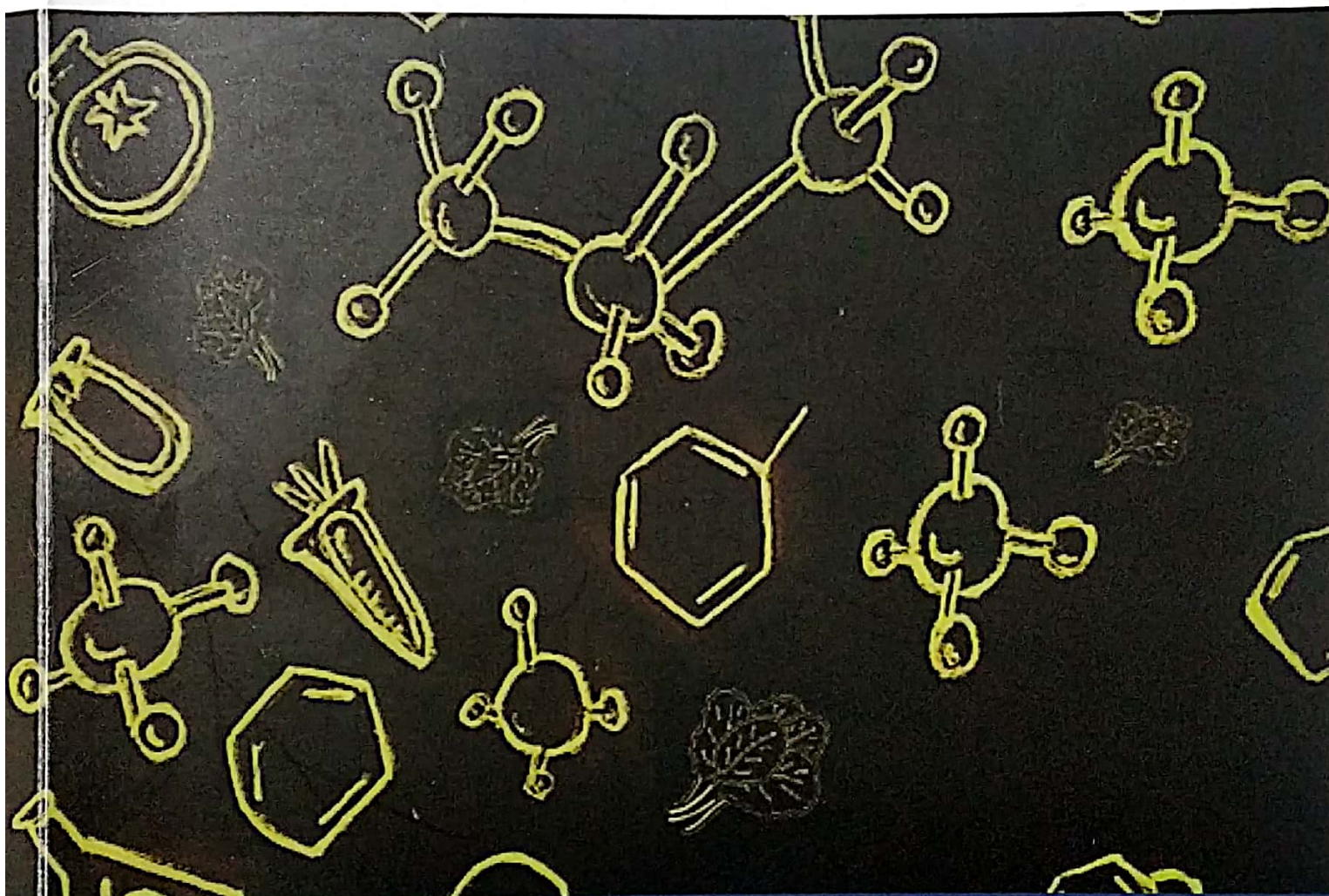


**FOOD SCIENCE, NUTRITION AND
BIOCHEMISTRY**

**LABORATORY MANUAL FOR
STUDENTS OF BSc HOME
SCIENCE**

Second Edition



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SCIENCE, NUTRITION AND BIOCHEMISTRY

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This manual is written by faculty of Home Science presently working in Kerala University and Calicut University. They are specialised in the subject of Home Science and have been working as faculty of Home Science.

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PREFACE

This book was conceived by the teachers of Home Science courses in Kerala and Calicut Universities as a handy reference for practical experiments in Food Science and Biochemistry done by the students of the three year BSc Home Science. The experiments are presented in the crisp style of a lab manual along with their intended learning points.

Diet has a significant role in the holistic development of the individual. Food menu planning is essential for a healthy life. Diseases can be prevented, controlled or cured by adjusting the components of the diet. To apply the science of nutrition in daily life we need an understanding of the nutritional components of food, how they are measured, the nutritional needs in ease and disease and on how to assess the nutritional status of an individual to make recommendations for a diet.

The book is presented in five sections. The first section on Food science covers weights and measures, commonly used recipes incorporating cereals, pulses, fruits, vegetables, fish, meat, milk and preserved foods. The second section deals with how to assess the nutritional status of a person using simple anthropometric measurements. The third section is on the nutritional needs for a healthy individual at various stages of the lifecycle.

The fourth part on Therapeutic Nutrition, deals with the science behind the modifications of the diet for disease conditions. The final part describes the qualitative and quantitative methods to estimate the nutrient content of foods. The commonly studied nutrients include simple sugars, proteins, calcium, vitamin C, and lactose.

The opening section on Food Science is authored by the team of teachers at St Joseph's College for Women, Allapuzha. The sections on nutritional needs and assessment of individuals are by the teams from KAHM Unity Women's College, Manjeri. and Government College for Women, Thiruvananthapuram. The section on therapeutic nutrition is co-authored by the teachers of NSS College for Women, Neeramankara and Government College for Women, Thiruvananthapuram. The section on Qualitative & Quantitative analysis is by the teachers of SN College for Women, Kollam.

I am indebted to the educators, experts in their own fields, who individually and collectively worked to shape this book. We hope to update this lab manual for future changes in curriculum and I welcome suggestions for improvement.

Dr Mini Joseph

FOREWORD

A book that enables student learning and makes concepts simple needs to be encouraged. I am glad to see such a laboratory manual being published by the faculty of Home Science in Kerala.

The subject of Nutrition has grown by leaps and bounds. Several textbooks have been published to provide theoretical knowledge to students and scholars. However a Laboratory manual for undergraduate Home Science students has not been published. This Laboratory manual fulfills this lacunae.

The manual explicitly puts forward the nutritional needs of human beings at various life stages, during diseased conditions, procedures to estimate the nutrient content of foods and methods to prepare nutritious recipes.

The concerted effort by teachers of various colleges and Universities in bringing forth such a book is highly laudable.

I wish all success to the students and teachers of Home Science.

Dr Anitha Mohan
Former State Nutrition Program Officer
Directorate of Health Services
Government of Kerala

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Basic Food Science

Chapters contributed and compiled by :

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Learning Outcome:

- Use of foods in different types of cookery
- Selection of appropriate food for recipes without affecting the quality
- Understand the standard weights and measures
- Identify the presence of adulterants in foods
- Understand the effect of browning, pH and temperature on fruits and vegetables

Introduction

Food Science experiments create an understanding of the influence of food ingredients, the amounts in which they need to be used for a required product and how methods of preparation and processing can be altered for desired results. Common home measures in use in India and their weight and volume equivalents in metric units and identification of common adulterants, effect of browning, heat and pH on vegetables and fruits has been added to enable the students to make use of this book more effectively. This booklet contains the Method of recipes which may be useful for Home Science students in providing nutritious menus.

Rules in Cooking Laboratory

- Wash hands and dry them well before starting the work.
- Finger nails should be clean.
- Keep hands away from hairs and face while cooking.
- Dress neatly in white. Use apron or lab coat during cooking.
- Tie the hair properly and place a cap on the head.
- Do not use the handkerchief or dress to hold the hot pan.
- Use towels while transferring vessels from the pan.
- Use dish towels to wipe the dishes.
- Keep the recipe book as per convenience for reference.
- Place personal things on the shelf or table provided.
- Keep spoons separately for testing the preparations.
- All the waste materials like burnt matches sticks, paper and vegetable peels should be put in the place provided.
- While washing vessels all the food particles should be first scraped and then put into sink.
- Greasy vessels should be first wiped with a piece of paper and then rinsed with hot water.
- After washing the vessels, wipe with a dish towel.
- Keep the cupboards closed while cooking and washing.
- Keep the washing area clean and tidy.
- Wash the sink with soap and scrubber.

Standardization of Recipe

A standardized recipe is a set of written instructions used to consistently prepare a known quantity and quality of food for a *specific location*. A standardized recipe will produce a product that is close to identical in taste and yield every time it is made, no matter who follows the directions. A good standardized recipe will include the name of the given recipe, number of servings, or portions that a recipe produces, portion size, Ingredient list/quantity – exact quantities of each ingredient, preparation procedures – Specific directions for the order of operations and types of operations (e.g., blend, fold, mix, sauté), cooking temperatures and times, service instructions, including hot/cold storage, plating/garnishing

Recipe Development Procedure

1. Analyzed and selected a recipe that seems practical in method and proportion compared to other recipes.
2. Tested the original recipe
 - Prepared the amounts given in original recipe.
 - Used accurate measurements and spatula for levelling ingredients
 - Accurately recorded the details of method and volume of prepared products to help enlarge the recipe.
 - Tasted at appropriate stages of preparations.
 - Had a taste panel to judge acceptability.
 - Ran popularity studies with questionnaire for clients.
 - Kept accurate count of portions actually served.
 - Figured portion cost of recipe.
3. Modify the recipe, if indicated and relish in large amount (25,50,100 servings)
 - change ingredient or a factor at a time (if many changes are needed by new recipes)
 - Modified time and method for quantity preparations.
 - Recorded weight of batter or contents of each pan used.
 - Checked for clarity and conciseness.
 - Kept track of number of portions

4. Repeated tasting steps again if necessary until recipe was satisfactory and with number of portion most appropriate for the operations.
5. Periodically checked and reevaluated recipes for
 - Accuracy
 - Improved methods
 - Time of saving steps

Use of ingredients with built in convenience

MODULE 01

WEIGHTS AND MEASURES

The purpose of measuring and weighing the ingredients is to get an accurate volume or mass of an ingredient. Proper measuring of ingredients is important to successful cooking and baking. Some foods can be greatly affected by too much or too little of certain ingredients, such as salt, baking soda, baking powder and hot or spicy ingredients.

To measure the amount of ingredients correctly, a right measuring utensil should be selected. There are several different types of measuring utensils used for proper measuring of ingredients. Measuring spoons for instance consists of at least 4 spoons, which are made of plastic or metal. They will come in sets including commonly used measurements such as 1/4 teaspoon, 1/2 teaspoon, 1 teaspoon and 1 tablespoon. Measuring spoons are used to measure small quantities of both dry and liquid ingredients. Dry Measuring Cups; plastic or metal sets include 1/4 cup, 1/2 cup, 3/4 quarters cup and 1 cup.



Measuring cups



Measuring spoons

For wet ingredients, a cup that is like a pitcher is used. It is frequently made of clear or translucent plastic, or glass and has lines marking common measurements on the outside of the cup, which make it easy to determine the amount of liquid. The pitcher-like spout on top makes it easy to pour liquids.



For the most accurate measurements of solid ingredients, a kitchen scale is used



KITCHEN SCALE

Liquid ingredients are generally measured by volume.

