ANNEXURE – I

Avinashilingam Institute for Home Science and Higher Education for Women
Department of Food Service Management and Dietetics

Efficacy of a Software "*Nutra Glyx*" on Nutraceutical Recipes Incorporated with Selected Medicinal Plants for Diabetes Mellitus

BACKGROUND INFORMATION

Personal Details

1. **Name of the Interviewee** :
2. **Residential Address** :
3. **Age** :
4. **Gender** : **Male [ ] Female [ ]**
5. **Marital Status** :
6. **Total monthly income** :

Low Income (<5000) ☐

Middle Income (5000-10000) ☐

High Income (Above 10000) ☐

ANNEXURE - II

Avinashilingam Institute for Home Science and Higher Education for Women
Department of Food Service Management and Dietetics

ANTHROPOMETRIC MEASUREMENTS

Name : **Age :** **Sex:**

Height (cm)	Weight (kg)	BMI	Waist to Hip Ratio	
			Waist circumference	
			Hip circumference	
			Waist to Hip ratio	

ANNEXURE - III

Avinashilingam Institute for Home Science and Higher Education for Women
Department of Food Service Management and Dietetics

BIOCHEMICAL MEASUREMENTS

Name : **Age :** **Sex:**

1. Blood Pressure (mm/hg) :

2. Blood Glucose

   i) Fasting Glucose Level :

   ii) Post Prandial Glucose Level :

   iii) HbA_1C :

ANNEXURE - IV

ETHICAL COMMITTEE APPROVAL

INSTITUTIONAL HUMAN ETHICS COMMITTEE

Avinashilingam
Institute for Home Science and Higher Education for Women
University
(Estd. u/s 3 of UGC Act 1956)

Chairman
Dr. S. Ramalingam
Principal, PSG Institute
of Medical Sciences
& Research, Coimbatore

Member Secretary
Dr. P. R. Padma
Professor, Department of
Biochemistry, Biotechnology and
Bioinformatics

Members
Dr. S. Premakumari
Mr. K.Arulmoli (Legal Expert)
Dr. A. Saraswathy
Mrs. V. Mangayarkarasi
Dr. S. Kowsalya
Dr. N.S. Rohini
Dr.Subhashini K. Sripathi
Mrs. S. Radha Devi
Mrs. Judith Justin

3rd February 2017

To
Ms. Padhmini K
Department of Food Service Management and Dietetics
Avinashilingam Institute for Home Science and
Higher Education for Women
Coimbatore – 641 043

Dear Madam,

Ref: Your proposal No. IHEC/16-17/FSMD-05 entitled "Development and performance analysis of a database on hypoglycaemic and hypolipidemic nutraceutical recipes" submitted for approval of the IHEC

The Institutional Human Ethics Committee of our University hereby grants approval to your research proposal No. IHEC/16-17/FSMD-05 entitled "Development and performance analysis of a database on hypoglycaemic and hypolipidemic nutraceutical recipes" submitted by you. The Approval number for the same is AUW/IHEC/FSMD-16-17/XMT-05.

We wish you all the best in your research endeavours.

Regards,

3/2/17

Dr.P.R.Padma
Member Secretary

Institutional Human Ethics Committee

ANNEXURE - V

Avinashilingam Institute for Home Science and Higher Education for Women
Department of Food Service Management and Dietetics

EXERCISE PATTERN

Name : **Age :** **Sex:**

1. **Do you Exercise Daily?**

   Yes ☐

   No ☐

   If yes

2. **What type of Exercise?**

   Walking ☐

   Jogging ☐

   Cycling ☐

   any other ☐

3. **Duration of exercise? :**

   15 minutes ☐

   30 minutes ☐

   45 minutes ☐

   More than 1 hour ☐

ANNEXURE - VI

Avinashilingam Institute for Home Science and Higher Education for Women
Department of Food Service Management and Dietetics

DIETARY PATTERN

Name : **Age :** **Sex:**

1. **Type of Diet :**

   Vegetarian ☐

   Non Vegetarian ☐

2. **Daily intake of meal pattern (3 days recall method)**

Meal Timing	1st day menu	2nd day menu	3rd day menu
Early Morning			
Breakfast			
Midmorning			
Lunch			
Evening			
Dinner			

ANNEXURE - VII

vinashilingam Institute for Home Science and Higher Education for Women
Department of Food Service Management and Dietetics

DIETARY INTAKE OF FOOD GROUPS

Name : **Age :** **Sex:**

S.No	Food Groups	Amount
1	Cereals and Millets	
2	Pulses	
3	Milk and Milk Products	
4	Roots and Tubers	
5	Green leafy vegetable	
6	Other vegetable	
7	Fruits	
8	Sugar	
9	Fat	

ANNEXURE - VIII

Avinashilingam Institute for Home Science and Higher Education for Women
Department of Food Service Management and Dietetics

PREFERENCE SHEET

Name : **Age :** **Sex:**

Tick the commonly consumed recipes you prefer?

Breakfast/Dinner

- Kuzhipaniyaram ☐
- Poori ☐
- Aval Uppuma ☐
- Parota ☐
- Appam ☐
- Sevai ☐
- Oothappam ☐
- Idli ☐
- Dosai ☐
- Pongal ☐
- Kichadi ☐
- Chappati ☐
- Adai ☐
- Rava Uppuma ☐
- Ragi dosai ☐
- Kambu dosai ☐
- Four flour dosa ☐
- Puttu ☐

Kulcha ☐

Wheat Dosa ☐

Any other ☐

Lunch recipes

Curd rice ☐

Tomato rice ☐

Lime rice ☐

Mint rice ☐

Veg pulao ☐

Besibelabath ☐

Arisiparuppu sadam ☐

Navarathna sadam ☐

Corriander rice ☐

Pulisadam ☐

Ghee rice ☐

Kushka ☐

Jeera rice ☐

Fried rice ☐

Thengai sadam ☐

Manga sadam ☐

Nellikai sadam ☐

Carrot rice ☐

Ellu sadam ☐

Beetroot rice ☐

Mushroom rice ☐

Any other ☐

Chutney recipe

- Coconut chutney ☐
- Mint chutney ☐
- Onion chutney ☐
- Tomato chutney ☐
- Coriander chutney ☐
- Peanut chutney ☐
- Chilly chutney ☐
- Garlic chutney ☐
- Nellikai chutney ☐
- Kara chutney ☐
- Any other ☐

Kuzhambu recipes

- Sambar ☐
- Pulikulambu ☐
- Veg kuruma ☐
- Moor kulambu ☐
- Paruppu urundai kulambu ☐
- Keerai kulambu ☐
- Pasipayaru kadaisal ☐
- Kai kulambu ☐
- Kathirikai sutta kulambu ☐
- Tomato kuruma ☐
- Cauliflower kuruma ☐
- Radish sambar ☐
- Peas kuruma ☐
- Any other ☐

Poriyal recipe

- Beans poriyal ☐
- Carrot poriyal ☐
- Cluster beans poriyal ☐
- Broad beans poriyal ☐
- Vazaithandu poriyal ☐
- Agathikeerai poriyal ☐
- Keerai kootu ☐
- Podalangai kootu ☐
- Cabbage poriyal ☐
- Cauliflower poriyal ☐
- Brinjal poriyal ☐
- Kovaikai poriyal ☐
- Sukiti keerai poriyal ☐
- Drumstick leaves poriyal ☐
- Ashgourd poriyal ☐
- Chow chow poriyal ☐
- Vendakkai poriyal ☐
- Any other ☐

