishment prepared the items with 10 percent incorporation while the remaining one establishment prepared the Fast Food items with 100 percent incorporation of soy flour.

All the owners (50) felt that there was a definite change in the taste, colour, texture and flavour of the prepared recipes.

Seven of the owners felt that the customer acceptance of the prepared items were good and three of the owners felt that customer acceptance was fair. The peak hours of sale at nine of the establishments were 11.00a.m and 3.00 p.m. For the remaining one establishments the peak hours of sales was 9.00 a.m and 4.30 p.m

SALE OF THE PREPARED SOY FLOUR INCORPORATED RECIPES

PLATE - 3

Customer's Age and Income Level

On the basis of a four day intake study conducted in 1985,88 percent of women 19 to 50 years of age reported eating some food away from home. A larger proportion of men also reported obtaining and eating food away from home.(USDA, 1987). The age of the customers frequenting these establishments were studied.

Table IX shows clearly that most of the people (44per cent) visiting the tea stalls are within the age group 20-30,with 20per cent between 40-50 years, 2 percent between 50-60, 3 percent below 20 age group and above 60 years.

TABLE IX

AGE OF THE CUSTOMERS

AGE	PERCENTAGE OF CUSTOMERS
Below 20	3
20-30	44
30-40	29
40-50	20
50-60	2
Above 60	2

The type of customer likely to frequent these operations will vary in terms of sex, age, socio-economic grouping and so on; from this type of information any one can build up a customer profile that is a description of the type of customer likely to visit or frequent a particular operation (Davisand Stone, 1988).

Table X shows that 46 percent of the populace that visit the establishment are in the monthly income level between 500 - 1000, 36 percent in the monthly income level below 500, 11 percent in the monthly income levels 1000-1500, 1500-2000 and 2 percent in the income level above Rs. 2000/-. According to Swaminathan (HINDU,1990) people in the income bracket 0-2000 fall under the low income group, 98 per cent of the customers fell under the low income level and the remaining 2 percent were middle income group.

TABLE X

INCOME LEVEL OF THE CUSTOMERS *

Income Level	Percentage of customers
Below 500	36
500-1000	46
1000-1500	11
1500-2000	11
Above 2000	2