Dry bulk ingredients, such as sugar and flour, are measured by weight ("250 g flour") while, small quantities of salt and spices are generally measured by volume. Meats are generally specified by weight or count "a 2 kg chicken"; "four lamb chops". Eggs are usually specified by count. Vegetables are usually specified by weight or occasionally by count,

Cooking conversion table (U.S.)

Measure	Abbrev	Size	Equivalent
1 milliliter	ml	1 ml	1 cc of water
1 teaspoon	tsp	5ml	-
1 tablespoon	tbsp	15ml	3 tsp
1 fluidounce	fl oz	30ml	2 tbsp
1 cup	cup	237 ml	8 fl oz
1 pint(U.S.)	US pt	473ml	2 cups
1 quart(US)	US qt	946 ml	2 US pts
1 liter	l	1,000ml	1.8 Imp pts 2.1 US pts
1 gram	g	1 g	Weight of 1 cc water
1 pound	lb	454g	16 oz
1 kilogram	kg	1,000 g	2.2 lb Weight of 1 liter of water

Experiment 1:

Aim: To develop an insight into the quantity and weight of various food stuffs

Method: Measures of 1 cup, 1tbsp and 1tsp of the various food stuffs are taken and the corresponding weight in g is found out.

Food stuff	Weight of 1 cup in g	Weight of 1 tbsp in g	Weight of 1 tsp in g
Rice			
Rice flour			
Wheat flour			
Rava			
Maida			
Green gram dhal			
Black gram dhal			
Sugar			
Milk			
Coconut oil			
Chilli powder			
Coriander powder			

Discussion :

Experiment 2:

Aim: To find out the change in volume of foods after cooking.

Method: Measure a certain volume of food and cook. Measure the volume of the food after cooking and the ratio of raw to cooked volume was found out.

Name of the food stuff	Volume/Weight		Ratio
	Raw	Cooked	
Rice			
Rava			
Dhal			
Potato			
Beans			
Amaranth			
Meat (Dry heat)			
Meat (Moist heat)			
Fish (Dry heat)			
Fish (Moist heat)			

Discussion :

MODULE 02**Cereal Preparations**

Cereals form the staple food of human race .Wheat, rice, maize, barley, oats, ragi and bajra are the common cereals and millets used. Cereals as a whole are rich sources of starch or carbohydrates and B group vitamins in an Indian diet. Millets like ragi are rich source of mineral calcium. Rice is the staple food of south Indians though wheat ,ragi and other millets are also consumed as food in our country.

Puri**Ingredients**

Wheat flour	100g
Salt	2 g
Water	100 ml
Oil	for frying

Method

Salt was added to the flour and stiff dough was prepared by adding required amount of water.

It was rolled out .

Heated the oil .

Fried the Puri in the hot oil until it was cooked.

Remove and serve hot.

Stuffed Chapathi**Ingredients**

Wheat Flour	½ cup	For stuffing	
Salt	½ tsp	Meat	125 gm
Water	as needed	Masala	to taste
Dalda	1 tsp	Salt	to taste

Method

Cooked the meat adding salt and masala, minced. Seasoned and allowed to cool.

Sifted flour. Added salt and water and mixed into a dough.

Kneaded well several times and divided into balls.

Rolled into chapathis sprinkling flour. Took one chapathi and smeared with dalda.

Applied filling and covered with another chapathi.

Pressed the sided well using a fork. Cooked on a hot thavai adding dalda. Served hot.

Parathas

Ingredients

Maida flour	½ cup	Water	100ml
Baking Powder	¼ tsp	Salt	2g
Dalda	2 tsp		

Method

Sifted maida and baking powder for several times .

Add required amount of salt and water to the flour.

Prepare a stiff dough.

Knead well several times and covered the dough with a damp cloth and kept aside.

The dough was divided into small balls .Rollout,

Spread little dalda over the rolled portion, fold and roll again.

Cook on hot tawa adding dalda around . serve hot.

Vegetable Pulao

Ingredients

Basmati Rice 80 g	Pepper corn 2nos
Onion 30g	Cardamom 2 no
Peas 15 g	Cloves 2 nos
Beans 15 g	Cinnamon 2 nos
Carrot 15 g	Bay Leaves 2 nos
Cauliflower 15 g	Salt to taste

Method

Shell peas .Peel and cut carrots into long thin slices. Break cauliflower into small pieces. Slice onion.

Wash and drain rice.

Heat fat .Fry onion till crisp.

Fry vegetables and remove.

Add all spices and rice .Fry well.

Add vegetable stock and cook.

When rice is three-fourth done add vegetables, cover and cook on a slow fire.

Ghee Rice

Ingredients

Rice	2 cup	Mustard	1/8 tsp
Shred Chili	1 tsp	Ghee	1 tbsp
Onion Sliced	1 tsp	Salt	to taste
Curry Leaves	a few	Water	4 cup

Method

Cooked the rice with salt and water. Drained .

Heated ghee, spluttered mustard .

Fried onion and chilies and added to rice .

Mixed with the rice and serve hot.

Lime Rice

Ingredients

Cooked rice	From 1 cup of uncooked rice	Turmeric powder	¼ tsp
Bengal Gram Dhal	1 tbsp	Fenugreek	¼ tsp
Lime	1 or 2	Mustard	¼ tsp
Cashew nuts	15 g	Curry leaves	a spring
Red Chilies	6 no's	Asafoetida	a pinch
Oil	2 tbsp	Salt	to taste

Method

Extract juice from lime and mix it with rice.

Roast and powder fenugreek and add to rice.

Heat oil, fry nuts and remove.

Add curry leaves, mustard, asafetida , red chilies and dhals.

When brown remove from fire and add to rice.

Mix well, add nuts and serve hot.

Coconut Rice

Ingredients

Cooked Rice	From 1 cup uncooked rice		
Black gram Dhal	1 tsp	Red chilies	4 no's
Bengal gram Dhal	1 tbsp	Curry leaves	a few
Coconut scrapings	½ coconut	Coconut oil	2 tbsp
Mustard	¼ tsp	salt	to taste

Method

Heat the oil ,add mustard ,dhals, curry leaves and red chilies.

Add coconut scrapings, fry for 5 minutes or until slightly brown.

Mix cooked rice and salt and add to the seasoning.

Stir well and remove from fire.

Dosa

Ingredients

Raw rice	75g (1/2K)	Oil As needed
Parboiled rice	75g (1/2K)	Salt to taste
Black gram dal	50g (1/3K)	

Method

Soak rice and dal separately overnight.

Grind both separately in a mixer grinder .

Mix both and keep for fermenting for 5-6 hours.

Heat an iron pan (tawa),smear with oil .

Add salt to the mixture and mix well.

Pour a ladleful of the mixture ,spread evenly .

Cook both sides, using a little oil.

Serve hot with sambar and chutney.

Appam

Ingredients

Rice	200g	Salt	7g
Coconut	75g	Water	100 ml
Oil	8g		

Method

Soak the rice for four hours. Grind it with coconut in a mixer grinder.

Make the batter with water and add salt.

Mix well and keep overnight for fermentation.

Take a deep frying pan and pour the batter in the center.

Rotate quickly so that the batter spreads evenly.

Cover with a lid, cook and remove after 3-4 minutes.

Ragi Preparations

Ragi Puttu

Ingredients

Ragi Flour	1 cup	Salt	to taste
Jaggery	3 tbsp grated	Cardamom	2 no's (Powdered)
Coconut scrapings	3 tbsp		

Method

Roast ragi flour in hot kadai and remove.

Sprinkle hot water on flour and mix thoroughly.

Steam for 10-15 minutes and sprinkle water for the second time and steam again.

When the flour is cooked ,remove it from the steam and mix in the jaggery and cardamom

Add coconut scrapings and serve hot.

Ragi Leaf Cake

Ingredients

Ragi flour	1 cup	Sugar	8tbsp
Water	½ cup	Oil	2 tsp
Coconut Scrapings	6 tbsp	Banana leaves	

Method

Cut leaves into sizes of your choice and spread oil on them.

Dissolve ¼ tsp of salt in water.

Mix ragi and salt water.

Mix sugar and coconut.

Put a table spoonful of ragi dough on a leaf and flatten it with your hand into a round shape

Easy to cook Recipes

Dalia

Ingredients

Broken Wheat	100 g	Black Pepper Powder	3 no.s
Green gram Dhal	100 g	Oil	15 g
Cumin Seeds	5 g	Salt	to taste
Grated Carrot	100 g	Water	450 ml

Method

Heat oil in pressure cooker .Add cumin and fry till it turns brown.

Add broken whet and fry till golden brown.

Add rest of the ingredients and cook at 15 lbs pressure for 2 minutes.

Total weight of cooked dalia – 750 gms

Vermicelli Upma

Ingredients

Vermicelli	100 g	Turmeric Powder	1/2 tsp
Peas	100 g	Oil	2 tsp

Onion	1 big	Ginger	1 tsp
Green Chilies	2 no	Water	300 ml
Mustard	1tsp	Coriander leaves	Chopped
Salt	to taste		

Method

Roast vermicelli till golden brown. Cook peas till soft in a pressure cooker or a vessel.

Heat oil in a vessel, splutter mustard.

Add chopped onions, ginger and green chilies.

Fry till golden brown. Add salt ,turmeric powder ,boiled peas ,savian and water.

Cook on low flame till savian are soft absorbing all the water.

Savian strands should not stick to each other .Serve hot.

Total cooked savian 400 g

Serving size 4 no's

Broken Rice Kanjee**Ingredients**

Broken Parboiled Rice	1 tbsp
Water	½ cup
Milk	½ cup
Sugar	to taste

Method

Cook the rice in water till it is done .

Add milk and sugar cook for some more time till it thickens .

Serve hot.

Arrowroot Porridge**Ingredients**

Arrowroot	1 tsp	Water	3tsp
Milk	1 cup	Sugar	to taste

Method

Make a paste of arrowroot powder using 2-3 tsp of water .

Heat milk ,add this paste slowly to the milk stirring all the time and let it simmer for 5 minutes.

When the mixture appeared to be of uniform consistency and the arrowroot cooked .

Remove it from the fire. Added sugar and serve it hot.

Sago Porridge**Ingredients**

Sago	1 tsp	Sugar	2 tsp
Milk	½ cup	Water	½ cup

Method

Boil the sago in water till it becomes transparent.

Add milk and sugar.

Cook for sometime .Serve hot.

Discussions about the prepared recipes

Discussions about the prepared recipes

PULSE COOKERY

A pulse is a dry legume that grows in a pod of one to 12 seeds. It includes beans, lentils, peas and other little seeds. Indian pulses are usually available in three types: the whole pulse, the split pulse with the skins on, and the split pulse with the skins removed. Studies have shown that people who eat at least ½ cup of pulses per day have higher intakes of fibre, protein, calcium, potassium, folate, zinc, iron, and magnesium as well as lower intakes of total and saturated fat. The amount of protein in beans, lentils, chickpeas and peas is 2-3 times the levels found in cereal grains like wheat, rice, quinoa, oats, barley, and corn. Compared to animal and many other plant-based sources of protein, pulses are a more affordable and sustainable protein source. Pulses also contain both soluble and insoluble fibre. Soluble fibre can help manage body weight, blood sugar levels and lower cholesterol. Insoluble fibre on the other hand, assists with digestion and regularity. Pulses also contain resistant starch, a type of carbohydrate that behaves like fibre in the body; and has been shown have similar health benefits such as reduced circulating cholesterol and blood sugar levels as well as improved gut health. The United Nations Food and Agriculture Organization (FAO) recognizes 11 types of pulses.