Snacks recipes

- Sundal ☐
- Kolukattai ☐
- Masal pori ☐
- Sprouted salad ☐
- Sandwich ☐
- Masala kadalai ☐
- Veg cutlet ☐
- Veg mixed salad ☐
- Veg roll ☐
- Green gram Sundal ☐
- Medhu vadai ☐
- Masala vadai ☐
- Puffs ☐
- Cutlet ☐
- Bonda ☐
- Fried peanut ☐
- Another ☐

ANNEXURE - IX

Avinashilingam Institute for Home Science and Higher Education for Women
Department of Food Service Management and Dietetics

THE KNOWLEDGE, ATTITUDE AND PRACTICE OF MEDICINAL PLANT

(KAP Sheet)

1. Do you believe herbs and spices can reduce your blood glucose level?

   Yes ☐

   No ☐

2. Do you consume following herbs

   Naval seed ☐

   Kandankathiri ☐

   Avaram Poo ☐

   Guava Leaves ☐

   Sirukurinjan ☐

   Kandanthipli ☐

   Nilavembu ☐

   Alovera ☐

   Karunjeeragam ☐

   Nutmeg ☐

   any other ☐

3. If so what forms

   Decoction ☐

   Powdered Form ☐

Juice ☐

Any other ☐

4. Have you tried incorporating herbs in your regular recipes

Yes ☐

No ☐

If yes

5. Name any five recipes that you have incorporated?
6. Will you Interested to take part in the study?

ANNEXURE - X

IDENTIFICATION OF MEDICINAL PLANT

भारत सरकार
GOVERNMENT OF INDIA
पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE
भारतीय वनस्पति सर्वेक्षण
BOTANICAL SURVEY OF INDIA

दक्षिणी क्षेत्रीय केन्द्र / Southern Regional Centre
टी.एन.ए.यू कैम्पस / T.N.A.U. Campus
लाउली रोड / Lawley Road
कोयंबत्तूर/ Coimbatore - 641 003

टेलीफोन / Phone: 0422-2432788, 2432123
टेलीफक्स/ Telefax: 0422- 2432835
ई-मैल /E-mail id: sc@bsi.gov.in
bsisc@rediffmail.com

सं. भा.व.स./द.क्षे.के./No.: BSI/SRC/5/23/2017/Tech. /2831 दिनांक/Date: 22nd January 2018

सेवा में / To

Ms. K. Padhmini
Ph. D. Research Scholar
Department of Food Service Management & Dietetics
Avinashilingam Institute for Home Science & Higher Education for Women
Coimbatore – 641 043

महोदया/Madam,

The plant specimen brought by you for authentication is identified as *Psidium guajava* L. - MYRTACEAE. The identified specimen is returned herewith for preservation in their College/ Department/ Institution Herbarium.

धन्यवाद/Thanking you,

भवदीय/Yours faithfully,

22/01/2018

डॉ. एम. पलनिसामी/Dr. M. Palanisamy
वैज्ञानिक 'डी' प्रभारी/Scientist 'D'-In-Charge

वैज्ञानिक 'डी' / SCIENTIST 'D'
भारतीय वनस्पति सर्वेक्षण
Botanical Survey of India
दक्षिणी क्षेत्रीय केन्द्र
Southern Regional Centre
कोयम्बत्तूर / Coimbatore - 641 003

भारत सरकार
GOVERNMENT OF INDIA
पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE
भारतीय वनस्पति सर्वेक्षण
BOTANICAL SURVEY OF INDIA

दक्षिणी क्षेत्रीय केन्द्र / Southern Regional Centre
टी.एन.ए.यू कैम्पस / T.N.A.U. Campus
लाउली रोड / Lawley Road
कोयंबत्तूर/ Coimbatore - 641 003

टेलीफोन / Phone: 0422-2432788, 2432123
टेलीफक्स/ Telefax: 0422- 2432835
ई-मैल /E-mail id: sc@bsi.gov.in
bsisc@rediffmail.com

सं. भा.व.स./द.क्षे.के./No.: BSI/SRC/5/23/2017/Tech. /2830

दिनांक/Date: 22rd January 2018

सेवा में /To

Ms. K. Padhmini
Ph. D. Research Scholar
Department of Food Service Management & Dietetics
Avinashilingam Institute for Home Science & Higher Education for Women
Coimbatore – 641 043

महोदया/Madam,

The plant specimen brought by you for authentication is identified as *Piper longum* L. – PIPERACEAE. The identified specimen is returned herewith for preservation in their College/ Department/ Institution Herbarium.

धन्यवाद/Thanking you,

भवदीय/Yours faithfully,

डॉ. एम. पलनिसामी/Dr. M. Palanisamy
वैज्ञानिक ' डी ' प्रभारी/Scientist 'D'-In-Charge
वैज्ञानिक 'डी' / SCIENTIST 'D'
भारतीय वनस्पति सर्वेक्षण
Botanical Survey of India
दक्षिणी क्षेत्रीय केंद्र
Southern Regional Centre
कोयम्बत्तूर / Coimbatore - 641 003

भारत सरकार
GOVERNMENT OF INDIA
पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE
भारतीय वनस्पति सर्वेक्षण
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टी,एन.ए.यू कैम्पस / T.N.A.U. Campus
लाउली रोड / Lawley Road
कोयंबत्तूर/ Coimbatore - 641 003
टेलीफोन / Phone: 0422-2432788, 2432123
टेलीफक्स/ Telefax: 0422- 2432835
ई-मैल /E-mail id: sc@bsi.gov.in
bsisc@rediffmail.com

सं. भा.व.स./द.क्षे.के./No.: BSI/SRC/5/23/2017/Tech. /2829 दिनांक/Date: 22nd January 2018

सेवा में / To

Ms. K. Padhmini
Ph. D. Research Scholar
Department of Food Service Management & Dietetics
Avinashilingam Institute for Home Science & Higher Education for Women
Coimbatore – 641 043

महोदया/Madam,

The plant specimen brought by you for authentication is identified as *Gymnema sylvestre* (Retz.) R.Br. ex Sm. (= *Periploca sylvestris* Retz.) - ASCLEPIADACEAE. The identified specimen is returned herewith for preservation in their College/ Department/ Institut;ion Herbarium.

धन्यवाद/Thanking you,

भवदीय/Yours faithfully,

22/01/2018

डॉ. एम. पलनिसामी/Dr. M. Palanisamy
वैज्ञानिक 'डी' प्रभारी/Scientist 'D'-In-Charge

वैज्ञानिक 'डी' / SCIENTIST 'D'
भारतीय वनस्पति सर्वेक्षण
Botanical Survey of India
दक्षिणी क्षेत्रीय केंद्र
Southern Regional Centre
कोयम्बत्तूर / Coimbatore - 641 003.

भारत सरकार
GOVERNMENT OF INDIA
पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE
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टी,एन.ए.यू कैम्पस / T.N.A.U. Campus
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कोयंबत्तूर/ Coimbatore - 641 003

टेलीफोन / Phone: 0422-2432788, 2432123
टेलीफक्स/ Telefax: 0422- 2432835
ई-मैल /E-mail id: sc@bsi.gov.in
bsisc@rediffmail.com

सं. भा.व.स./द.क्षे.के./No.: BSI/SRC/5/23/2017/Tech./2833 दिनांक/Date: 22nd January 2018

सेवा में / To

Ms. K. Padhmini
Ph. D. Research Scholar
Department of Food Service Management & Dietetics
Avinashilingam Institute for Home Science & Higher Education for Women
Coimbatore – 641 043

महोदया/Madam,

The plant specimen brought by you for authentication is identified as *Solanum virginianum* L. - SOLANACEAE. The identified specimen is returned herewith for preservation in their College/ Department/ Institution Herbarium.