* FIGURE 4

INCOME LEVEL OF THE CUSTOMERS

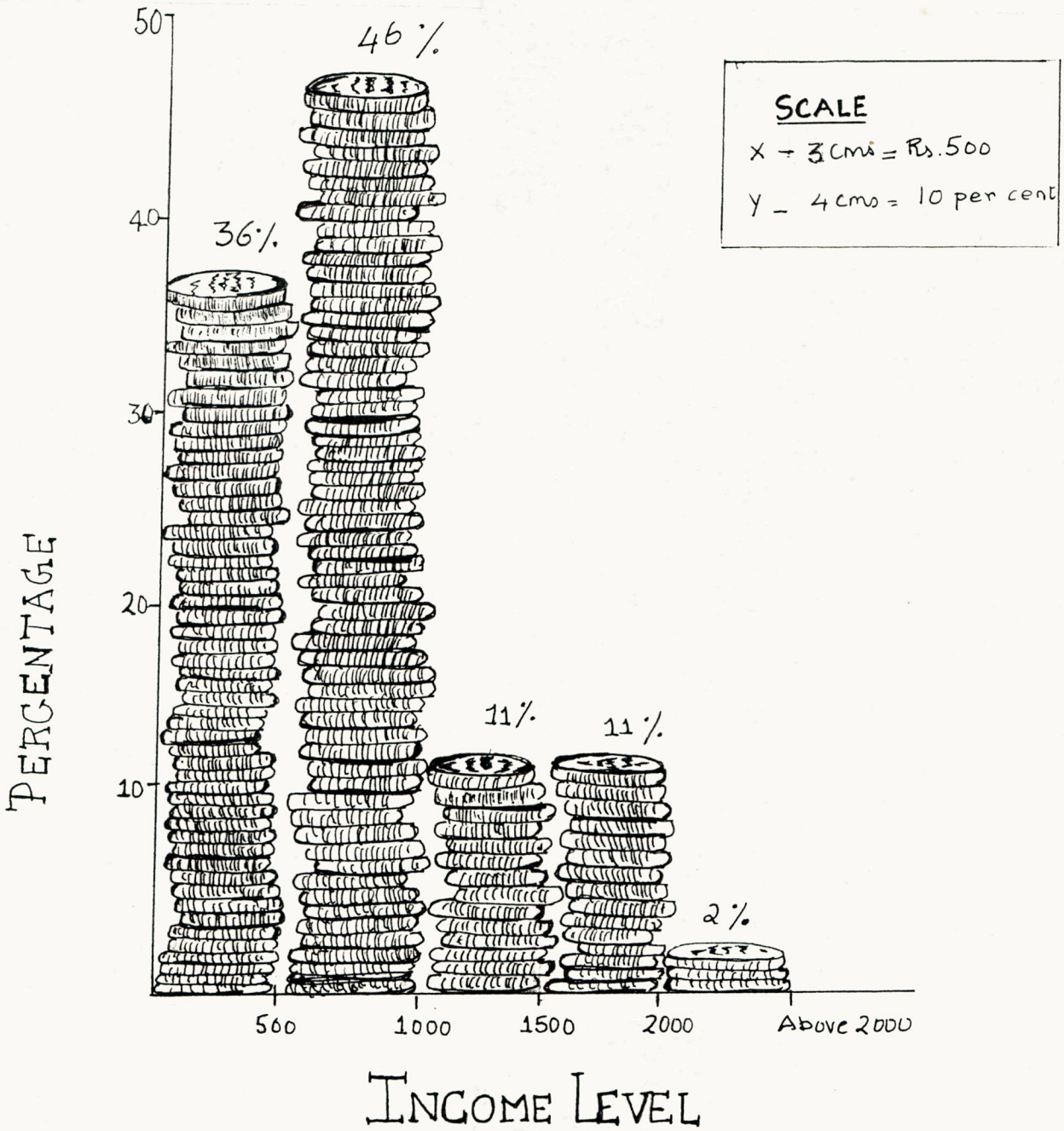


Figure: 4

TABLE XI

PREFERENCE RATING OF THE CUSTOMERS

AGE GROUP	ITEMS PREFERRED N=100	
	BAJJI	BONDA
YOUNG		
Below 20	3	-
20-30	37	5
Middle Age		
30-40	18	10
40-50	16	4
Old Age		
50-60	2	-
Above 60	-	2

From Table XI, 3 of the customers below 20 years, like bajji; bajji is also preferred by 37 people in 20-30 age group, eighteen in 30-40 age group, 16 customers in 40-50 age group, and two in 50-60 range. Bonda was preferred by 5 customers in the age group 20-30, ten in 30-40 age group, 4 in 40-50 and 2 of them above 60 years of age.

It was seen that Bajji is the fastest selling item (73) followed by Bonda (21) and Vadai (6).

FREQUENCY OF VISIT, TIMING & REASON FOR PATRONISATION

Table XII

FREQUENCY OF VISIT

AGE GROUP	FREQUENCY OF VISIT N = 100	
	ONCE IN A WHILE	OFTEN
Young		
Below 20	-	-
20-30	5	39
Middle Age		
30-40	6	23
40-50	2	18
Old Age		
50-60	1	1
Above 60	-	2

Table XII shows that the younger age group that is, below20 years, and between 20-30 years visit the establishment often (39) only 5 customers in the age group 20-30 visit the establishment once in a while.

In the age group 30-40, 6 of the customers patronise the establishment once in a while, while 23 of them visit often. In the age group 40-50, eighteen visit the establishment often and 2 of them once in a while. In the old age 50-60, and above 60, 3 of the customers visit the establishment often and one very rarely.

FREQUENCY OF PATRONISATION ON WEEKLY BASIS

Table XIII

FREQUENCY OF PATRONISING ON WEEKLY BASIS

FREQUENCY OF VISIT	NUMBER OF CUSTOMERS N=100
Daily	70
Twice a week	12
Very Rarely	4
First	14

Thus from the table XIII it is evident that seventy of the clientele patronise the establishment daily, twelve twice a week, and four visit the establishment very rarely and fourteen for the first time .

Most of the customers (65) visit the establishment at work hours while the rest thirty five visit before or after work hours. Seventy three of the clientele visit the establishment because they like the foods offered, 24 of them visit because the establishments is near and the remaining 3 visit the establishment for a change.

In take away operations, the customer's food and beverage items are wrapped and packed and the customer has the choice of either eating his food immediately or taking it away to be consumed later. (Davis and Stone 1988).According to the survey 85 of the clientele ate the items at the establishment itself while 15 of them pack the items and carry it away from the establishment.