COOKED DALS

RED GRAM DAL/ GREEN GRAM DAL/ BENGAL GRAM DAL/BLACK GRAM DAL

Ingredients

Dal	250 g	Curry leaves	5 g
Oil	10 g	Salt	to taste
Mustard	a few	Onion	100 g
Green Chillies	5 g	Water	1 litre

Method:

Boil dal (Bengal gram 15lbs for 3 minutes, black gram dal for 1 minute, Green gram dal for 1 minute and Red gram dal for 3 minutes after pressure is reached) in water till soft. Add spices, cook for few minutes and remove.

Season Bengal gram dal , green gram dal with ghee and cumin

Season Red gram dal with mustard seeds and curry leaves.

KOOTU

Ingredients

Bengal gram dal	250g	Turmeric	2g
Calabash Cucumber	250g	Cumin	5g

Oil	10g	Mustard	5g
Coconut	100g	Curry leaves	a few
Salt	to taste	Water	½ litre

Method:

Boil dal at 15lbs for 3 minutes after pressure is reached.

Add grated coconut to kootu

Season with mustard and curry leaves

SPINACH -WITH-DAL**Ingredients**

Green gram dal	250g	Tomato	100g
Spinach	500g	Oil/Ghee	10g
Green Chillies	10g	Salt	to taste
Onion	50g	Water	300ml

Method:

Boil dal under pressure at 15lbs for 2 minutes after pressure is reached.

Season Spinach dal with chopped fried onions and tomatoes

SAMBAR**Ingredients**

Red gram dal	100g	Curry leaves	a few
Onion	50g	Red chillies	1g
Sambar Masala	5g	Salt	to taste
Tamarind	1g	Cumin	2g
Mustard	1g	Water	450ml

Method:

Boil dal under pressure at 15lbs for 3 minutes after pressure is reached.

Add tamarind pulp to sambar

Season with mustard, curry leaves and whole chillies

CHOLE**Ingredients**

Kabuli Chana	250g	Tamarind	20g
Bengal gram dal	100g	Tomato(big)	100g
Oil	50g	Green Chillies	5g
Potato	200g	Kala namak	5g
Onion (small)	125g	Coriander leaves	1g
Garlic	5g	Roasted powdered cumin	10g
Ginger	5g	Mint	1g
Garam masala	10g	Salt	to taste
Water	as needed	Soda	0.2g

Method:

Soak cleaned chana and dal overnight.

In the morning cook at 15lbs pressure for 45 minutes

Decant water and keep water aside

Apply a pinch of soda bicarbonate to chana and keep them aside for 15-20 minutes

Add decanted water and boil till soft

In a separate vessel fry ground onion, ginger and garlic till brown

Add all spices except tamarind, green chillies and coriander leaves

Stir for a few seconds and add boiled chole

Cook for a few minutes.

Remove, add tamarind pulp and garam masala

Garnish with slices of onion, green chillies, tomatoes and chopped coriander leaves

RAJAMH / RAWAN**Ingredients**

Rajmah	250g	Coraiander leaves	5g
Onion	100g	Garam masala	5g
Tomato	100g	Salt to taste	

Oil	10ml	Water	as needed
Chilli powder	5g	Coriander powder	10g
Turmeric	5g		

Method:

Soak dried beans overnight and boil (at 15lbs pressure for 5 minutes) till soft.

In another vessel, fry the ground onions till brown

Add chopped tomatoes and fry till the juice evaporates

Add all the spices except garam masala and boiled beans

Cook for a few minutes

Remove, sprinkle garam masala and chopped coriander leaves

CHAT**Ingredients**

Green gram dal	100g	Red chilli powder	5g
Black gram dal	100g	Roasted cumin powder	5g
Oil	10ml	Garam masala	5g
Tamarind	100g	Salt	to taste
Jaggery	100g		
Curd	500ml		

Method:

Soak both dals for 4-5 hours.

Wash and remove the husk and grind them to a fine paste

Deep fry in small balls and soak in salted water

Squeeze out the water and keep them aside

Chutney:

Soak tamarind and jaggery separately in a little amount of water

Squeeze out the pulp of tamarind after 1-2 hours and strain the dissolved jaggery

Mix both of them and add all the spices

Churn the curd, add a little salt and dip the dal pakories in it, spread tamarind chutney over them. Serve.

DAHI VADA

Ingredients

Black gram dal	100g	Oil	50ml
Coconut	50g	Salt	to taste
Green Chillies	5g	Curd (buffalo)	500g
Red Chillies	1g	Mustard	3g
Curry leaves	a few	Green Coriander	5g

Method:

Soak black gram dal overnight and grind to a fine paste

Heat oil and fry small vadas with the dal. Churn the curd

Grate coconut, chop green chillies, curry leaves, green coriander and add the whole thing along with salt to the curd.

Add vadas and season with mustard and red chillies

MASALA VADA

Ingredients

Bengal gram dal	100g	Curry leaves	a few
Mint	1g	Salt	to taste
Onions	50g	Green chillies	3g
Soda	0.5g	Oil	30ml
Ginger	3g	Coriander leaves	1g

Method:

Soak dal for 4-5hours.

Keep about a tablespoon of dal aside and grind the rest of dal coarsely.

Chop all spices and add to dal, add one tablespoon of dal too

Mix well and divide into small portions(20)

Flatten with hand and fry till golden brown and serve hot.

BASEN BURFI**Ingredients**

Bengal gram flour	500g	Pistachio nut	5g
Powdered sugar	200g	Cardamom	1g
Vanaspati/Ghee	250g	Raisins	5g
Almonds	10g		

Method:

Blanch almonds and pistachionut. Peel and slice them thinly.

Peel and powder the cardamom seeds

Fry Bengal gram flour in ghee, on slow fire, till golden brown.

Remove from fire, add sugar and mix well

Add nuts and cardamom and spread the whole mixture in a greased plate.

When set, cut into small diamond shaped pieces.

GREEN GRAM DAL PAYASAM (KHEER)**Ingredients**

Green gram dal	250g	Cardamom	1g
Jaggery	300g	Dry coconut	25g
Raisins	50g	Water	500ml
Cashew nuts	50g	Coconut milk	250ml
Milk	400ml		

Method:

Roast green gram dal and cook with water till semi solid

Add milk and coconut milk, fried nuts and powdered cardamom.

Boil once and remove from the fire

Make a syrup of jaggery, strain and add to the cooked green gram dal. Serve it warm.

Discussions about the prepared recipes

Discussions about the prepared recipes

VEGETABLE COOKERY

Vegetable plays a very important play as more and more people are becoming vegetarian and vegetables are widely used in cookery. They are served in various form as an accompaniment, garnishes, salad, bhajis, horsd'oeuvre, curries, sabzi, raitis etc. Vegetable cooking needs a good knowledge of the principle of cookery and high degree or skill. Recent studies have demonstrated that the Method and cooking can improve the nutrition quality of food. Except for the dried vegetable such as dried legumes, vegetable have a high water contain which ranges from approximately 70-95%. Beside nutrient components vegetable have certain other materials and component which have no food value but of great concern in vegetable cookery like flavouring substances and pigments. They have an effect upon on colour and general palatability of the cooked vegetable product.

AVIAL

Ingredients

Drum sticks	100g	Coconut oil	50g
Pumpkin	200g	Curd	200ml
Potato	100g	Cumin	5g
Ash gourd	100g	Curry leaves	a few
Raw Banana	100g	Salt	to taste
French Beans	100g	Water	250ml
Fresh Coconut	250g	Green Chillies	30g

Method:

Wash, peel and cut all the vegetables lengthwise (about 2" thick pieces)

Add salt and water and cook till they soft

Beat curd and add to boiled vegetables

Add grated coconut and boil for a minute.

Season with oil and cumin and remove from the fire

PEAS POTATO CURRY**Ingredients**

Peas (Shelled)	250g	Potato	250g
Tomato	100g	Onion	150g
Turmeric	5g	Oil	10ml
Chilli powder	5g	Coriander powder	5g
Garam masala	5g	Green Coriander	5g
Salt	to taste	Water	250ml

Method:

Grind and fry onions till golden brown

Add chopped ginger and tomatoes and cook till all the moisture evaporates

Add all the spices except garam masala and coriander leaves

Add shelled peas, potatoes and water

Cook till vegetables are soft

Sprinkle garam masala and chopped green coriander

After peas are cooked soft, add pieces of paneer and cook for 4-5 seconds

POTATO STEW**Ingredients**

Potato	250g	Coconut milk	100ml
Curry leaves	a few	Green chillies	10g
Onion	100g	Ginger	5g
Coconut oil	10ml	Salt	to taste

Method:

Boil, peel and cut potatoes

Grate and grind coconut and extract milk

Add the coconut and extract second lot of milk

Then add hot water to the coconut and extract third lot of coconut milk

Heat oil and fry sliced onion, ginger, green chillies and curry leaves till onions are soft but not brown

Add potatoes, salt and third lot of milk and cook till thick.

Add second lot of milk and cook for a few minutes

Lastly, add first milk and immediately remove from the fire and use immediately otherwise it gets spoilt

SOUP**Ingredients**

Tomato	250g	Refined flour	10g
Sugar	10g	Butter	50g
Black Pepper	5g	Garlic	1g
Ginger	5g	Onion	10g
Salt	to taste	Water	500ml

Method:

Boil tomatoes, chopped onion, ginger and garlic till very soft

Strain the tomatoes

Heat butter and fry corn flour till slightly brown

Add tomato juice, salt, sugar and black pepper

Cook for a few minutes and remove. Serve hot

TOMATO JUICE COCKTAIL**Ingredients**

Tomato	½ cup	Salt	5g
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Water	1 ½ cup	Celery	1 rib
Onion	1 slice	Bay leaf	½
Sugar	1/4tsp		

Method:

- Simmer for ½ an hour ½ cup tomatoes, 1 ½ cup water, onions, celery and ½ bay leaf
- Strain and season with 1tsp salt and ¼ tsp sugar
- Serve the cocktail thoroughly chilled

CUCUMBER AND TOMATO FROST**Ingredients**

Tomato juice	250 ml	Salt	¼ tsp
Cucumber (grated)	100g	Sugar	1 ½ tsp
Lemon	¼		

Method:

Mix all ingredients, grated cucumber, tomato juice, lemon juice, sugar and salt. Chill and strain. Serve in glasses with sliced cucumber in edge

VEGETABLE KOFTA CURRY**Ingredients**

Carrots	100g	Tomatoes	100g
French Beans	100g	Poppy seeds	10g
Sesame seeds	10g	Dry Coconut	10g
Ginger	5g	Garlic	
Onion	50g	White flour/Bengal gram dal flour	50g

Oil	50ml	Turmeric	5g
Chilli powder	5g	Coriander powder	5g
Salt	to taste	Water	250ml

Method:

Boil carrots and beans with salt

Decant all the water and keep aside to use for making gravy

Add a little chilli powder, Bengal gram dal flour to the vegetables and make into small balls(70)

Fry the koftas in deep oil and keep aside

Gravy: Grind onion, garlic and ginger. Fry in a little oil (50g) till golden brown. Roast poppy seeds, sesame seeds and coconut and grind them. Add to browned onion mixture. Add chopped tomatoes and cook till all the moisture evaporates

Add salt, chilli powder, turmeric and coriander powder. Fry for a few seconds. Add the decanted water and boil for a few minutes. Lastly add koftas and left it simmer for a few seconds. Remove from the fire and add coriander leaves.