धन्यवाद/Thanking you,

भवदीय/Yours faithfully,

22/01/2018

डॉ. एम. पलनिसामी/Dr. M. Palanisamy
वैज्ञानिक 'डी' प्रभारी/Scientist 'D'-In-Charge
वैज्ञानिक 'डी' / SCIENTIST 'D'
भारतीय वनस्पति सर्वेक्षण.
Botanical Survey of India
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Southern Regional Centre
कोयम्बत्तूर / Coimbatore - 641 003.

भारत सरकार
GOVERNMENT OF INDIA
पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE
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टेलीफोन / Phone: 0422-2432788, 2432123
टेलीफक्स/ Telefax: 0422- 2432835
ई-मैल /E-mail id: sc@bsi.gov.in
bsisc@rediffmail.com

सं. भा.व.स./द.क्षे.के./No.: BSI/SRC/5/23/2017/Tech./2832 दिनांक/Date: 22nd January 2018

सेवा में / To

Ms. K. Padhmini
Ph. D. Research Scholar
Department of Food Service Management & Dietetics
Avinashilingam Institute for Home Science & Higher Education for Women
Coimbatore – 641 043

महोदया/Madam,

The plant specimen brought by you for authentication is identified as *Syzygium cumini* (L.) Skeels (= *Myrtus cumini* L.) - MYRTACEAE. The identified specimen is returned herewith for preservation in their College/ Department/ Institution Herbarium.

धन्यवाद/Thanking you,

भवदीय/Yours faithfully,

22/01/2018

डॉ. एम. पलनिसामी/Dr. M. Palanisamy
वैज्ञानिक 'डी' प्रभारी/Scientist 'D'-In-Charge
वैज्ञानिक 'डी' / SCIENTIST 'D'
भारतीय वनस्पति सर्वेक्षण
Botanical Survey of India
दक्षिणी क्षेत्रीय केन्द्र
Southern Regional Centre
कोयम्बत्तूर / Coimbatore - 641 003.

ANNEXURE - XI

NUTRIENT ANALYSIS PROCEDURE

Determination of Energy Value of Food Using Parr Oxygen Bomb Calorimeter

Ex.No:

Aim :

To determine the energy value of food stuff using Parr oxygen bomb calorimeter.

Principle:

The principle behind the working of bomb calorimeter is based on the fact that a known weight of the sample completely burnt in the apparatus permits the heat developed by the combustion to be absorbed by a definite weight of water. By determining the rise in temperature, it is possible to calculate within close limits, the number of heat units liberated.

Equipment:

Parr oxygen bomb calorimeter, analytical balance, weight box.

Description of the Apparatus:

An oxygen bomb calorimeter is consisting of three essential parts namely,

1. Bomb or the vessel, in which the combustible food is burnt.
2. The calorimeter bucket, or the water container holding measured quantity of water, in which the bomb thermometer and the stirring device are immersed.
3. The jacket for protecting the calorimeter bucket from the effects of variation in room temperature.
4. The bomb consists of thick walled vessel with a mechanically sealed cover, which can be removed for cleaning and for inserting the sample. The apparatus works at a normal pressure at 100 atmospheres, but can withstand a pressure upto 200 atmospheres. The air which is trapped into the bomb when it is closed, contains nitrogen and in the presence of oxygen at a high temperature and pressure developed within the bomb, some of the nitrogen oxidises and combines with water vapour to form nitric acid. Likewise if the samples being burnt contain sulphur, that is converted to sulphuric and

sulphurous acids. These several acids combine to form a mixture (corrosive) which with residual oxygen gas at high temperature generates an atmosphere, which will corrode the ordinary metals. There are two electrodes attached to the underside of the double walled head. Both electrodes serve as binding posts for the fuse wire which is strung between them and bent down in contact with the food, which encloses simplified ignition circuit. The calorimeter bucket provides for total immersion of bomb in a measured quantity of water. It must have a constant stirrer running at constant speed to circulate the water for rapid absorption of heat liberated by the bomb and to maintain temperature equilibrium throughout the bucket. All Parr Calorimeters are furnished with solid stem mercurical thermometer made according to highly developed specification which assure the greatest possible accuracy and ease in reading.

Procedure:

The food was weighed and taken in a capsule. 11 cm of the fuse wire was attached and the capsule was placed in loop electrodes. The bomb was assembled and oxygen was filled with 15 atmospheres. Two litres of distilled water which was cooled to 2° F below the room temperature was taken in the calorimeter bucket. The calorimeter was then closed. The thermometer was inserted and the stirring mechanism was started, while the terminals were attached to the bomb. It was allowed to run for 2 minutes before taking the temperature. The temperature readings were recorded at one minute interval for an initial period of five minutes. Exactly at the 5^{th} minute, the wire was ignited and the button was held for 15 seconds. The temperature readings exactly the minute after ignition were recorded. The readings of the thermometer were taken at 15 seconds intervals thereafter until 2 minutes have elapsed, when the readings were taken at one-minute intervals. After the maximum was reached, the temperature was noted every one minute for 5 minutes. The calorimeter was opened, the bucket and the bomb were removed, and the residual pressure was released. Then the bomb calorimetric cover was taken out. The combusted pieces of the fuse wire were removed from the electrodes. They were straightened and the length of all the pieces combined to make the fuse wire correction. All the inner surface of the bomb, the cylinder and the cover were rinsed.

Result:

Determination of Food Using phenol Suplhuric Acid Method For Total Carbohydrate

Aim:

To determine the carbohydrate value of food stuff using Parr oxygen bomb calorimeter.

Principle:

In hot acidic medium glucose is dehydrated to hydroxymethyl furfural. This forms a green colored product with phenol and has absorption maximum at 490nm.

Equipment:

Centrifuge machine, analytical balance, weight box.

Description of the Apparatus:

A wide variety of laboratory-scale **centrifuges** are used in chemistry, biology, **biochemistry** and clinical medicine for isolating and separating suspensions and immiscible liquids. They vary widely in speed, capacity, temperature control, and other characteristics.

Procedure

1. Weigh 100mg of the sample into a boiling tube.
2. Hydrolyse by keeping it in boiling water bath for 3 hours with 5mL of 2.5 N-HCl and cool to room temperature.
3. Neutralize it with solid sodium carbonate until the effervescence ceases.
4. Make up the volume to 100mL and centrifuge.
5. Pipette out 0.2, 0.4, 0.6, 0.8 and 1mL of the working standard into a series of test tube.
6. Pipette out 0.1 and 0.2mL of the sample solution in two separate test tubes. Make up the volume in each tube to 1mL with water.
7. Set a blank with 1mL of water.
8. Add 1mL of phenol solution to each tube.
9. Add 5mL of 96% sulphuric acid to each tube and shake well.
10. After 10min shake the content in the tubes and place in a water bath at 25-30°C for 20min.
11. Read the color at 490nm.
12. Calculate the amount of total carbohydrate present in the sample solution

using the standard graph.