Impact of the Incorporation of Soy Flour in the selected fast food recipes.

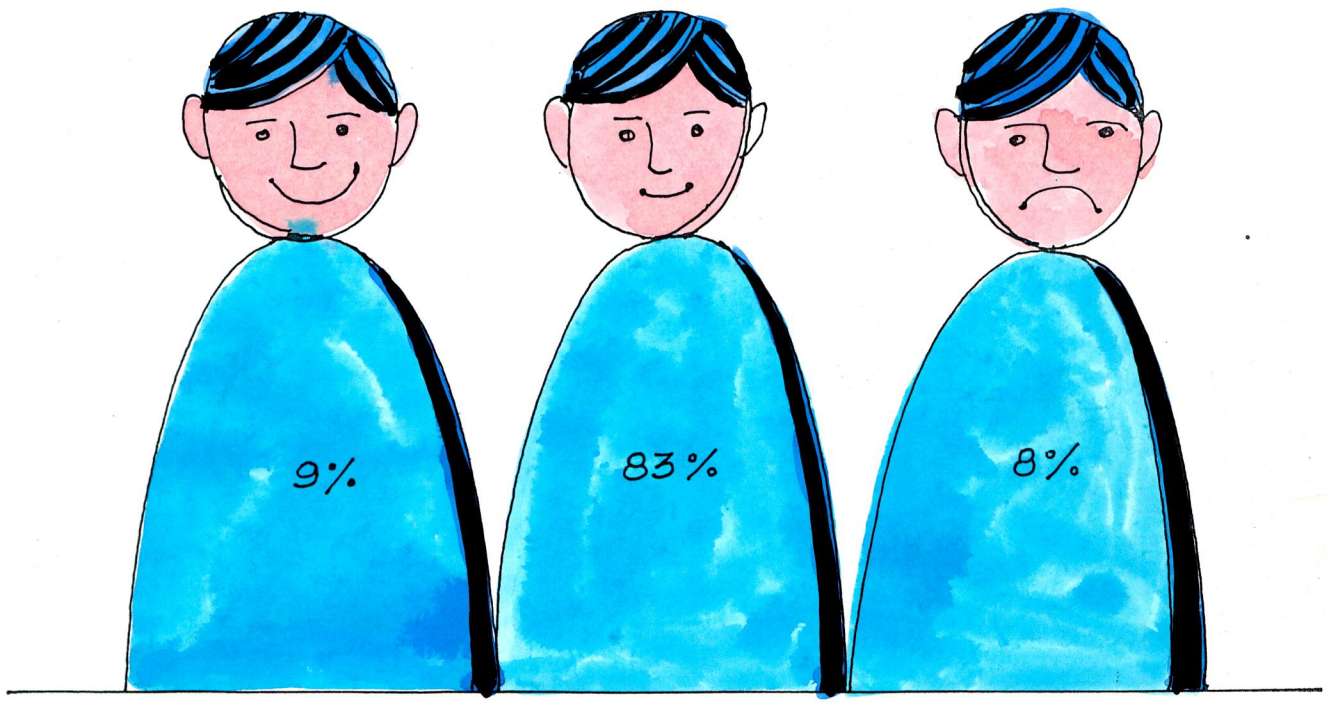
The table gives the consumer acceptance of soy incorporated recipes.

Table XIV

CONUMER ACCEPTANCE OF SOY INCORPORATED RECIPES

AGE GROUP	RATING N = 50		
	VERY GOOD	GOOD	FAIR
YOUNG			
Below	-	3	-
20-30	1	36	7
MIDDLE AGE			
30-40	5	23	1
40-50	3	17	-
OLD AGE			
50-60	-	2	-
Above 60	-	2	-

PERCENTAGE OF RESPONDENTS



CUSTOMER ACCEPTANCE OF THE PREPARED ITEMS

Figure - 5

From Table XIV it is inferred that 36 of the customers in the age group 20-30 felt that the food items prepared with soy flour were good, 8 in the middle aged group, that is 30-40 and 40-50 thought that the prepared items were very good 8 in the young and middle age group felt that the items were fair.

It can therefore be seen that most of the customers (83) felt that the Fast Food recipes prepared with 10 percent, 25 percent and 100 percent incorporation of soy flour was good in taste, flavour, colour and texture. Nine customer felt that the items were very good and tasted extremely good. The remaining 8 percent felt that the soy flour recipes were not very good and stated their reason as follows : 7 of them thought that the items tasted different and 1 customer felt that the flavour was not good. However, 92 customers felt that they did not notice any change and 8 of the clientele had noticed that there was a modification in the recipe. Figure 5 shows the customer acceptance of the prepared items.