VEGETABLE KURUMA**Ingredients**

Potatoes	100g	Carrots	100g
Beans	100g	Tomatoes	100g
Onion	50g	Garlic	5g
Ginger	2g	Green chillies	5g
Sesame seeds	10g	Poppy seeds	5g
Coconut dry	15g	Cumin	1g
Oil	50ml	Salt	to taste
Water	300ml		

Method:

Roast and grind sesame seeds, poppy seeds, coconut and cumin and keep aside

Grind garlic, ginger and onion

Peel and cut vegetables

Chop tomatoes and green chillies

Fry onion till golden brown

Add nuts mixture.

Fry for 1-2 minutes

Add tomatoes and cook till no moisture remains

Add all other ingredients and simmer the vegetables till soft

TOMATO CHUTNEY**Ingredients**

Tomato	250g	Green chillies	1g
Onion	100g	Cumin seeds	1/4tsp
Garlic	1g	Coriander leaves	¼ bundle
Fat or Oil	5g	Salt	to taste

Method:

Blanch tomatoes. Peel and chop finely

Heat fat and add cumin seeds and chopped onions, garlic and green chillies

When onion is fried add tomato and salt

Cook until tomatoes are soft

Transfer to a serving dish

Garnish with chopped coriander leaves

PUMPKIN CURRY**Ingredients**

Pumpkin	250g	Green chillies	5g
Onion	100g	Oil	15ml
Fenugreek seeds	1g	Sounf	5g
Cumin	1g	Salt	to taste
Turmeric	1g		

Method:

Wash and cut the vegetables into small pieces. Heat oil and fry cumin or mustard or chopped onion

Add the rest of the spices except garam masala

Add the vegetable, cover the pan and cook on slow fire till the vegetable is soft and no liquid is left

Remove and sprinkle garam masala

BAIGAN BHARTA**Ingredients**

Big round brinjal	250g	Onion	100g
Tomato	100g	Green chillies	2g
Green coriander	25g	Oil	25ml
Chilli powder	2g	Garam masala	2g
Salt	to taste		

Method:

Apply a little oil to the brinjal and roast over live charcoal or open flame, till fully cooked. Remove the skin, wash and mash.

Fry chopped onion and green chillies till slightly soft but not brown

Add chopped tomatoes and cook till no moisture is left.

Add spices and mashed brinjal, cook for about seven minutes on slow fire, till the vegetables does not stick to the sides of the vessel and a little oil is separated.

Sprinkle garam masala and chopped coriander leaves. Remove from the fire.

CABBAGE PUGATH

Ingredients

Cabbage	250g	Onion	50g
Mustard	1g	Oil	10ml
Coconut	50g	Garlic	1g
Curry leaves	5g	Green chillies	1g
Salt	to taste		

Method:

Chop cabbage and steam it till cooked. In another pan fry mustard, garlic, green chillies and curry leaves. Add cooked cabbage and salt.

Cook for a few minutes. Sprinkle grated fresh coconut and remove from fire

STUFFED TOMATOES

Ingredients

Tomatoes	200g	Carrot	100g
Beans	50g	Bengal gram flour	30g
Potato	100 g	Garam masala	2g
Chilli powder	2g	Oil	20g
Salt	to taste		

Method:

Wash and scoop the tomatoes

Chop all the vegetables and steam till they are well cooked

Mash and fry in a small amount of oil along with spices

Fill the tomatoes with the cooked vegetables

Make a thick batter with besan and close the opening in tomatoes with it.

Apply little oil to the tomatoes

Bake in an oven or cook (fry) on slow fire in a pan with heavy cover.

VEGETABLE CUTLET**Ingredients**

Vegetables	250g	Garam masala	5g
Green chillies	5g	Bread crumbs	20g
White flour /Egg	25g/50g	Onion	10g
Green coriander	3g	Salt	to taste
Oil	50ml		

Method:

Boil the vegetables and peel potatoes

Add chopped onions, green chillies and coriander leaves

Add salt, garam masala and mix by mashing the vegetables

Divide them into small portions (30) and flatten them to form any shape

Dip them in maida batter and fry or dip in beaten egg

Coat with bread crumbs and deep fry in hot oil. Serve hot

FRUIT COOKERY

Fruits are ripened ovary or ovaries of a plant together with adjacent tissues. They are fleshy or pulpy in character, often juicy and usually sweet with fragrant and aromatic flavours. They are good source of vitamins, minerals, fiber and antioxidants. They are used in both raw and cooked in desserts, juices, and chutneys .

HAWAIIAN PAPAYA FREEZE

Ingredients

Ripe Papaya	2 cups	Sugar	1 cup
Lime juice	10g	Orange juice	10 g
Cream	½ cup		

Method:

Wash, cut and remove seeds from papaya
 Scrape the pulp and rub it through a wire sieve
 Measure pulp, add orange juice, lime juice and sugar
 Add cream, mix well
 Freeze in refrigerator. Serve chilled

FRUIT SALAD

Ingredients

Banana ripe	4	Mangoes	2
Apples	2	Papaya	½ a fruit
Orange	2	Pineapple	100g
Black grapes	250g	Sugar	½ cup
Cream	½ cup		

Method:

Remove the skin of bananas and slice into small pieces. Sprinkle some sugar

Remove skin of mangoes, apples and papaya and cut into pieces

Peel Orange and remove the pulp

Wash grapes and add to the rest of the fruits

Mix all the fruits. Mix in the sugar and cream

Transfer to a serving dish and serve chilled

STEWED APPLE**Ingredients**

Apple	50g
Water	½ cup
Sugar	¼ cup

Method:

Wash apple and remove seeds and cook in water till soft

Add sugar and cook. If syrup is too thin, remove fruits and thicken the sugar syrup

Add fruit to the syrup and allow to cool

Transfer to a serving dish

FRUIT PUNCH**Ingredients**

Lime	2	Ginger	30g
Orange	1	Sugar	250g
Sweet lime	2	Pine apple	½ slice
Black grapes	250g		

Method:

Extract juice from lime, sweet lime and orange
Grate pineapple into fine shreds and extract juice
Wash the grapes. Separate the skin and pulp, remove seeds
Pass the pulp through a sieve
Extract the colour of the skin with a little water
Add sugar to 1 cup of water and boil. Add ginger extract and boil for 3 minutes
Add pineapple juice, boil for 2 minutes
Add orange juice and sweet lime juice and finally grape juice. Mix well and dilute.

SWISS FRUIT MOULD**Ingredients**

Sago	½ cup	Water	250ml
Sugar	250g	Pineapple	250g

Method:

Soak sago in 1 cup of water for ½ hour
Put sugar, chopped pineapple and a cup of water in a pan and boil for 5 minutes
Add sago and cook over low flame
When sago is cooked remove from fire, pour into a pudding dish and cool
Unmould and serve with custard or cream

Discussions about the prepared recipes

Discussions about the prepared recipes

MILK COOKERY

Milk is the nutrient rich fluid produced by the mammary gland of mammals and has been recognized as a complete food because of its high nutritional quality. It is based on the scientific principles that (i) it is a good source of protein of high biological value (ii) it is the best source of calcium and encourages sound bone and teeth development and that (iii) it contains all the important minerals and vitamins.

In food preparation, milk is used in many ways and is combined with many kinds of foods. Milk and its products may be combined with egg, meat or vegetables. It is used as a basic ingredient in pudding and in frozen desserts or soups and for drinks like tea, coffee, and cocoa. Milk is combined with cereals and with many foods as in custard and in all types of bread. The gross composition of milk is 87% water, protein 3.3%, fat 4%, carbohydrate 5% and ash 0.7%.

CARAMEL CUSTARD

Ingredients:

Milk – 200 ml	Custard powder – 5 g
Egg – 1 no	Vanilla essence – ½ tsp
Sugar – 30 g	

Method :

Boil the milk and keep aside.

Caramelize 10 g of sugar and spread this at the bottom of the pudding mould.

Mix the custard powder in a small amount of milk and add it to the rest of the milk.

Mix together beaten egg, sugar and vanilla essence.

Pour the mixture into the pudding mould and steam until done.

Cool and turned upside down, into a serving mould.

No of servings- 4

Major nutrients provided – protein, carbohydrate

RICE FLAKES PAYASAM

Ingredients:

Rice flakes – 30 g	Nuts & raisins – a few
Milk – 200 ml	Ghee – 1 tbsp
Jaggery -30 g	

Method :

Boil the milk and keep aside.

Place a thick bottomed vessel on fire, add a small portion of ghee and fry the nuts and raisins. Take out the fried nuts and raisins and keep aside in a plate.

Add rice flakes to the pan and heat it on fire for a few minutes. Keep aside and when cool crush it slightly with the hand.

Melt the jaggery in a pan and strain it to remove the impurities.

Place the pan on the fire and add the jaggery. When it starts boiling, add the crushed rice flakes and turn off the fire. Add the boiled milk and ghee and the fried nuts and raisins. Add a pinch of cardamom powder.

No of servings- 4

Major nutrients provided – protein, carbohydrate, iron

SEMOLINA PAYASAM**Ingredients:**

Semolina -30 g

Ghee- ¼ tsp

Milk- 100 ml

Cardamom -1

Water -20 ml

Cashew nuts & Raisins -1 tsp

Sugar- 1tbsp

Method:

Fry the nuts and raisins in ghee and set aside.

Roast the semolina in a pan with ghee until golden brown

Boil the milk and water together and add the roasted semolina and cook till done.

When half done, add the sugar and keep stirring.

Add in powdered cardamom and turn off the flame.

Add the fried cashew nuts and raisins.

No of servings- 1

Major nutrients provided – protein, carbohydrate, fat, calcium

BREAD PUDDING**Ingredients:**

Bread crumbs – 100 g

Sugar - 30 g

Milk - 200 ml

Egg -1 no

Butter – ½ tsp

Vanilla essence - to taste

Method:

Boil the milk, add vanilla essence and soak the bread in it and keep aside.

Beat the egg, sugar and butter together.

Mixed with the first mixture and steamed until done. Cooled and served.

No of servings- 4

Major nutrients provided – protein, carbohydrate

SOFT CUSTARD**Ingredients:**

Milk – 200 ml

Egg – 1 no

Sugar – 30 g

Method:

Mix all the ingredients together and place on fire in a double boiler. Heat till thick consistency.

Remove from fire and allow to cool, add flavorings and refrigerate.

No of servings- 4

Major nutrients provided – protein, carbohydrate and vitamin c if fresh fruits used as flavorings.

CARROT KHEER**Ingredients:**

Milk – 200 ml

Sugar – 100 g

Water– 20 ml

Cardamom powder – to taste

Carrots – 250 g

Ghee – 1 tbsp

Method:

Heat ghee in a pressure cooker, add the grated carrots and saute on a medium flame for 7 to 8 minutes.

Add half of the milk and simmer till the carrots absorb the milk. Add the water and pressure cook.

Add sugar, cardamom powder and rest of the milk and cook on a low to medium flame till done.

Turn off the flame, cool and transfer to serving bowls

No of servings- 4

Major nutrients provided – protein, carbohydrate, fat and beta carotene.

CHOCOLATE LAYER PUDDING**Ingredients:**

Milk – 200 ml

Gelatine – 10 g

Egg – 1 no

Chocolate powder – 1 tbsp

Sugar – 200 g

Method:

Beat the egg well, add the milk and sugar.

Cook on a double boiler and add the previously soaked gelatin to this, while the mixture is still hot. Mix thoroughly.

Divide the mixture into two parts. To one part, add the chocolate powder and set this in a tray in the freezer. After 20 minutes, take the set tray and pour the rest of the mixture on top of it and set in the freezer.