Determination of Energy Value of food using Phenol suplhuric acid method for total carbohydrate

Absorbance corresponds to 0.1mL of the test = 'x' mg of glucose

$$\text{100mL of the sample solution contains} = \frac{x'}{.1} \times 100\text{mg of glucose}$$

= % of total carbohydrate present

Estimation of Amino Acids by Sorensen's Formal Titration

Ex.No:

Aim:

To estimate the amount of glycine present in the whole of the given solution.

Principle:

The carboxyl group of amino acids cannot be titrated in water solution with alkali very accurately because it reacts with the basic amino groups to form zwitter ions that are not decomposed completely at the end point of alkaline indicators. Sorenson observed that if amino acid solutions are neutralized to phenolphthalein and titrated with large excess of neutralized formaldehyde solution the mixture becomes acidic and can be titrated sharply to phenolphthalein with standard alkali formation of dimethylol amino acid. Addition of formaldehyde to the amino group occurs as the filtration of the compound is complete. The reactions are reversible and a large excess of formaldehyde must be present to convert all the amino groups into the methyl derivative and to give accurate titration.

Under these conditions formaldehyde adds to the amino groups with the

NH_3 $HOH_2C\text{-}N\text{-}CH_2OH$

$$R - \underset{\displaystyle H}{\underset{|}{C}} - COO + OH + 2\,CH_2O = R - \underset{\displaystyle H}{\underset{|}{C}} - COO + H_2O$$

Reagents:

1. Glycine
2. Formaldehyde
3. 0.01N Sodium hydroxide: 400mg of sodium hyroxide was dissolved in 1000 ml water.
4. 0.01N Oxalic acid (for determining the normality of NaOH): 63 mg of oxalic acid was dissolved in 100 ml of water.

Procedure:

The given glycine was made upto 100 ml with distilled water. 10 ml of this was pipetted into a conical flask and then added 5ml of formaldehyde. A drop of phenolphthalein was added as indicator and titrated against 0.01N sodium hydroxide solution taken in the burette. The end point was the appearance of a permanent pale pink colour . A blank titration was carried out with formaldehyde against the alkali. The difference in the titre values of the blank and the experiment gives the amount of alkali required to neutralize the amino acid.

Result:

The amount of glycine present in 100ml of the given solution is

Standardization of Sodium hydroxide

0.01N Oxalic acid Vs Sodium hydroxide

S.No.	Volume of Oxalic acid (ml)	Burette Reading		Volume of O.OlN NaOH (ml)	Indicator
		Initial (ml)	Final (ml)		
					Phenolpht-halein

$V_2N_2 = V_1N_1$

Volume of Oxalic acid $= V_1$

Normality of Oxalic acid $= N_1$

Volume of Sodium Hydroxide $= V_2$

Normality of Sodium Hydroxide $= N$

Estimation of glycine in the given solution

Standard NaOH x glycine

S.No.	Volume of Sample (ml)	Burette Reading		Volume of NaOH (ml)	Indicator
		Initial (ml)	Final (ml)		
					Phenolphtha-lein

Volume of NaOH required to neutralize 10 ml of glycine + formaldehyde } =

Volume of NaOH required to neutralize 5 ml of formaldehyde =

Therefore volume of NaOH required to neutralize glycine =

Strength of NaOH

Volume of glycine solution

Equivalent weight of glycine

Amount of glycine present in the given solution

Result:

Determination of Fat Content

Ex.No:

Aim:

To determine the fat content of the food stuff.

Principle:

Ether extraction of the crude fat in vegetable products is carried out in a continuous extractor that is an apparatus in which the ether, after dissolving a portion of the fat of the material and discharging into the extraction flask, is volatized, condensed and again allowed to act on the material. The steps in the process are repeated continuously and automatically until the extraction is complete.

The soxhlet extraction used depends on the intermittent action of a glass syphon. The ether gradually condenses into the extraction tube containing the material until it rises to the top when it is discharged into the extraction flask.

Reagent:

Petroleum ether (60-80°C boiling point).

Procedure:

The soxhlet flask was weighed to consecutive concordant weights. 2g of the moisture free sample was packed into an extraction thimble and placed in an extractor which was fixed into a soxhlet flask. Poured sufficient amount (150 ml) of petroleum ether so as to permit siphon action. The thimble and the contents were allowed to soak in ether for 24 hours. The entire set up was kept over an electric water bath and the extractor was connected to the condensor. The nozzle of the condensor was always plugged with moistened cotton. The temperature was maintained at 60° c. A steady stream of water in the condensor was maintained. The ether evaporated rose up but owing to the condensor arrangement, it fell back into the condensor extractor. When the extractor got filled with ether, it was siphoned back into the flask. This went on till the ether that got collected in the extractor was free from any yellow colour indicating the presence of fat. The soxhlet flask was then disconnected and ether was evaporated in a water bath maintained at 60°c. When the ether in the flask was evaporated, the flask was weighed again to get concordant values. From the difference in weight, the fat content was calculated.

Result:

Determination of Fat Content

Weight of Soxhlet flask =

Weight of Soxhlet flask + fat =

Weight of fat alone =

2g of contains =

100g of will contain =

Result:

Estimation of Calcium

Ex.No.:

Aim:

To estimate the amount of calcium present in the given sample.

Principle:

Calcium is determined by precipitating it as calcium oxalate and titrating the oxalate solution in dilute sulphuric acid against standard potassium permanganate.

Apparatus:

Beaker, burette, pipette, flask and standard flask

Reagents:

1. Ammonium oxalate: Ammonium oxalate was dissolved in 200 ml of water till it was saturated.
2. 0.01N Oxalic acid: 0.063g Oxalic acid crystals were weighed and dissolved in 100 ml of distilled water.
3. 0.01N Potassium permanganate: 0.316g of Potassium permanganate was dissolved in 1000 ml of distilled water.
4. Strong Ammonia
5. Glacial acetic acid.
6. 2N sulphuric acid: 5.5 ml of sulphuric acid was dissolved in 94.5 ml of distilled water

Procedure:

Ash from the ignited sample was dissolved in hydrochloric acid and made upto the 100 ml. 10 ml of the ash solution was pipetted out in a conical flask and 90 ml of distilled water was added to it. Added 2 drops of methyl red indicator. It was made strongly alkaline by adding ammonia and kept for boiling. 20 ml of saturated ammonium oxalate was added to the solution, 10 ml each time to ensure complete precipitation directly. When it was hot, a few drops of acetic acid was added to render the medium acidic. The precipitate was allowed to settle overnight. The next morning the solution was filtered with Whatman No.40 filter paper. The precipitate was washed first with ammoniacal water and then with hot water several times until it was free from chloride. To test it 5 ml of the washing was collected, in a test tube and a drop of silver nitrate solution was added. The washing was continued till there was no precipitate with silver nitrate or calcium chloride solution. The filter paper was collected in a flask by making a hole in the filter paper. To this, 2 ml of 2N sulphuric acid was added. This solution was heated to 60-80°c and when still hot was titrated against N/100 potassium permanganate solution. From the volume of

potassium permanganate solution used up the milligrams of calcium present in 100g of the sample was calculated.