COST ANALYSIS OF SOY FLOUR INCORPORATED RECIPE

The price is a very important element also to the success of the Fast Food and Popular Catering Industry. Customers will tend to be cost conscious and be aware of the prices charged by the competitiors for similar items. Any significant increase in price could well result in a significant decrease in sales. The price must be seen by these customers as given good value for money togetherwith a consistant and standard product of good quality (Davis and Stone, 1988).

TABLE XV

COST ANALYSIS OF BAJJI (ONE PIECE)

ESTABLISH - MENT	ACTUAL COST WITH 100 PER CENT BENGAL GRAM FLOUR	COST WITH 25 PER CENT INCORPORATION	COST WITH 100 PERCENT INCOR- PORATION	SELLING PRICE
1	0.55	0.57	-	0.60
2	0.46	0.48	-	0.75
3	0.50	0.53	-	1.00
4	o.43	0.46	-	0.70
5	0.54	-	0.65	0.60
6	0.46	0.49	-	0.60
7	o.44	0.45	-	0.50
8	0.40	0.43	-	0.65
9	0.36	0.38	-	0.60
10	0.27	0.29	-	0.30

Table xv, showed that the soyflour incorporated Fast Food recipes can be sold with a good profit margin by only slightly increasing the selling price of the fast food items. Moreover,soy flour incorporated items have superior quality protein thus being economically more suitable to the low income strata.

Vaidehi (1990), has compared the cost of one Kilo soy-sunflower tempeh with lamb and chicken and has shown the superiority of the tempeh. Similarly the cost of one Kilogram of defatted soy flour is compared with the other available protein sources.

TABLE XVI

COMPARISON OF DEFATTED SOY FLOUR WITH OTHER PROTEIN SOURCES

Protein Value Per 100 gram edible portion	Protein Gms.	Per Kilogram Rate (Rs.)	Approximate cost per 50 gram of protein
Defatted Soy flour	50	15	1.50
Cereals	8-11	8	3.75
Groundnut	25	10-12	2.50
Pulses/Dal	25	15	3.75
Eggs	14	8 Per Dozen	3.50
Chicken	25	38	7.20
Meat	20	40	9.60
Milk	4	5 Per Litre	55 -66

Table XVI shows the superiority of defatted soy flour over all other Protein sources both in protein quality and in cost. Thus, it can be seen that good quality protein can be obtained for a better bargain.

SUMMARY AND CONCLUSION

V SUMMARY AND CONCLUSION

Today soybean flour help feed the people better and could do much to reduce nutritional deficiencies in India. People are ignorant about the food they eat. The Indian diets are generally low in calories, vitamins, minerals and mostly protein. Defatted soy flour appears to have no equal in supplying protein (50 per cent). Defatted soy flour lends itself to any preparation and is easy to use. Defatted soy flour is also cheaper when compared to any other protein source. Thus this Defatted soy flour was chosen as the suitable material for the present study

Fifty estblishments were surveyed out of which 18 were established hotels 21 tea stalls and 6 were road side units and the rest 5 were mobile catering units. Out of these ten establishments were selected

The nutritive value of soy flour incorporated samples were calculated and compared with standard bengal gram flour recipes.

Defatted soy flour was incorporated in selected fast foods and was evaluated by a panel of judges. Results showed,

that soy flour incorporated pakoda and Boondhi were superior to the standard sample in qualities like flavour, texture, and taste. In case of Bajji and Bonda the standard sample was found to be superior to the soy flour incorporated recipes in all qualities like colour, flavour, texture and taste.

More than half of the establishment owners had agreed to incorporate soy flour in their fast food recipes and sell it through their establishments. The rest, refused to try out of the soy flour incorporated recipes. Hundred per cent of the establishments had never heard of soy flour before the incorporation.

Eight of the establishments prepared the Fast Food items with 25 per cent incorporation of soy flour, one establishment prepared the items with 10% incorporation while the other prepared the items with 100 per cent incorporation.

Seven owners felt that the customer acceptance of the prepared items were good and three owners felt that customer acceptance was fair. The customers likely to frequent these operations were mostly in the age group 20-30 years. The customers least likely to frequent these establishments were in the age group 50-60 years, below 20, and above 60 years. Most

of the populace were in the income level 500-1000.