No of servings- 4

Major nutrients provided – protein, carbohydrate, fat.

MOSS PUDDING**Ingredients:**

Milk – 150 ml

China grass – 10 g

Condensed milk – 50 ml

Vanilla essence – to taste

Sugar – 30g

Method:

Cut the china grass into small pieces and soak in water for 15 minutes. Melt the china grass keeping on fire.

In another vessel, mix thoroughly the milk, condensed milk and sugar and keep on fire.

When both the mixture are of the same temperature, add the china grass mixture to the milk mixture stirring continuously. Keep on fire for 5 minutes.

Turn off the flame, add vanilla essence and cool and pour into pudding tray and set in a refrigerator.

No of servings- 4

Major nutrients provided – protein, carbohydrate, fat

SIMPLE ICECREAM**Ingredients:**

Milk -200ml

Vanilla - to taste

Egg- 1

Cream – 50 g

Sugar – 50 g

Method:

Mix the milk, egg and sugar in a bowl and double boil for a few minutes. Keep aside to cool.

Mix the cooled mixture with the cream and vanilla essence in a blender. Pour in ice-cream tray and set in a freezer. When the mixture starts to set, take it out, mix it in a blender, and then re-set in the freezer. Repeat this for better texture of the ice-cream.

Discussions about the prepared recipes

MEAT COOKERY

Meat is chiefly the muscle tissue of animals or birds which is used as food. Edible internal organs such as liver, kidney, heart, brain, intestine etc are also included under this. Though expensive, meat furnishes first class proteins to the body and also contributes phosphorous, iron and B vitamins. Organ meats are especially rich in these nutrients. Fresh meat has no unpleasant odour, is moist to touch and desirably has a high water holding capacity that helps in maintaining the juiciness. The energy value of meat varies with its fat content.

The major purpose of cooking meat is to enhance digestibility by changing colour, tenderness of texture and enhance flavor. The major changes on cooking of meat can be on proteins in the muscle fibre and connective tissue. The stimulating effect of meat dishes is due to the presence of meat extractives. Meat may be stewed, boiled, roasted, baked, fried, grilled or pickled.

MUTTON STEW

Ingredients:

Mutton - 250 g	Curry leaves – a few
Vinegar – 1tsp	Thin coconut milk – 1 cup
Ghee/ dalda – 2 Tbsp	Thick coconut milk – ½ cup
Coconut oil – 1 tsp	Potatoes – 2 medium sliced
Onion chopped – 1 tsp	Salt – to taste
Green chillies slit – 6	Garam masala – to taste
Ginger chopped – ½ tsp	

Method:

Cut the mutton into small pieces, washed and cooked with salt, pepper and vinegar.

Add the ghee and oil to a pan kept on the fire and fry in it the sliced onion, green chillies, and ginger. Add the crushed masala and curry leaves.

Add the mutton, and thin coconut milk, cooked potatoes, and salt. Add the meat stock and cooked till the meat is tender.

Add the thick coconut milk and remove from fire. Taste the gravy and adjust the salt and vinegar.

ROASTED BEEF**Ingredients:**

Sliced beef – 100g	Pepper – ½ tsp
Big onion sliced – 1	Vinegar – 3tsp
Potato sliced– 1 small	Salt – to taste
Red chilly – 4	Ghee – 1 Tbsp
Coriander – Tbsp.	Cloves -2
Cinnamon- 1 piece	

Method:

Fry the masala ingredients and grind to a paste. Apply the paste on the cleaned and washed meat along with salt.

Cook the meat and remove from fire with a little gravy.

Fry the onions and potato and keep aside.

To the pan, add the meat pieces without gravy. When dry, add the gravy and cook till the desired consistency. Garnish with the fried onion and potato

MEAT BALL CURRY**Ingredients:**

Meat raw minced – 250 g	Pepper – ½ tsp
Ginger chopped – 1 tbsp	Garam masala – to taste
Onion chopped – 1 tbsp	Kuskus – a pinch
Green chillies chopped -1 tbsp	Small onion – 1 tsp
Flour -2 tbsp	Coconut milk – ¼ cup
Salt – to taste	Vinegar – 1 tsp
Coriander powder – 1 tsp	Oil – 2 tbsp

Method:

Mix the minced meat and the chopped ingredients, flour and salt and form into small balls and fry lightly till golden brown.

Grind the pepper, coriander, masala and kuskus to a fine paste.

Fry onion in the oil remaining after frying the meat balls and add the masala paste to this. Cook till the raw smell disappears.

Add the coconut milk and simmer the flame. When the gravy thickens, add the fried meat balls and simmer for a few minutes.

Flavour with vinegar and remove from fire.

VINDALOO

Ingredients:

Meat – 250 g	Green chillies – 4
Chilli powder – 1 tbsp	Vinegar – 2 tsp
Pepper – ½ tbsp	Salt – to taste
Garlic – 3 pods	Sugar – ¼ tsp
Cumin seeds – a pinch	Water – ½ cup
Onion sliced – ½ cup	Tomato – 2
Mustard – to splutter	Ginger – 1 piece
Turmeric – a pinch	

Method:

Slice the meat thin.

Chop the onions, green chillies, ginger and tomato.

Grind half of the chopped onions, chilly powder, pepper, cumin, garlic, sugar and turmeric.

Fry the rest of the onion, and then add the green chillies and tomato.

Add the ground masala and sauté for a few minutes.

Put in the meat pieces and fry for some time stirring all the time. Pour water, salt and vinegar and cooked over thick fire for 5 minutes and then reduce the fire and simmer until well cooked.

LIVER FRY

Ingredients:

Liver – 500 g	Vinegar – ¼ tsp
Dalda -2 tsp	Turmeric – 5 g
Pepper – 5 g	Salt – ½ tsp

Method:

Wash the liver and cut into square pieces.

Add salt, vinegar, turmeric and pepper to the pieces.

Heat dalda in a pan.

Add the liver and stir continuously.

Cook over low flame for 10 minutes.

Transfer to a serving dish.

Discussions about the prepared recipes

FISH COOKERY

Fish is a valuable food affording variety in the diet. The fibres of fish are fine and short and is more easily digestible. It is good in protein and they are rich in oil, containing fat soluble vitamins. The food value of fish as a source of energy depends upon the amounts of fat and protein present. Small fish when eaten with bones are a rich source of calcium. Good fresh fish has got bright clear bulging eyes and reddish pink gills, are free from slime or unpleasant odour and have a firm elastic flesh that springs back when pressed.

Fish should be cooked as soon as possible after purchasing and moist heat as well as dry heat methods can be used for cooking. Fishes are cooked by boiling, stewing, baking, frying and grilling. Muscle fibres of fish separate readily after a short period of cooking that may prevent the retention of shape during cooking. Too much heat in the form of high temperature or low temperature for a long time, increases cooking losses and is likely to produce a dry and tasteless product.

BAKED FISH

Ingredients:

Fish – sliced/ whole

Salt, Pepper, Turmeric, Vinegar – as needed

Oil – for greasing

Method:

Marinate the fish with salt, pepper, turmeric, and vinegar.

Place it in a greased baking tray and bake at 175 ° C for 10 – 15 minutes depending on the size of the slices. The top of the fish can be brushed with melted fat.

Turn on the other side after 10 minutes.

FISH MOILEE/STEW

Ingredients:

Fish – 125 g

Small onion – 3

Green chillies – 4

Coconut milk – ½ cup(thick)

Ginger chopped – 1 tsp

Coconut milk – ½ cup(thin)

Garlic chopped - 1tsp

Tomatoes – 2

Turmeric powder – a pinch

Flour – 1tsp

Method:

Clean and drain the fish pieces and apply salt, turmeric, and a drop of vinegar on the fish pieces.

Shallow fry the fish pieces to golden brown, by turning on both the sides.

Heat oil in a pan and saute chopped onion, garlic, ginger and slit green chilies.

Add turmeric and a pinch of garam masala. Add half of the chopped tomatoes and fry.

Add the thin coconut milk and when boiling, add the fish pieces and cook on a slow fire.

Mix the flour in a small portion of water and add to the mixture. Add the thick coconut milk and heat.

Place the chopped tomatoes on the top of the fish and remove from fire. Adjust the taste with salt and vinegar.

FISH TOMATO CURRY**Ingredients:**

Fish – 125 g

Chili powder – 1tsp

Green chilies – 2

Small onion – 3

Ginger chopped – 1 tsp

Tomato chopped - 1

Garlic chopped - 1tsp

Coconut milk – ½ cup

Turmeric powder – a pinch

Oil -1tbsp

Method:

Clean the fish slices and allow the water to drain.

Place a pan on fire and add half of the oil. Splutter a few mustard seeds, add chopped onions, curry leaves, ginger, garlic and green chilies and fry. Add the chopped tomatoes and saute for some time.

Add the turmeric powder and chilly powder and saute.

Add some water to the mixture and when boiling, add the fish pieces and salt as needed and cook till done.

When done, add the coconut milk and remove from fire. Add a few curry leaves and rest of the oil.

FISH FRY

Ingredients:

Fish pieces – 75 g	Turmeric powder – a pinch
Onion – 5g	Red chili powder – a pinch
Ginger garlic paste – 1tsp	Oil- for frying
Coriander powder – a pinch	Salt – to taste

Method:

Clean the fish and allow the water to drain

Grind all the ingredients to a fine paste and apply on the fish pieces and keep aside for some time.

Heat oil in a pan and when the oil is hot, put the pieces of fish one by one in the oil and fry till golden brown.

FISH FINGERS

Ingredients:

Fish – 125g	Rice flour - 1/2tsp
Lemon juice- 1/2tsp	Corn flour - 1/2tsp
Salt – to taste	Salt – to taste
Pepper – to taste	Pepper powder – a pinch
Ginger garlic paste -1tsp	Egg - 1
Turmeric- a pinch	Bread crumbs – for coating

For batter:

Maida – 1/2tsp

Method:

Cut the fish to boneless strips approximately 1 to 2 cm wide and 6 to 8 cm long. Clean and keep aside.

Add the fish fingers in a bowl and add salt, lemon juice, turmeric powder, crushed pepper, ginger garlic paste and mix well. Keep aside for 10 minutes.

Mix the flours, salt, pepper powder and egg in a bowl.

Add the marinated fish to this mixture and coat the fish fingers with the batter.

Roll each of the fingers in bread crumbs and deep fry in oil, until golden brown on a medium flame.

(For a healthier version, place each of the coated fish finger on a greased baking tray and bake in a pre-heated oven at 175 ° C for 10 – 15 minutes)

Discussions about the prepared recipes

Egg Cookery

Eggs are very valuable foods and being rich in proteins are an excellent substitute for meat. Egg has two important portions named the white and the yolk. Used alone or in combination with other foods, they may become the major protein dish for a meal.

Eggs are the basis of large varieties of preparations. Beaten egg offers lightness, richness and cohesiveness to all mixtures to which it is added. Egg is an important ingredient in almost all the dessert dishes.

- Eggs are used as boiled, scrambled or poached for table use.
- Used as a thickening agent-stirred custards and baked custards, soups, puddings. Help in gel formation.
- Emulsifying agent-mayonnaise, ice-cream.
- Leavening agent-cakes, foamy omelette, soufflés, and meringue. Egg white foam used in certain candies also improves the texture by controlling crystallization of sugar.
- Binding and coating agent-cutlet, French toast or Bombay toast, banana fritters.
- Interfering substances-ice-creams.