Result:

Estimation of Calcium

Standard Oxalic acid Vs Potassium permanganate

Volume of Oxalic acid (ml)	Volume of 2N H2SO4	Burette readings (ml)		Volume of KMnO4 ml)	Indicator
		Initial	Final		
5.0 5.0	2.0 2.0				self

Volume of Oxalic acid = 5.0 ml

Normality of Oxalic acid = 0.01 N

Volume of $KMnO_4$

(titration done at 60-80° c) =

Normality of $KMnO_4$ =

1 ml of 0.01N $KMnO_4$ = 0.2 mg calcium

Therefore, 1.0 ml of $KMnO_4$ =

Standard Potassium Permanganate Vs Sample

Volume of the sample (ml)	**Burette readings (ml)**		**Volume of KMnO4 (ml)**	**Indicator**
	Initial	Final		
Blank Sample I Sample II				Self

The sample consumed = ml of $Kmno_4$

Therefore, ___ml of

Potassium permanganate =

10ml o the Ash solution contains =

Therefore, 100ml of the

Ash solution contains =

g of the sample was taken for ashing =

Therefore, g of the sample contains = mg of calcium

Therefore, 100g of the sample contains = mg of calcium

Result:

Estimation of Iron

Ex.no.:

Aim:

To estimate the amount of iron present in 100g of the given food sample.

Principle:

The food sample is oxidized with ignition or oxidation. Iron as ferric iron reacts with ammonium thiocyanate or with potassium thiocyanate to give ferric thiocyanate which is red in colour.The colour which is a measure of the concentration is measured colorimetrically.

Apparatus:

Volumetric flask, test tubes, klett, pipette.

Reagents:

1. Stock iron solution: Dissolved 0.0702 gm (70.2mg) of reagent grade crystalline ferrous ammonium sulphate (Mohr's salt) in 100 ml of water.
2. Working standard: Prepared a working standard solution in a 100ml volumetric flask by adding 10ml of the stock solution and diluted to the mark with distilled water.
3. Saturated potassium persulphate solution: Shook 7to8 g of reagent grade potassium per sulphate in 100ml of water in a glass stoppered flask. The undissolved crystals settled to the bottom and compensates the loss by decomposition.

4. 3N Potassium thiocyanate: Dissolved 146g of reagent grade potassium thiocyanate in water and diluted to 500 ml with water. Filtered if turbid. Added 20ml of pure acetone to improve the keeping quality. Deterioration will be evident from the rapid fermentation of a yellow colour in the blank. Stored in brown bottles.

Procedure:

2g of the sample was ashed by ignition. When ashing had been completed 5 ml of hydrochloric acid was added and made up to 100 ml in a volumetric flask.

Took different aliquots of the standard solution (1ml – 5ml) corresponding to 10-50 gamma in a series of test tubes. 2ml of the unknown solution was taken in the test tube. Added 1ml of 30% H_2SO_4, 1ml of potassium persulphate and 1.5ml of potassium thiocyanate to all the test tubes.This was made upto 10ml with water. A blank was prepared by adding the reagents except the standard or the unknown solution. Allowed the colour to develop for 20 minutes and the intensity was read at 530-540 μ filter in the colorimeter.

Result:

Estimation of Iron

Volume of the solution (ml)	Concentration (γ)	Volume of potassium persulphate (ml)	Volume of water (ml)	Volume of 30% H_2SO_4 (ml)	Volume of potassium thiocyanate (ml)	Klett reading OD
Blank		1.0	6.5	1.0	1.5	
Standard						
1.0	10	1.0	5.5	1.0	1.5	
2.0	20	1.0	4.5	1.0	1.5	
3.0	30	1.0	3.5	1.0	1.5	
4.0	40	1.0	2.5	1.0	1.5	
5.0	50	1.0	1.5	1.0	1.5	
Unknown						
2.0		1.0	4.5	1.0	1.5	
2.0		1.0	4.5	1.0	1.5	

2 ml of the ash solution contains gamma of iron

Therefore 100 ml of the ash solution will contain :

100ml of the ash solution was made from g of

Therefore 5g of the contains :

Therefore 100 g of the will contain :

Estimation of Total Carotenoids and Beta Carotene

Ex.No:

Aim:

To estimate the amount of total carotenoids and beta carotene in 100g of the food sample

Principle:

The total carotenoids present in food sample is extracted with petroleum ether and the intensity of the colour of the extract is read in a spectrophotometer at 450nm and the beta carotene is separated and quantified in HPLC.

Apparatus:

Mortar and pestle, test tubes, pipettes, volumetric -flask, conical flask, separating funnel.

Reagents:

Total carotenoids

1. Potassium hydroxide (12%)
2. Distilled alcohol
3. Calcium carbonate
4. Sodium sulphate (anhydrous)
5. Petroleum ether(60-80°C)
6. Glass wool

Beta carotene

1. Sigma standard beta carotene
2. HPLC solvents- Acetonitrile, dichloromethane and methanol(7:2:1)
3. 0.45u membrane filters

Procedure :

1. Weighed 150g of Potassium hydroxide into a conical flask
2. Added 250ml of distilled water to t he conical flask (This forms 60% KOH. Placed the conical flask containing KOH in a tub containing ice water and then added 250ml water to it. Transferred into a bottle and used whenever needed).

3. 20ml of 60% KOH was taken and added 80ml of distilled alcohol (This forms 12% alcoholic KOH).
4. Weighed the sample (duplicate) and transferred into a mortar. (Amount of sample to be weighed depends on the carotene content. Small amount is taken to minimize the time of extraction)
5. Added small amount of glass powder (broken glass of high quality made into small pieces) to the mortar and pestle, then added small amount of 12% KOH and macerate thoroughly (Glass powder is added to break the intact cells; KOH is added to extract the carotenoids from the sample)
6. Transferred into the conical flask and washed the remaining content in the mortar and pestle using 12% KOH.
7. Mix it well by a vortex mixer.
8. Placed it in a shaking water bath at 37°C for 30minutes.
9. Remove the conical flask and transfered it into a separating funnel. $CaCo_3$ was added previously to the separating funnel before the extract was transferred. Petroleum ether (60-80°C) was added to extract the carotenoids.
10. Shook well . The upper layer of petroleum ether was collected, discarding the lower layer and the extraction was continued till no colour was obtained.
11. A small amount of glass wool previously soaked in petroleum ether was taken in a funnel and at the bottom of which a conical flask was kept and added anhydrous sodium sulphate to the funnel. The extract was filtered and the clear yellow solution was collected in the conical flask. (anhydrous sodium sulphate is added to remove the moisture. If there is any turbidity add a small amount of NaCl to the extract).
12. The volume of the filtered extract was noted.
13. 1ml of the solution was taken in a cuvette and the optical density was determined from which the total carotene content was calculated .
14. 1 ml of the solution was filtered by 0.45um filter and 20µl was injected into HPLC from which the β-carotene content was calculated.

Precautions:

Water should not be used throughout either for rinsing or for making up . Only petroleum ether should be used. The entire extraction procedure should be carried out in a dark room.

Result:

Calculation

Total carotenoids:

Weight of the sample

Volume of made up solution =

O.D

Total carotenoid

Beta - carotene:

Area (standard)

Area of sample

Concentration (standard) =

Concentration (sample)

20 ml of sample solution contains =

Therefore for 80 ml of sample solution =

0.5g of sample contains

Therefore 100g contains =

Estimation of Carotene (Beta Carotene)

Ex.No:

Aim:

To estimate the amount of carotene in 100g of food sample.

Principle:

Carotene present is extracted with petroleum ether and the intensity of the color of the extract is compared with that of the standard solution using a colorimeter.