Seventy three customers like Bajji in all the fast food items and the younger age group 20-30 years visit the establishment often. Most of the clientele (70) patronise the establishment daily. The reason for patronising the establishment by the majority of customers was the quality of food offered.

Results showed that 36 customers in the age group 20-30 felt that the food items prepared with soy flour were good; 8 per cent in the middle age group, that is 30-40 years thought that the prepared items were very good. Eight per cent in the young and middle age group felt that the items prepared were fair in quality.

It can there fore be concluded that most of the customers felt that Fast Foods items prepared with incorporation of soy flour was good. The owners of the establishment were very enthusiastic about the soy flour and agreed to incorporate soy flours in all there recipes in the future Cost analysis showed that the soy flour incorporated samples can be sold with a good profit margin by only slightly increasing the selling price. Cost comparison of soy flour with other protein rich source revealed superiority of defatted soy flour.

Recommendations

Long term studies can be undertaken to incorporate defatted soy flour in all fast food recipes like Burgers, Pani puri, Sev puri, Masala Poori, Puffs, samosas and Kachoris. These fast food items can be made popular in all Fast Food establishments which will increase the protein qaulity of food.

Studies can be undertaken to incorporate defatted soy flour in ready to eat mixes and ready to drink beverages.

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APPENDICES

APPENDIX -I

AVINASHILINGAM INSTITUTE FOR HOME SCIENCE AND

HIGHER EDUCATION FOR WOMEN

(DEEMED UNIVERSITY)

COIMBATORE

INTERVIEW SCHEDULE TO ASSESS THE IMPACT OF INCORPORATION OF DEFATTED SOY FLOUR IN FAST FOOD RECIPES

Name of the Interviewee :

Name of the establishment :

Name of the owner / Manager :

Location :

Type of establishment

Roadside :

Established Restaurant :

Tea Stall :

Mobile :

What are the food items served ?

Food Items	Amount	Cost

Which are the Fast Foods items sold regularly?

What are the special items, if any?

why are the items very popular?

Because of

Cost ( )

Texture ( )

Method of preparation ( )

Any others ( )

What is the number of items served/plate?

What is type of the storage if there are left - overs? Will you,

Throw it away ( )

preserve it and use it for the next day ( )

give to the employees for consumption ( )

Take it home and consume it ( )

Any others ( )

Will you accept any modification in the recipe?

How do you determine Food cost?

How much quantity of flour do you use per day?

APPENDIX - II

PINIONER TO ELICIT INFORMATION FROM THE CUSTOMERS VISITING THE SELECTED ESTABLISHMENTS

Name :

Age :

Occupation :

Income :

Do you visit this establishment

often ( )

Once in a while ( )

When do you visit this establishment? (tick the appropriate)

During work hours ( )

During lunch break ( )

After work hours ( )

Why do you visit the establishment? because

You like the food here ( )

The establishment is near by ( )

You were in a hurry ( )

How often do you visit the restaurant?

Daily ( )

Once in a week ( )

Twice a week ( )

Very rarely ( )

as the taste

very Good ( )

Good ( )

Fair ( )

Was the colour

Very brown ( )

Brown ( )

Golden brown ( )

Was the texture

Hard ( )

Crisp ( )

Soft ( )

Was the flavour

Good ( )

Fair ( )

Poor ( )

Can you offer any suggestions to further popularise soy flour

APPENDIX - III

AN INTERVIEW SCHEDULE TO ELICIT INFORMATION FORM THE ESTABLISHMENT OWNERS

Name . :

Location :

Peak hours of sales :

How much percent of soy flour did you incorporate in the fast Food Recipes?

10 percent ( )

25 percent ( )

100 percent ( )

How was the customer acceptance of the product?

very Good ( )

Good ( )

Fair ( )

Poor ( )

Was there any change in the products incorporation with soy flour?

yes ( )

no ( )

Do you consume the food

Here ( )

Take it home/office ( )

What are the fast food items you prefer

How was the perpared item

Very Good ( )

Good ( )

Fair ( )

Poor ( )

Can you find any change in the perpared Fast foods

Yes ( )

No ( )

If yes, in what did not you notice a change

Taste ( )

Colour ( )

Texture ( )

Flavour ( )

Do you think the pricing of the products were nominal?