Beaten egg white act as interfering substance in frozen desserts. Tiny bubbles of air trapped in egg prevent ice crystals from coming together and creating large masses of icy material.

- Clarifying agent-raw eggs can be added to hot broths. When protein in egg coagulates they trap the loose particles in liquid and clarify it.
- Garnishing agent-hard boiled eggs are often diced and used to garnish dishes.
- Flavouring agent- custards
- Enriching agent-to enrich the nutritive value e.g., Bombay toast.
- Glazing agent-for pastries to give the surface a golden brown colour when cooked.
- Improve colour- custards

Egg Preparations

Egg curry

Ingredients

Egg hard Boiled	1	Mustard	to splutter
Small Onion	3 no's	pepper	¼ tsp
Coconut Scraping	¼ cup	Turmeric	a pinch
Red Chilli powder	1 tsp	Ginger	a small piece
Coriander Powder	1 tsp	Oil/Dalda	1 tsp
Garam Masala	1 tsp		
Salt and vinegar	to taste		

Method

Hard boil the egg and cut into pieces .

Grind the red chilli powder ,coriander powder turmeric powder and garam masala powder to a smooth paste.

Heat dalda/oil in a frying pan ,splutter mustard ,add the chopped onion and ginger .

Fry the onion till golden brown .Add the masala paste .Fry for sometime.

Add vinegar and salt . Add the boiled egg when done serve hot.

No. of serving - 1

Egg Roast

Ingredients

Egg	1	Curry leaves	a few
Big Onion sliced	½ cup	Cinnamon	a small
Chopped green chillies	2 no's	Cloves	2 no's
Aniseed crushed	a pinch	Cardamom	2 no's
Pepper powder	1 tsp	Oil	2 tsp
Ginger chopped	¼ tsp	Salt and vinegar	to taste

Method

Hard boil the egg and shell .

Grind the masalas together into a smooth paste .

Heat oil and splutter mustard .

Add onion ,green chillies ginger and curry leaves.

When onion turns golden brown add the masala paste .Cook until the raw smell disappears.

Add salt and mix well .Add the boiled egg .Cook for sometime.

Flavour with vinegar .Remove from fire with a little gravy and serve hot .

Serving size - 1

Indian Omelette**Ingredients**

Egg	1	Pepper	a pinch
Chopped Chilli	1	Oil	½ tsp
Onion	1	Salt	to taste

Method

Break the egg . Fold the egg white and yolk together in a vessel .

Add the chopped onion ,pepper ,salt and chillies .Mix well.

Heat a pan . Grease the pan with oil .

Pour the egg mixture on the greased pan .Cover the pan with a lid .

Turn the other side with a ladle .When done serve it hot .

Serving size – 1

Spanish Omelette**Ingredients**

Egg	1	Peas cooked	1 tsp
Tomato Chopped	1	Oil	1 tsp
Onion	1	Salt	to taste

Method

Beat the egg in a bowl .

Add the rest of the ingredients ,mix well.

Heat a little oil in a pan .Add the mixture and fry until the top was set .

Fold over and serve hot .

Serving size – 1

Puffy Omelette

Ingredients

Eggs	2	Butter	1 tsp
Water	1 tbsp	Pepper	a pinch
Salt	1/8 tsp		

Method

Separate the yolk from the white of the egg.

Beat the egg white until stiff but, not dry.

Add water ,salt and pepper to yolk and beat till stiff and light coloured.

Fold the yolk into the white.

Grease a frying pan , pour the egg mixture and cook evenly.

Dry the top of the omelette in a pre-heated oven for three minutes .Serve hot.

Poached Egg

Ingredients

Egg

Method

A) Boil enough water in a saucepan so as to cover an egg.

Break an egg into a small porcelain dish and slide it carefully into water.

Cook for five minutes.

B) Repeat method I , but add $\frac{3}{4}$ tsp salt to the cooking water.

C) Repeat method I ,but add $\frac{1}{2}$ tsp vinegar to the cooking water .

Lime Souffle'

Ingredients

Lime	$\frac{1}{2}$ no	Sugar	$\frac{1}{2}$ cup
Egg	2 no's		

Method

Beat egg yolk.

Add sugar ,lime juice and grated lime rind.

Fold in stiffly beaten egg white.

Place in baking dish and bake at 350-375`F.

Serve with sweetened whipped cream.

Soft Custard**Ingredients**

Milk	240ml
Egg	1 no.
Sugar	25 g

Method

Mix all the three ingredients well and put on fire.

Heat till it has a custard consistency.

Remove from fire allow to cool, added flavourings and keep it in refrigerator.

Baked Custard**Ingredients**

Milk	1 cup	Sugar	2 tbsp
Egg	1no	Vanilla essence	¼ tsp

Method

Set oven at 350`F. Scald milk over boiling water.

Beat eggs slightly. Add sugar .

Add milk very slowly at first and then rapidly, stirring constantly.

Add vanilla essence.

Pour into custard cups till ¾ full. Place cups in a pan and set the pan on an oven rack and pour boiling water till it reaches almost the level of the custard mixture.

Bake at 350`F till a knife that is inserted comes out clean.

Mayonnaise Dressing

Ingredients

Well beaten Egg yolk	1 no's	Vinegar	1 tsp
Lime Juice	1 tsp	Sugar	½ tsp
Salt	1/8 tsp	Salad Oil	1 cup

Method

Mix dry ingredients and add to egg yolk.

Beat well, add vinegar and lime juice gradually while beating.

Add oil in drops at first.

After half the oil is added, add the rest rapidly.

The mixture should be thick and smooth when finished

Egg Flip

Ingredients

Egg	1 no.	Milk	¾ cup (Boiled and cooled)
Sugar	2 tsp	Cardomom	1 powdered
Salt	a pinch		

Method

Beat up the egg very well and add the sugar, salt and cardomom powder.

Beat up again till the sugar and salt is dissolved completely.

Add slowly the milk and mix all together well.

Strain if necessary and serve warm.

Discussions about the prepared recipes

POULTRY COOKERY

Chicken, turkey, duck, fowl etc. are generally included under the classification of poultry. Poultry has a nutritional composition similar to other flesh foods. The poultry meat is considered as light meat as compared to red meat. A variable level of energy content, highly digestible protein of high biological value with very low collagen, B vitamins, mainly thiamine, vitamin B6 and pantothenic acid, and presence of minerals like iron, zinc and copper make poultry a valuable food. Giblets are the edible internal organs of the poultry.

Poultry can be cooked using any method, but the maturity of the bird and fat distribution determines the quality of the product. Mature birds are best cooked using moist heat methods while dry heat methods can be used to cook young birds.

CHICKEN CURRY

Ingredients:

Chicken – 100 g	Coriander powder – 1 tbsp
Chili powder – 1 tsp	Cumin seeds- 5 g
Turmeric powder – ½ tsp	Garam masala – 1 tsp
Pepper powder – ½ tsp	Tomato chopped - ½ cup
Lime juice – ½ tsp	Potato sliced - ½ cup
Onion -10 g	Salt – to taste
Ginger chopped– 1 tsp	Oil – 1 tbsp
Garlic chopped – 1 tsp	

Method:

Clean the chicken pieces and marinate it by applying salt, turmeric, pepper powder and lime juice.

Heat oil in a pan and add the chopped onion, ginger, garlic and fry till raw smell disappears.

Grind the masala and add it to the pan and saute for some time. Add the chopped tomatoes and fry for some time.

Add the sliced potatoes and chicken pieces and cook on a slow fire till done. Add water if needed.

CHICKEN FRY

Ingredients:

Chicken -125g	Garam masala –a pinch
Chilli powder -5g	Salt – to taste
Coriander powder -5g	Onion – 15 g
Oil -20 ml	

Method:

Clean the chicken pieces and marinate it with salt, pepper powder, turmeric and vinegar. Slightly cook it over a flame in a pan.

Heat oil in a pan and add the chopped onions. When the onions are golden brown, add the coriander powder, chilly powder and garam masala powder and stir it.

Add the chicken pieces to this and cook till brown.

BUTTER CHICKEN

Ingredients:

Lime juice – ½ tsp	Chicken – 250 g
Salt - to taste	Tomato – 4 (pureed)
Red chilli powder – ½ tsp	Cashew nuts -6 to8 nos.
Turmeric powder – ½ tsp	Cream – 50 ml
Garam masala- ½ tsp	Coriander leaves – for garnishing
Ginger garlic paste -1 tbsp	Yoghurt – ½ cup

Method:

Clean and marinate the chicken pieces with lime juice, chilli powder, yoghurt, turmeric, ginger garlic paste, garam masala and salt for 20 minutes.

Add the cashews and tomatoes to a blender and make a smooth paste.

Fry or grill the chicken in a pan on a high flame till the moisture evaporates.

Heat a pan and add butter and saute cinnamon, cloves and cardamoms for a minute.

Add ginger garlic paste and green chillies till the raw smell disappears.

Add the tomato cashew paste and then add red chilli powder, a pinch of sugar and salt.

Mix and cook with stirring until the tomato puree becomes thick and starts leaving the sides of the pan.

Add some hot water and bring the mix to boil. Simmer and add the chicken pieces and simmer for 5 more minutes.

Add the garam masala powder and simmer for 2 more minutes.

Pour the cream and switch off the flame. Garnish with coriander leaves and cream.

BAKED CHICKEN

Ingredients:

Boneless chicken pieces – 250 g	Pepper powder – ½ tsp
Lime juice -1 tsp	Garam masala- ½ tsp
Salt - to taste	Ginger garlic paste -1 tbsp
Red chili flakes – ½ tsp	

Method:

Clean the chicken and marinate it for some time using salt, lime juice and pepper powder.

Mix in turmeric, ginger garlic paste, chili flakes and garam masala.

Brush with butter or fat on the surface.

Bake at 220°C for 15 to 20 minutes.

DRAGON CHICKEN

Ingredients:

Boneless chicken pieces – 250 g	Big onion sliced – 1
Lime juice -1 tsp	Capsicum sliced – 2 tbsp
Salt – to taste	Ginger garlic paste -1 tsp
Soya sauce -1 tsp	Soya sauce - ½ tsp
Egg - 1/2	Sugar - ¼ tsp
Red chili flakes – 1 tsp	Tomato ketchup – 2 tsp
Corn flour -2 tbsp	Coriander leaves – to garnish
	Pepper powder – ½ tsp
	Ginger garlic paste -1 tsp

Method:

Clean the chicken and marinate it for 15 minutes with the ingredients given under **I**.

Heat oil in a pan and fry the marinated chicken pieces till it is cooked crisp. Set aside.

Add the sliced onion to the oil and saute for a minute. Add the ginger garlic paste and continue to saute for a few more minutes. Add the sliced capsicum and toss.

Add the soya sauce, salt, sugar, tomato ketchup, red chili and mix well. Cook on a low flame.

Now add the fried chicken and toss well in the mix.

Turn off the flame and garnish with coriander leaves.

Discussions about the prepared recipes

MODULE 03

SUGAR COOKERY

INTRODUCTION

Sweeteners have been used for food since prehistoric times, probably beginning with the discovery of honey. Sugar is pure sucrose made up of glucose and fructose. 1 g of sugar supplies 4 Kcal and a teaspoon full provides 20Kcal. Brown sugar and white sugar are similar in nutritive value. Sweets made from sugar produce a sense of satiety and they must be taken with a meal. Sugar syrup is used as a preservative for fruits, jams and jellies.