Reagent:

1. **Stock Standard Solution**: 1mg of the standard carotene was weighed and made up to 10ml with petroleum ether.
2. **Working Standard**: 2ml of the stock standard was taken and made up to 50ml with petroleum ether.
3. 95% Ethanol
4. 85% Ethanol
5. Petroleum ether (40 to 60)

Procedure:

The given sample was pulverized with 95% ethanol. The suspension was refluxed for about half an hour in a boiling water bath. The clear supernatant was filtered, diluted with 20ml of 85% ethanol. Extracted the solution repeatedly with petroleum ether using 20ml portion every time and the extraction was done for 3 or 4 times. Carotene was extracted in the petroleum ether pooled the ether extracts and made up to 100ml with ether.

Take different volumes of standard carotene solution 2 to 8ml corresponding to 40 to 160gama. The volume of all solution was made up to 8ml with petroleum ether. The extract was considered to be unknown. 8ml of the made up extract was taken for the experiment. The color developed was read at 540mug in a colorimeter.

Precautions:

No water should be used throughout the experiment either for rinsing or for make up. Only petroleum ether should be used.

Result:

100g of food stuff contains of carotene.

Estimation of Carotene

Volume of the solution (ml)	Concentration	Volume of petroleum ether (ml)	Klette reading (O.D)
Blank			
Standard			
Unknown			

Calculation:

Concentration of the unknown solution =

8ml of the made up solution contains =

Therefore 100ml of the made up solution contains =

100ml of the extract was made from 10g of carrot.

Therefore 10g of carrot contains =

Therefore 100g of carrot contains =

Estimation of Thiamine

Ex.No:

Aim:

To estimate the amount of thiamine present in 100g of the given food sample.

Principle:

Thiamine estimation is based on the oxidation of thiamine to thiochrome in ultra violet light under standard conditions and in the absence of other fluorescent substances, the fluorescence produce directly proportional to the thiochrome present.

Extraction of Vitamin:

Prepared a homogenized powder of the food sample using a blender.Accurately weighed 5 gm into 250 ml conical flask, added 100ml of O.1N H_2SO_4 slowly without shaking, stoppered and allowed to stand overnight. The next day, it was shaken well and filtered through Whatman No.1 filter paper discarding the initial10-15ml of filtrate. Aliquotes of the filtrate were used for the estimation.

Reagents:

1. 0.1N H_2SO_4 : 2.77 ml of concentrated sulphuric acid was made upto 1000ml with distilled water.
2. 15% NaOH: 15g of sodium hydroxide was made upto 100ml with distilled water
3. Isobutanol
4. 1 % Potassium ferri cyanide
5. Thiamine stock solution: 125mg of thiamine hydrochloride was dissolved and made upto 100ml with 2% acetic acid
6. Thiamine working standard: 2ml of thiamine stock solution was made upto 100 ml with 2% acetic acid
7. Sodium sulphate

Procedure:

Pipetted out 10ml of the extract (in duplicate) into 100ml separating funnel. Similarly pipetted out 10ml of standard thiamine (in 4- 5 duplicates for the standard). Added 3ml of 15% NaOH into each separating funnel followed immediately by 4 drops (0.2ml) of ferricyanide solution. Shaken gently for exactly 30 seconds and added rapidly 15ml of isobutanol from a quick delivery burette and then stoppered immediately and shook vigorously for 60 seconds. Allowed to stand for the layers to separate. After the layers had been separated, the bottom aqueous layer was carefully discarded in 2-3 installments after stirring gently.

Added one heaped spatula of sodium sulphate directly into the separating funnel. Stoppered and shook to clarify the extract. If the extract was not clear,

added a little more of sodium sulphate and clarified. The clear extract was decanted carefully through the tap into a clean dry test tube.

Prepared a set of standard blank and sample blank by proceeding in the same way that the addition of ferricyanide was omitted. Since the standard had to be read a number of times during the experiment, it is convenient to oxidize the standard in 4-5 duplicates and to combine all the oxidized extracts in one conical flask. Portions of this will be read at a time and discarded because thiochrome is rapidly destroyed by uv light, and the solution once exposed should not be read again. Similarly the duplicate extracts of standard blank and experimental blank were combined separately in two test tubes and read at intervals if necessary. The fluorimeter was switched on while taking the readings and allowed to warm up for 5-10 minutes. The readings were adjusted to 100 with the standard, similarly adjusted the readings to zero with the standard blank. The readings were checked again and then read the sample blank and different samples one after the other. Since the light intensity sometimes changes progressively with time, the 100 and zero settings were checked at intervals of 5-6 readings.

Result:

Calculations:

Reading of the standard =

Reading of the standard blank =

Reading of the sample =

Reading of the sample blank =

Thiamine content in 100 ml of the sample =

$$\frac{\text{Reading of the sample} - \text{Sample blank} \times 10}{\text{Readings of the standard} \quad \text{Standard blank}}$$

100 ml of the substance contains =

5g of the sample was made upto 100 ml

Therefore 5g of the sample contains =

Therefore 100g of the sample contains =

Result:

Estimation of Riboflavin

Ex.No:

Aim:

To estimate the amount of riboflavin in the given food sample.

Principle:

The concentration of riboflavin in the food sample is estimated fluorimetrically. Fluorimetric procedure for the determination of riboflavin depends on the extraction of vitamin with diluted acid, reaction with potassium permanganate and hydrogen peroxide to destroy interfering pigments and measurement of fluorescence. The vitamin content of the extract is evaluated by means of internal standards.

Extraction of vitamin:

Prepared a homogenized powder of the food sample using blender. Accurately weighed 5g into 250 ml conical flask. Added 100ml of 0.1N H_2SO_4 slowly without shaking. Stoppered and allowed to stand overnight. The next day it was shaken well and filtered through Whatman No.1 filter paper and discarded the initial 10-15 ml of filtrate. Aliquots of the filtrate were used for estimation.

Reagents:

1. **Stock standard solution:** 25 mg of riboflavin was dissolved in 300-400 ml of water, adding 1-2 ml of glacial acetic acid and warming at a low temperature to aid solution. After dissolving, the solution was cooled and made upto 1000 ml. The stock solution had a concentration of 25µg/ml.
2. **Working standard:** 2ml of stock was diluted to 50ml with a concentration of 1µg/ml.
3. 4%Potassium permanganate: 4g of $KMnO_4$ was dissolved in 100 ml of water.
4. Hydrogen per oxide :1:1 solution was prepared by mixing, 20 volumes of H_2O_2 and 20 volumes of water.
5. 10 % Sodium hydroxide: Dissolved 10 g of NaOH in 100 ml of water.
6. Sodium dithionate.
7. Caprylic alcohol.

Procedure:

To 25ml of vitamin extract 2 drops of caprylic alcohol was added followed by 3ml of freshly prepared 4% $KMnO_4$. The mixture was stirred, within two minutes 3ml of 1:1 H_2O_2 solution is added to discharge the $KMnO_4$ colour. The volume was made upto 35ml with H_2O after adjusting the pH to 7.0 by the addition of NaOH. Then the solution was filtered. The fluorescent of the 5ml filtrate was measured in a fluorimeter, using the appropriate filter. From the readings the riboflavin content of the sample was calculated making due allowance for dilute and blank.

Result:

Calculation

The quantity of riboflavin in the amount of

solution taken for fluorimetry = A-C/B-AX1

5ml of sample (A)

5ml of sample + 1 ml of riboflavin working standard (B) =

Blank (after addition of sodium dithionate) (C) =

5 ml of the filtrate containing 0.5 µg of riboflavin =

Therefore 35ml of the filtrate contains =

25 ml of the filtrate contains = ug of riboflavin

100 ml of the filtrate contains =

5g of the substance contains

Therefore 100 g of the substance contains =

Result:

ESTIMATION OF VITAMIN C BY COLORIMETRY

Ex.No.