Yes ( )

No ( )

APPENDIX - IV A

SCORE CARD FOR EVALUATION OF THE RECIPES

PRODUCT : Bajji

Characteristics	Score	Sample	
		A	B
COLOUR			
Golden Yellow	5		
Golden brown	4		
Pale Brown	3		
Pale Yellow	2		
Dark Brown	1		
FLAVOUR			
Very Good	5		
Good	4		
Quite Good	3		
Fair	2		
Not Good	1		
TEXTURE			
Soft	5		
Crisp	4		
Hard	3		
Leathery	2		
Soggy	1		

CHARACTERISTICS	SCORE	SAMPLE	
		A	B
TASTE			
Excellent	5		
Very Good	4		
Good	3		
Fair	2		
Not Good	1		
TOTAL SCORES	20		

* SAMPLE A - STANDARD

*SAMPLE B - SAMPLE

APPENDIX IV B

SCORE CARD FOR EVALUATING THE RECIPES

PRODUCT : Boondhi

CHARACTERISTICS	SCORE	SAMPLE	
		A	B
COLOUR			
Golden Yellow	5		
Golden Brown	4		
Pale Brown	3		
Brown	2		
Dark Brown	1		
FLAVOUR			
Very Good	5		
Good	4		
Quite Good	3		
Fair	2		
Off-Flavour	1		
TEXTURE			
Crisp	5		
Very Crisp	4		
Soft	3		
Hard	2		
Soggy	1		

Characteristics	Score	Sample	
		A	B
TASTE			
Excellent	5		
Very Good	4		
Good	3		
Fair	2		
Not Good	1		
TOTAL SCORE	20		

SAMPLE A - SOY FLOUR INCORPORATED SAMPLE

SAMPLE B - STANDARD

APPENDIX IV C

SCORE CARD FOR THE EVALUATION OF THE SAMPLE

PRODUCT : Bonda

CHARACTERISTICS	SCORES	SAMPLE	
		A	B
COLOUR			
Golden Brown	5		
Golden Yellow	4		
Pale Brown	3		
Brown	2		
Dark Brown	1		
FLAVOUR			
Very Good	5		
Good	4		
Quite Good	3		
Fair	2		
Off Flavour	1		
TEXTURE			
Soft	5		
Crisp	4		
Hard	3		
Leathery	2		
Soggy	1		

CHARACTERISTICS	SCORE	SAMPLE	
		A	B
TASTE			
Excellent	5		
Very Good	4		
Good	3		
Fair	2		
Not Good	1		
TOTAL SCORES	20		

* SAMPLE B - SOY FLOUR INCORPORATED SAMPLE

* SAMPLE A - STANDARD

APPENDIX IV D

SCORE CARD FOR EVALUATION OF THE RECIPE

PRODUCT : Pakoda

CHARACTERISTICS	SCORE	SAMPLE	
		A	B
COLOUR			
Golden Brown	5		
Golden Yellow	4		
Brown	3		
Pale Brown	2		
Dark Brown	1		
FLAVOUR			
Very Good	5		
Good	4		
Quite Good	3		
Fair	2		
Off-Flavour	1		
TEXTURE			
Crisp	5		
Very Crisp	4		
Soft	3		
Hard	2		
Soggy	1		

CHARACTERISTICS	SCORE	SAMPLE	
		A	B
TASTE			
Excellent	5		
Very Good	4		
Good	3		
Fair	2		
Not Good	1		
TOTAL SCORES	20		

* SAMPLE B - STANDARD

* SAMPLE A - SOY FLOUR INCORPORATED SAMPLE

APPENDIX V A

PAKODAS (50 Percent Protein)

Source : Thangam Philip

INGREDIENTS

Bengal gram flour	50g.
Defatted soy flour	50g.
Curry leaves	2g.
Green Chillies	5g.
Turmeric	1g.
Onion	20g.
Salt	5g.
Water used for frying	125ml.
Fat for frying.	

METHOD

1. Seive soy flour and bengal gram flour.
2. Chop onions, chillies and curry leaves and salt and mix well.
3. Add all the ingredients and enough water to make a thick better adding enough water.
4. Heat fat. Pour spoonfulls of the batter into the hot fat and deepfat fried until golden brown.
5. Drain on paper and serve hot.

Serves Four.