Crystallization property of sugar depends on the temperature. As the temperature increases crystallization of sugar increases. The various stages of sugar are brittles, fudge, fondant and caramels. Desire for sweet taste is inherent in every individual. Sugar and jaggery are used in beverages and other foods to increase palatability.

STAGES OF SUGAR COOKERY

AIM

To determine the boiling temperature of sugar syrup corresponding to the cold water test

PRINCIPLE

COLD WATER TEST

When a portion of syrup is dropped into cold water, from its firmness or hardness it is possible to determine the stage of cooking of the syrup. The degree of firmness in the cold water test is designated by descriptive terms. As the concentration of the solution gradually increases the firmness of syrup tested in water increases.

CAUSES OF VARIATIONS

1. The colder the water in which the sugar is tested the firmer the tested portion.
2. The portion to be tested has to be left for constant length of time.
3. Longer the tested portion is allowed to stay in cold water, the firmer the tested portion.

To avoid this variation put ice cubes in the water and maintain the temperature.

PROCEDURE

Dissolve 100 g or 1 cup of sugar in half cup of water. The portion of sugar and water used may have to be increased. The quantity of syrup should be sufficient to cover the thermometer stem to a depth of half inch above the bulb. At temperature given below remove portion of the syrup and drop teaspoon full of the syrup in ice cold water.

Note these:

1. Consistency
2. Mouldability
3. Thread formation
4. Character and length of the thread
5. Taste
6. Shape at room temperature

Remove portions of syrup at following temperature:

1. 110⁰c or 231.8⁰F
2. 113⁰c or 236.4⁰F
3. 118⁰c or 244.4⁰F
4. 122⁰c or 251.2⁰F
5. 132⁰c or 269.2⁰F
6. 145⁰c or 293⁰F
7. 170⁰c or 338⁰F

Stage of the sugar Cookery	Description	Standard Temperature	Average temperature

SUGAR COOKERY

Fondant

Ingredients

Sugar	2 cups	Corn Syrup	30 g
Creams of tartar	0.5g	Water	1 cup

Method

Mix the ingredients in the cooking pan.

Stir till all the sugar, is dissolved.

Cook to the soft ball consistency (115⁰c) in about 25 minutes.

Pour into a warm shallow baking dish and cool to 40⁰c.

Beat and knead till the Lumps have broken.

Transfer to a jar and close it with a lid.

Chocolate Fudge**Ingredients**

Sugar	2 cups	Vanilla	1 tsp
Milk	2/3 cup	Light corn syrup	2 tsp
Butter	2 tbsp	or Cream of tartar	1/8 tsp
Chocolate	4 squares		

Method

Add the chocolate powder and butter to cooking pan and heat on a steam bath till the chocolate powder and butter have melted.

Add Sugar, mix the chocolate and butter well with sugar.

Then add milk and heat till the sugar dissolves completely.

Cook the syrup to a soft ball stage (112⁰c).

Allow it to cool to about 10⁰c and transfer to a greased molding pan.

Cut the candy when it is cool and wrap in butter paper or foil and store in an air -tight container.

Gulab Jamun**Ingredients**

Sugar	2 cup	Soda	a pinch
Water	2 cup	Maida	3 tbsp
Milk powder	9 tbsp	Cardamom	a few
Curds	2 tsp	Oil	for frying
Ghee	5 tsp		

Method

Sift flour ,milk powder and soda together.

Make into dough with curds and fat.

Make a thin syrup with water and sugar (thread stage).

Make dough into balls and fry on low heat.

Put in the syrup while hot.

Peanut Brittle**Ingredients**

Peanut 50 g

Sugar 100g

Method

Crush the peanuts.

Sugar is heated till hard crack stage is reached and peanuts are added.

Mix well and pour into a greased plate cut it into desired shape.

Cool it and store in an air tight container.

Carrot Halwa**Ingredients**

Grated carrot 1 cup Cardamom for flavour

Milk 1 ½ cup Ghee 1 ½ tbsp

Sugar ¾ cup

Method

Grate the carrot .

Boil milk and grated carrot together till it becomes a thick liquid.

Add sugar, mix it well till it becomes halwa consistency and add cardamom.

Add fat, stir it till it leaves the sides of the pan.

Grease the plate, spread the mixture on the plate .

Cool and cut into desired shape .Serve it .

Mysore Pav

Ingredients

Dalda	2 ½ cup	Water	1 cup
Sugar	2 ½ cup	Bengal Gram Flour	1 cup

Method

Heat dalda ,bring to boiling point. Remove from stove and keep aside.

Mix Sugar and water. Make a thick syrup of thread consistency.

In a thick bottomed pan roast gram flour in about a tsp of dalda. Keep stirring. Roast for 3 minutes. Remove pan.

Add the syrup to the roasted gram flour. Return pan to fire and keep stirring to mix well on slow heat until the dalda separates.

Pour on a greased pan and tilt it to drain excess fat .

Sprinkle cardamom powder. Cut into pieces with a wet knife when cooled.

Boondi Ladoo

Ingredients

Gram flour	100 g	Sugar	100 g
Pistachio	10 g	Soda Bicarbonate	a pinch
Cashewnuts	10 g	Water	60 ml
Fat	30 g	Cardamom	a few

Method

Make a thick batter with flour and soda bicarbonate.

Heat fat and drop batter through a boondi jhara.

Prepare sugar syrup ,put in fried boondi.

Add cardamom and pistachio and form into balls.

Marshmallows

Ingredients

Sugar	200g	Salt	2 g
Gelatin	5 g	Vanilla Essence	2 ml
Hot Water	55ml	Cold Water	25ml

Method

The sugar syrup was cooked along with salt and hot water to 120' C .

Hydrate the gelatin in a large bowl with cold water.

Add the syrup to the gelatin and beat with an egg beater till the mixture can hold shape.

Pour into an 8" square pan dusted with powdered sugar.

Put in the refrigerator to set .

Cut into square pieces. Roll in powdered sugar and serve.

Discussions about the prepared recipes

JAMS, JELLIES AND SQUASHES

Fruits and vegetables are good sources of vitamins, minerals and other useful substances like fibre which are necessary for good health. They are health promoting as well as a pleasure in the diet. A number of fruits are grown in our country and their production is so high that a substantial amount is lost every year because of their highly perishable nature. So if these seasonal fruits are preserved, they can be used to enrich the diet of people throughout the year.

Fruits contain abundant quantities of sugar, mainly fructose, sucrose, glucose etc. and the fruit starch is changed to sugar on ripening. Fruits are very efficient sources of vitamin C and yellow and deep orange coloured fruits are excellent sources of B carotene. Fruits can be easily preserved as they contain pectin which is a polysaccharide that gives cell structure. Value added products made from fruits can contribute to the economy also. Jams, jellies, squashes and pickles are the commonly prepared value added products from fruits and vegetables.

Jams, jellies and squashes are fruit products that are widely taken as a food accompaniment. They differ in their ingredients, physical form of fruits and also in the way they are prepared. Jam is usually prepared from whole fruits or fruit pulp of adequately ripened fruits. Jelly refers to a clear fruit spread consisting of fruit juice made firm with pectin. Squash is a non-alcoholic concentrated syrup made from fruit juice, sugar and water.

ORANGE SQUASH

Ingredients:

Orange juice – 1/4cup

Lime juice -1/4 tsp

Sugar – 1/4 cup

Potassium meta-bi-sulphate(KMS) – a pinch

Water -1/3 cup

Method:

Prepare a sugar syrup by boiling sugar and water. Turn off the flame and add lime juice. Strain the syrup to remove the impurities and allow it to cool.

Squeeze the orange juice from oranges and strain it. Mix in with the cooled and strained sugar syrup. (The orange juice must be mixed with the cooled sugar syrup as soon as it is squeezed out).

Mix in a pinch of KMS with a little juice and add it to the whole mix.

Pour the orange squash in sterilised jars or bottles.

For serving, stir 1/3 to 1/4 part of squash with cold water or regular water. Garnish with mint leaves and lemon slices.

GRAPE SQUASH

Ingredients:

Grape juice – 1/4cup

Lime juice -1/4 tsp

Sugar – ¼ cup

Tonovin (essence) -1 drop

Water -1/3 cup

Sodium benzoate – a pinch

Method:

Prepare a sugar syrup by boiling sugar and water. Turn off the flame and add lime juice. Strain the syrup to remove the impurities and allow it to cool.

Wash the grapes and crush it with a wooden crusher and boil for a few minutes. Strain the juice

Mix in with the cooled and strained sugar syrup. Add the essence for colour and flavour.

Mix in a pinch of KMS with a little juice and add it to the whole mix.

Pour the grape squash in sterilised jars or bottles.

For serving, stir 1/3 to ¼ part of squash with cold water or regular water.

PINEAPPLE SQUASH

Ingredients:

Strained pineapple juice – 1/4cup

Lime juice -1/4tsp

Sugar – ¼ cup

Pineapple essence – a drop

Water -1/3 cup

Potassium meta-bi-sulphate(KMS) – a pinch

Method:

Prepare a sugar syrup by boiling sugar and water. Turn off the flame and add lime juice. Strain the syrup to remove the impurities.

Mix with the juice and all the other ingredients and allow it to cool.

Store the squash in sterile bottles.

For serving, stir 1/3 to ¼ part of squash with cold water or regular water

GINGER LIME SQUASH

Ingredients:

Lime juice – ¼ cup

Sugar – ¼ cup

Ginger crushed and extracted – 1tbsp

Potassium meta-bi-sulphate (KMS) – a pinch

Method:

Prepare a sugar syrup by boiling sugar and water. Cool it.

Add the lime juice and ginger extract.

Mix in the KMS

Strain it and store in sterile air tight bottle.

For serving, stir 1/3 to 1/4 part of squash with cold water or regular water.

MIXED FRUIT JAM**Ingredients:**

Fruit pulp	Tomato - 1/4 cup
Apple – 1/4 cup	Sugar – 1 cup
Pineapple - 1/4 cup	Citric acid – a pinch
Plantain - 1/4 cup	Sodium benzoate – a pinch

Note:

1. While selecting fruits for jam, they should be just ripe and not over ripened. Any other fruit except those with low pectin content, may also be chosen.
2. The fruits may be washed, skin removed and cut to small pieces and cooked with minimum amount of water and mashed to prepare the pulp.
3. Citric acid is an optional ingredient and can be substituted with 1/2 tsp of lime juice.
4. Sodium benzoate is added as a preservative.
5. While bottling, take care to keep the bottles on a wooden surface.

Method:

Mix the pulp and sugar and boil in a thick bottomed vessel till the end point. Add citric acid just before removing. Add the preservative. The end point can be tested by the sheet method or plate method. Transfer to sterile bottles without forming air bubbles, while still hot and allow to cool.

Sheet method: Take a small quantity of boiling mixture in a wooden ladle, cool and drop slowly. If the jam is ready, it will fall in the form of a sheet.

Plate method: Drop a small quantity of boiling mixture on a porcelain or stainless steel plate. Cool and tilt the plate, if the mixture slides down as a single mass, the jam is ready.

PINEAPPLE JAM

Ingredients:

Chopped pineapple – 200g Limejuice- 1/2tsp Sugar – 200g

Method:

Cook the chopped pineapple with minimum water and extract the pulp.

Mix in the sugar and lime juice and cook on fire till done.

Remove the scum in between as they form.

Remove from fire

Bottle and leave it to cool.

FRUIT JELLY

Ingredients:

Fruit extract – 1cup Lime juice/citric acid -1/2 tsp/ a pinch

Sugar -1/2 to 3/4 cup Food colour(optional)

Note: Select fresh ripe fruits like guava, orange, papaya, jamun, apple, jack fruit etc.