Aim:

To estimate the amount of ascorbic acid present in 100g of the given food sample.

Principle:

Ascorbic acid is oxidised to dehydroascorbic acid by bromine water. The excess bromine is removed by aeration. The dehydroascorbic acid is treated with thio urea and then coupled with 2.4 dinitro phenyl hydrazine and finally treated with 85% sulphuric acid to produce a red colour which is read at 540 mu colorimetrically.

Apparatus:

Volumetric flasks, test tubes, pipette and colorimeter

Reagents:

1. Bromine water
2. 10% Thio urea solution
3. 2% Solution of 2,4 dinitro phenyl hydrazine in 9N H_2SO_4
4. 85% Sulphuric acid
5. 4% Oxalic acid
6. Stock standard solution: 100mg of ascorbic acid dissolved in 100ml of 4% oxalic acid in standard flask
7. Working standard: 100ml of stock solution was pipetted out and made up to 100ml in a standard flask with 4% oxalic acid.

Procedure:

Weighed 10 ml of lime juice and made upto 25 ml with 4% oxalic acid. Pipetted out 10ml of it into a clean conical flask.

Added a few drops of bromine water, till the solution turned yellow and then removed the excess of bromine by aeration. Made it upto 50ml with 4% oxalic acid and one ml of it was taken for experiment.

Pipetted out 10ml of the working standard solution into a clean conical flask and added a few drops of bromine water till it became yellow. The excess of bromine was eliminated and this solution was made upto 50ml with 4% oxalic acid. one ml of this solution contained 2 or of ascorbic acid. Known volume of standard solutions (0.5,1.0,1.5,2.0,and 2.5 ml) corresponding to 10-50r were taken in a series of test tubes. To all tubes added 1.0ml of 10% thio urea solution and 1 ml of 2,4 dinitrophenyl hydrazine reagent and made up the volume to 7 ml using 4% oxalic acid solution. Incubated for 3 hours at 37°C. Removed the tubes and cooled them in ice. Added 4ml of 85% sulphuric acid to each of the test tube and the red colour developed was read against a reagent blank at 540 mg in klett summerson colorimeter. From the standard curve obtained, the account of ascorbic acid was calculated.

Result:

Estimation of Ascorbic Acid By Colorimetry

Solution	Concentration (γ)	Volume of 10% thiourea solution (ml)	Volume of 2,4 dinitro phenyl hydrazine (ml)	Volume of oxalic acid (4%) (ml)	Volume of 85% sulphuric acid (ml)	Klett Reading
Blank		1.0	1.0	5.0	4.0	
Standard						
0.5	10	1.0	1.0	4.5	4.0	
1.0	20	1.0	1.0	4.0	4.0	
1.5	30	1.0	1.0	3.5	4.0	
2.0	40	1.0	1.0	3.0	4.0	
2.5	50	1.0	1.0	2.5	4.0	
Unknown						
1.0		1.0	1.0	4.0	4.0	
1.0		1.0	1.0	4.0	4.0	

1ml of the solution contains γ of ascorbic acid

50 ml of the solution contains =

10 ml of the diluted solution contains = γ of ascorbic acid

Therefore ml of the diluted solution contains = ascorbic acid

25 ml was diluted from 10ml of lime juice ascorbic acid

Therefore 100ml of the lime juice contains =

Result:

Determination of Fibre Content

Ex.No. :

Aim:

To determine the fibre content of the given food sample.

Principle:

The term "crude fibre" ordinarily meant in agriculture and food analysis is the organic residue consisting largely of cellulose, that is left after other carbohydrates and proteins have been removed by successive treatment with boiling acids and alkalies. The crude fibre obtained in this way is not cellulose but contains distinct properties of hemicellulose, and nitrogenous substances. These however are not sufficient to prevent the results from being reasonably accurate and comparable.

Apparatus:

Weighing balance, beaker, glass rod, funnel, muslin cloth, burner and wire gauze.

Reagents:

1. 0.255N Sulphuric acid: 0.9 ml of sulphuric acid in 99.1ml water.
2. 0.313N Sodium hydroxide: 0.8g Sodium hydroxide in 99.2ml water.
3. Ether.
4. Alcohol.

Procedure:

5g of the sample was weighed into a 500 ml beaker and 200 ml of boiling 0.255N sulphuric acid was added. The mixture was boiled for 30 minutes, keeping the volume constant by adding water at frequent intervals (a glass rod inserted in the beaker helps smooth stirring and boiling). At the end of the period, the mixture was filtered through a muslin cloth and the residue was washed with hot water till free from acid. The mixture was then transferred to a beaker containing 200 ml of boiling 0.313N sodium hydroxide. After boiling for 30 minutes (keeping the volume constant as before) the mixture was filtered through a muslin cloth. The residue was washed with hot water till free from alkali followed by washing with some alcohol and ether. It was then transferred into a crucible, dried overnight at 80-100°c and weighed. The crucible was heated in a muffle furnace at 600° c for 2-3 hours. Cooled and weighed again. The difference in the weight represents the weight of the fibre.

Result:

Determination of Fibre Content

Weight of the crucible =

Weight of crucible with fibre content

(after heating in muffle furnace) =

Weight of fibre alone =

Crude fibre(g/100 g of) =

$$\frac{100 - (\text{moisture} + \text{fat}) \times \text{wt of fibre}}{\text{wt of the sample} - (\text{moisture and fat})} =$$

Therefore, 100 g of contains =

Result:

ANNEXURE - XII

EXTRACTION PROCEDURE

Extraction of *Guava leaf (Psidium guajava L.)*

Thus 100gm of the *Guava leaf (Psidium guajava L.)* powder were dissolved in 1600ml of water and were boiled at 60ºC approximately for two hours till it reduced to 400ml (Thakkur, 2014). The extracts were then stored in clean dry and airtight container

Extraction of Long Pepper (*Piper longum L.)*

Thus 100gm of the Long Pepper (*Piper longum L.)* powder were dissolved in 1600ml of water and were boiled at 60ºC approximately for two hours till it reduced to 400ml (Thakkur, 2014). The extracts were then stored in clean dry and airtight container

Sirukurinjan leaf (*Gymnema sylvestre* R.Br.)

Thus 100gm of the Sirukurinjan leaf (*Gymnema sylvestre* R.Br.) powder were dissolved in 1600ml of water and were boiled at 60ºC approximately for two hours till it reduced to 400ml (Thakkur, 2014). The extracts were then stored in clean dry and airtight container

Naval Seed (*Syzygium cumini L.)*

Thus 100gm of the Naval Seed (*Syzygium cumini L.)* powder were dissolved in 1600ml of water and were boiled at 60ºC approximately for two hours till it reduced to 400ml (Thakkur, 2014). The extracts were then stored in clean dry and airtight container

Kandankathiri (*Solanum virginianum* L.),

Thus 100gm of the Kandankathiri (*Solanum virginianum* L.), powder were dissolved in 1600ml of water and were boiled at 60ºC approximately for two hours till it reduced to 400ml (Thakkur, 2014). The extracts were then stored in clean dry and airtight container.