APPENDIX V B

POTATO BONDA (50 percent protein)

Source : Thangam Philips

INGREDIENTS

Potato	225g.
Oninion	50g.
Green Chillies	5g.
Ginger	5g.
Turmeric	1g.
Bengal gram flour	25g.
Defatted seeds	25g.
Mustard seeds	a pinch.
Curry leaves	a few leaves.
Water to mix the batter	100ml.
Salt	5 to 8g.
Water	100ml.
Oil to fry	35ml.

METHOD

1. Boil and peel potatoes, mash.
2. Chop onion, ginger and green chillies finely.
3. Heat 30 ml. of oil. Add mustard seeds and curry leaves.
4. When mustard seeds crackle, add chopped spices, potatoes, turmeric and salt. Mix well. Remove and divide into equal sized portions.
5. Dip in batter and deep fat fry

Batter: Sift soy flour and bengal gram flour, salt and batter and deep fry and mix to smooth medium balls.

Serves 10.

APPENDIX V C

SOY BHAJJI

INGREDIENTS

Plantain	- 1 small
Soy flour	- 50 g.
Begal gram flour	- 50 g.
Chilli powder	- 2 tea spoons
Omum seeds	- ½ tea spoon
Salt to taste	
Oil to fry.	

METHOD

1. Cut the raw plantain transversly into thin slices. Keep Aside.
2. Mix both the flours well.
3. Rub in fat into flours.
4. Mix into this chilli powder, cooking salt and omum seeds.
5. Prepare batter of pouring consistency.
6. Dip the plantain slices in the batter and deep fat fry them.
7. Similarly onion, brinjal can be used.

Serves Four.

APPENDIX V D

KHARA BOONDHI

INGREDIENTS

Bengal gram flour	50 g.
Soy Flour	50 g.
Fat for batter	1 tea spoon
Red chilli powder	1 tea spoon
Curry leaves	15 g.
Turmeric	a pinch
Oil to fry	
Salt to taste	
Required seasonings.	

METHOD

1. Sift the flours with salt.
2. Rub in fat and chilli powder.
3. Prepare a thick pour batter.
4. Hold a perforated boondhi ladle over heated oil.
5. Pour batter by table spoonfull into ladle and rub over in a circular manner with another spoon.
6. Deep fat fry the droplets of boondhi.

Serves four.

APPENDIX VI A

Individual Scores to Evaluate Boondhi

Characteristics	I Sample		II Sample		III Sample		IV Sample		V Sample		VI Sample		VII Sample	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Colour	5	4	5	5	3	5	5	5	2	4	4	5	5	5
Flavour	4	5	5	4	4	4	4	4	3	4	4	5	4	4
Texture	3	5	5	5	4	5	3	3	3	5	3	3	3	5
Taste	3	4	5	5	5	5	2	3	3	4	3	5	3	5
	15	18	20	19	16	19	14	15	11	17	14	20	15	19

APPENDIX VI B

Individual Scores to Evaluate Bajji

Characteristics	I Sample		II Sample		III Sample		IV Sample		V Sample		VI Sample		VII Sample	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Colour	5	4	4	5	3	5	2	5	1	2	4	5	4	5
Flavour	5	4	4	4	5	5	2	4	3	3	4	5	4	4
Texture	5	4	5	4	3	5	1	5	4	4	5	3	5	5
Taste	5	5	4	5	5	4	2	3	4	3	3	4	4	4
	20	17	17	18	16	19	7	17	12	12	16	17	17	18

APPENDIX VI C

Individual Scores to Evaluate Bonda

Characteristics	I Sample		II Sample		III Sample		IV Sample		V Sample		VI Sample		VII Sample	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Colour	5	4	5	5	3	5	2	2	1	2	2	5	4	4
Flavour	5	5	4	4	4	5	3	4	4	3	4	5	4	4
Texture	5	5	4	5	4	5	1	5	4	4	5	3	5	5
Taste	4	4	4	5	5	5	2	3	4	4	5	4	4	5
	19	18	17	19	16	20	8	14	13	13	16	17	17	18

APPENDIX VI D

Individual Scores to Evaluate Pakoda

Characteristics	I Sample		II Sample		III Sample		IV Sample		V Sample		VI Sample		VII Sample	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Colour	5	5	5	5	3	5	2	5	5	4	5	4	5	5
Flavour	4	4	4	5	4	5	2	4	5	5	3	5	4	4
Texture	5	5	4	5	5	4	4	5	5	4	4	5	5	5
Taste	4	5	4	5	4	5	3	3	5	4	2	4	5	5
	18	19	17	20	16	19	11	17	20	17	14	18	19	19