ANNEXURE - XIII

SENSORY EVALUATION

Avinashilingam Institute for Home Science and Higher Education for Women
Department of Food Service Management and Dietetics

Name : **Age:** **Name of the Recipe:**

S. No	Headonic scale	Colour					Flavor					Consistency					Taste					Appearance				
		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1	Like extremely																									
2	Like very much																									
3	Like moderately																									
4	Like slightly																									
5	Neither like nor dislike																									
6	Dislike slightly																									
7	Dislike moderately																									
8	Dislike very much																									
9	Dislike extremely																									

1-Guava leaf (Psidium guajava L.), 2-Long Pepper (*Piper longum L.)*, 3-Sirukurinjan leaf (*Gymnema sylvestre* R.Br.)*,4*-Naval Seed (*Syzygium cumini L.)*, 5-Kandankathiri (*Solanum virginianum* L.),

ANNEXURE - XIV

SCORE SHEET

Checklist for evaluation of a software

1. Name :
2. Age:
3. Specify: Dietitian House wife

Score sheet

Attributes	VE(40-60)	EFF (20-40)	NE (1-20)	Overall score
Dia-Edu Ease of understanding the content Effectiveness of video on “Take a look”				
Health tracker Adaptability of BMI-tracker Authentication of BMI-tracker Adaptability of bio-tracker Authentication of bio-tracker				
Herba treat Usefulness of nutraceutical recipes Adaptability of nutraceutical recipes Usefulness of nutrient content Authentication of nutraceutical component given				

Adaptability of new recipes Ease of using and viewing the software Usefulness of comparison of nutrient content between nutraceutical recipes and standard recipes				
Diet planner Usefulness of diet planner Adaptability of menu				
Exercise zone Usefulness of exercise zone Clarity of videos				
Efficacy of the software Adaptability of the software in home/hospital dietaries Duration of the software programmes Ease in using the software Reliability of the software content Presentation of the software content Efficacy of a software in self-management of diabetes				

ANNEXURE XV

LIST OF PAPERS PRESENTED AND AWARDS

- Presented oral paper on “Hypoglycemic and hypolipidemic effect of Indian herbs-A review in national conference on challenging issues and technological approaches in medicine held on 19th 20th feb 2016.
- Presented oral paper on titled **“**Hypoglycemic Effect of Guava Leaves *(Psidium Guajava Linn*) On Newly Detected Female Type II Female Diabetics, Annual national conference of indian dietetic association on 30th sep -2nd Oct, 2016, organized by IDA, Mathya Pradesh.
- Presented poster on “Hypoglycemic effect of medicianal plants”Symposium of nutrition and vaccination on public health in Kumarakuru college of technology.
- Presented oral paper on “Ancient Literature in Herbal Medicine, Aspects of prosperous Life in Tamil Literature- International Conference on 9th Dec 2016 at Avinashilingam University, Institute for Home Science and Higher Education for Women, Coimbatore-641-043.
- Presented oral paper titled “organoleptic evaluation of herbs and spices incorporated chappatis for therapeutic uses” UGC sponsored international conference on Bridging Innovation in sports, education, nutrition held on 8th and 9th feb 2019.
- Presented paper in national conference on challenging and sustainable approaches towards food and nutrition security-a globa perspective. Paper entited “ Effect of guava leaves incorporated chaptis on selected type II female diabetics obtained **IInd Prize**.
- Presented oral Paper titled “Nutraceutical Effects Of Sirukurinjan *(Gymnema Sylvestre)* ***(Best Paper Award)*** in Lowering Blood Glucose Levels in Type II Female Diabetics”, International Conference on Current Approaches in Nutraceuticals and Food Technology for Diabetes Management(ICND2019),organized by Department of Nutrition and Dietetics, School of Life Sciences , held on January 24th & 25th2019 at Periyar University ,Salem-636011.

- Presented poster (II Price) entitiled “Nutraceutical effect of Sirukurinjan *(Gymnema sylvestre (Retz.) R.)* and Long Pepper *(Piper Longum Linn)* on Female Type II Diabetics on International conference on Expanding Horizons in *Health*, Disease 2DP2 and Pharmaceuticals conducted by *Biochem*,Biotech & Bioinformatics.

ANNEXURE XVIII

Award Letter - ICSSR

Alka Srivastava
DD & In-charge RFD (Division)
Tel # 011-26716691/87
E-mail: rfdicssr1819@gmail.com

Indian Council of Social Science Research
(Ministry of Human Resource Development)
JNU Institutional Area, Aruna Asaf Ali Mar
New Delhi 110067

File No-RFD/2018-19/GEN/Short-Term/18 17-12-2018

Award Letter

Subject: ICSSR Short -Term Doctoral Fellowship for the Year 2018-19.

Dear Ms. Padhmini K,

On behalf of the ICSSR, I am pleased to inform you that you have been provisionally recommended for award of ICSSR Short - Term Doctoral Fellowship for the Year 2018-19.

The recommendation has been made in accordance with the procedure as laid down in the ICSSR Guidelines for Doctoral Fellowship Scheme for the year 2018-19. Further, the ICSSR Doctoral Fellowship Grant's terms and conditions and monitoring shall also be as per these Guidelines uploaded in the ICSSR website www.icssr.org.

To join the ICSSR Fellowship you need to agree with the Terms and Conditions and submit the following documents, duly forwarded through the competent authority of the University/Institute/College where you are registered for the Ph.D. within 15 days of the receipt of this letter:

1. Joining Report as per the format enclosed
2. Undertaking (on non-judicial stamp paper of Rs.100) as per the format enclosed
3. Grant-in-aid bill/Pre-receipt bill for the first instalment as per the format enclosed
4. An attested copy of Ph.D. Registration Certificate
5. Caste Certificate in case of SC/ST/Persons with Disability, if not submitted
6. Details of RTGS as per the enclosed format of ICSSR by the affiliating institution for disbursement of fellowship

After receipt and acceptance of these documents by ICSSR, a formal Sanction Order for the award of the Doctoral Fellowship will be issued and subsequently the Fellowship Grant shall be transferred through RTGS to the concerned Registrar/Director/Principal of the University/Institute/College along with a copy of the sanction marked to you.

In case, the awardee does not join within 15 days from the date of issue of this letter, the Application shall be treated as withdrawn. In case of any difficulty in joining, the awardee is required to inform the ICSSR and take its permission for any delay.

With best wishes,

Yours sincerely,
Asrivastava
(Alka Srivastava)

Enclosures: Being emailed individually
The concerned formats are also available on Result page of Doctoral Fellowship on ICSSR website

Ms. Padhmini K
Department of Food Service Management and Dietetics,
Avinashilingam University For Women,
Bharathi Park Rd, Tatabad, Forest College Campus,
Saibaba Colony, Coimbatore, Tamil Nadu 641043

Copy to:

The Registrar,
Avinashilingam Institute of Home Science &
Higher Education for WomenUniversity For Women.
Bharathi Park Rd, Tatabad, Forest College Campus,
Saibaba Colony, Coimbatore, Tamil Nadu 641043

The Supervisor: Letter being sent by email only

URKUND

Urkund Analysis Result

Analysed Document: I Introduction.doc (D48415348)
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Urkund Analysis Result

Analysed Document: III Methodology.doc (D48415354)
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Analysed Document: IV Results and Discussion.doc (D48415401)
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Urkund Analysis Result

Analysed Document: V Summary and Conclusion final on 28th.doc (D48415351)
Submitted: 2/28/2019 5:37:00 AM
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