Method:

Wash the fruits thoroughly and cut into large pieces.

Remove the core, seeds etc.

Place in a thick bottomed vessel and add water, just to cover the fruit pieces.

Cook without stirring for 40-45 minutes on a slow fire.

Strain the cooked fruit mix to get a clear fruit extract.

Note: The amount of pectin in the extract can be tested using spirit or alcohol. Add two spoons of spirit to a spoon of extract taken in a glass. A precipitate is formed. If the lump is thick, it is a thick precipitate and you need to add more sugar. If the precipitate is formed as 2 or 3 lumps, it is a thin precipitate and lesser amount of sugar is to be added.

Mix the extract with the required amount of sugar and lime juice. Keep on fire and continue cooking till the end point is reached.

Note: 1. Place a spoon of jelly on a steel plate and allow it to cool. If the jelly rolls like a pearl ball, it is done.

Transfer to clean sterile bottles and allow it to cool.

Discussions about the prepared recipes

MODULE 04

EFFECT OF HEAT ON VEGETABLES AND FRUITS

EFFECT OF DRY HEAT

Procedure:

- Wash 100g Spinach, Cauliflower and Carrot thoroughly. Peel or trim and cut appropriately into separate pans
- Place the pan on source of heat and cook for 3, 5,7,10 and 15 minutes, stirring periodically without covering the pan. Remove a sample from the pan after each time period into a bowl for evaluation.
- Repeat and keep the pan covered. Keep sample aside in separate bowls.

EFFECT OF MOIST HEAT

Procedure:

- Add enough water to 100 g Spinach, Cauliflower and Carrot to cover the vegetables. Note the temperature of the liquid at the different time periods. Keep samples aside.
- Drain the liquid from the pan into a measuring cylinder for each sample. Note the volume and colour.
- Cook Beetroot and Apple without peeling and keep aside.

Observation:

EFFECT OF TEMPERATURE ON THE COOKING OF VEGETABLES AND FRUITS

Fruits/Vegetables	Weight	Time(Min)	Colour	Flavour	Texture	Taste	Applications
	Raw Cooked						

- Compare results and draw inference with respect to the best method of cooking vegetables and fruits.

Discussion:

EFFECT OF HEAT ON PIGMENTS IN FRUITS AND VEGETABLES

Method:

- Prepare juices and measure into test tubes up to 1 day in advance.
- Do not leave juice unrefrigerated for more than 2 hours.
- Label tubes with the juice type (e.g. cranberry, pink grapefruit, beet, orange), and transfer 20 ml of juice into the corresponding test tube(s).
- Add test items (see below) to test tubes labelled with their names. Make up one complete set of 3 tubes per group.
 - a. Baking soda – 0.5 grams per test tube
 - b. Cream of tartar – 0.5 grams per test tube
 - c. Salad oil – 3 ml (1/2 teaspoon) per test tube.

Identify the pigments and observe the change in pigments when 5ml juice is heated with baking soda, cream of tartar and salad oil.

Juice	Pigment Type	Effect of base (baking soda)	Effect of acid (Cream of tartar)	Solubility (lipid or aqueous phase)
Cherry	Anthocyanin	Colour change to blue or purple	Brightening, more pink	Water soluble remains in juice
Beet	Betalain	Colour darken	No change	Water soluble remains in juice
Grapefruit	Carotenoid	No change	No change	Lipid soluble, oil will change colour
Tomato	Carotenoid	No change	No change	Lipid, oil will change colour

Combinations	pH	Observation
Juice only		
Juice+ Baking soda		
Juice+ Cream of tar tar		
Juice+ Salad oil		

Which pigment is present?

EFFECT OF CHANGES IN pH DURING COOKING OF VEGETABLES AND FRUITS**Procedure:**

- Take 25g of prepared Spinach/Carrot/Beetroot/Cauliflower in each of 6 pans.
- Add 100 ml of one of the following ingredients to each pan, and note their pH.
 1. Distilled water
 2. Tap water
 3. Tap water containing $\frac{1}{2}$ t citric acid
 4. Tap water containing a pinch of cooking soda
 5. Milk
 6. Beaten curd
- Place pan with (1) on the burner and cook the spinach till tender. Note the time taken.
- Repeat the cooking with each of the pans containing (2) for same time as recorded in above step.
- Drain any liquid remaining and measure it for volume and pH, keeping the liquid and vegetable separately in bowls for evaluation.

Vegetables	Liquid	Vegetable			Taste	Drainage		Time min
	pH	Colour	Texture	Flavour		ml	pH	
Spinach								
Carrot								
Beetroot								
Cauliflower								

Discussion:

EFFECT OF BROWNING IN FRUITS (Banana) AND VEGETABLES (Potato, Brinjal)

Procedure:

- Select ripe apples without blemishes
- Cut the fruit into slices
- Expose them to the air for about one hour each
- Cut few slices with a steel knife and expose to air in one plate
- Cut the slices with an iron knife
- Cut and dip in water to cover the slices completely
- Apply lemon juice to the cut surface
- Dip in salt solution
- Apply baking soda to cut surface
- Dip in sugar solution
- Blanch in boiling water
- Dip in KMS solution

Observation:

APPENDIX 01**Weaning Recipes**

Nutrition during the first few years sets the trend for the health ,growth and development of child. The baby should be exclusively breastfed for the first six months. After this the baby is usually ready for addition of solid foods . Start with an easy to digest cereal like rice .Introduce new foods one by one at a time .Foods introduced should be bland and at moderate temperature. Foods should be given in small quantities at frequent intervals.

Ragi Kali**Ingredients**

Ragi flour	1 ½ tbsp	Jaggery	1 ½ tbsp
Roasted Bengal gram dhal flour	1 ½ tbsp	Water	1 ½ cup

Method

Mix flours well in half part of the water and cook till done.

Dissolve jaggery in the rest of the water and strain .

Add to the flour mix ,blend well and cook till it thickens.

Remove from heat .

Kheer**Ingredients**

Vermicelli/Rice	30 g	Water as required
Milk	100 ml	Jaggery 20 g

Method

Boil rice/vermicelli in water till half done.

Add milk and bring to boil.

Add jaggery and cook well.

Serving size - 2 portions

Wheat Payasam

Ingredients

Wheat	30 g	Roasted & crushed Groundnut	5 g
Roasted Bengal gram flour	15 g	Sugar	15 g

Method

Roast whole wheat and powder.

Add roasted Bengal gram flour, groundnut and sugar.

Cook with sufficient water.

Serving size - 2 portions

Wheat / Rice and Gram Porridge

Ingredients

Roasted wheat or rice flour	1 ½ to 2 tbsp	Roasted green gram Dhal flour	¾ tbsp
Roasted Bengal gram dhal flour	1 tbsp	Water	1 ½ cup

Method

Mix all the ingredients without lumps.

Heat till well –cooked.

Serve in a clean bowl .

Kichidi

Ingredients

Rice	35 g	Ghee/Fat	2 tsp
Green gram dhal	10 g	Cumin (jeera)	
Leafy vegetables	2 tsp		

Method

Clean rice and dhal and cook them in water with salt till the grains are soft and water is absorbed.

Leafy vegetables can be added when the cereal/pulse is 3/4th done.

Cumin is fried in fat and added towards the end.

<http://ninindia.org/DietaryGuidelinesforNINwebsite.pdf>

Potato and carrot

Ingredients

Carrots 2 no.s

Large potato 1no

Method

Peel potato and carrot, removing any blemishes on them.

Slice into pieces and boil in water until soft.

Do not add salt.

Mash with a hand blender, or a spoon, until desired consistency.

Cooked apple

Ingredients

Apples 2 no.s

Water

Method

Wash, peel and core the apples.

Place in pot and cover with a little boiling water, and simmer until soft for about 5-10 minutes .

Cool and mash or blend to a puree depending on baby's needs .

Use on its own or mix with a little rice.

Yoghurt Yummy

Ingredients

Plain Yoghurt (Curd) ½ cup(Must not be sour)

Mashed or pureed fruit ½ cup

Method

Mix both the ingredients well together

Tomato soup

Ingredients

Water	1 cup	Garlic	1 clove
Chopped tomatoes	1 cup	Onion	1 medium
Vegetable oil	1 tsp		

a variety of vegetables as preferred e.g. 1 medium carrot
for flavour e.g. coriander leaves

Method

Heat the oil in a large pot on medium heat .

Chop the garlic, onion and other vegetables and add to the pot, stirring until onions are soft .

Add the water, tomato puree, and flavours

Bring to the boil then turn down to simmer for 30 minutes, stirring occasionally .

Blend or mash with a fork to get the right consistency.

APPENDIX 02**PICKLES****MANGO PICKLE****Ingredients:**

Small pieces of sour mango- ½ cup	Gingely oil -1/2tsp
Salt solution boiled – ¼ cup	Coconut oil -1/2 tsp
Red chillies -15	Mustard – 1/2tsp
Fenugreek -1/8tsp	Dry chilli -1
Asafoetida and turmeric –a pinch	Curry leaves –a few

Method:

Place the mango pieces in warm salt solution.

Saute the chillies, fenugreek and asafoetida separately and grind with salt solution.

Mix in the ground paste with the mango and add the asafoetida and mix well.

Heat both the oils in a pan and add mustard, fenugreek, slit dry chillies and curry leaves.

Add to the pickle and keep aside for one day. Bottle in sterile bottles.

LIME PICKLE**Ingredients:**

Lime -6	Salt - 1/8 cup
Chilli powder -1/2tsp	Chopped ginger -1tbsp
Turmeric powder – 1/4tsp	Vinegar 1 cup
Mustard dhal - 1/4tsp	Gingely oil -30g
Asafoetida powder – 1/8tsp	Curry leaves –a few
Green chillies – 5	Mustard – a few
Garlic -15 g	Fenugreek – a few

Method :

Pour half the oil in a pan and cook the lime till soft. Wipe with a clean cloth.

Heat rest of the oil in a pan and fry the slit green chillies, garlic, ginger and curry leaves. Reduce the flame to minimum and add all the dry ingredients and fry. Allow it to cool.

Slice the lime and mix with the cooked ingredients and vinegar. Add a pinch of sugar to balance the taste.

Bottled and served.

PAPPAYA PICKLE

Ingredients:

Pappaya sliced (4×1cm pieces) -1/4cup	Ginger chopped -1tsp
Green chillies slit -5	Garlic -3 pods
Vinegar – 1 cup	Sugar- a pinch
Mustard dhal -1tsp	Salt- to taste
Red chillies -2	Turmeric powder –a pinch

Method:

Washed and drained the papaya slices.

Grind the red chillies, ginger and garlic using a little vinegar.

Boil rest of the vinegar in a pan with salt and cook the papaya in it for 5 minutes.

Remove from the vinegar and cook the green chillies in vinegar.

Dilute the ground ingredients using vinegar and mix all the ingredients. Add sugar and simmer.

Remove from fire, cool and bottle.

MEAT PICKLE

Ingredients:

Meat – 250g	Ginger chopped – 1 tsp
Pepper – 1 tsp	Garlic crushed – ¼ tsp
Dry chillies- 1/8 tsp	Fenugreek -1/4 tsp
Turmeric – a pinch	Chilli powder - 2 tbsp
Mustard seeds – 1/ 2tsp	Cloves -1 tsp
Aniseed – a pinch	Cinnamon – 2 pieces
Salt and vinegar- to taste	Vinegar – ½ cup

Coconut oil – ¼ cup

Salt solution – as needed

Gingely oil - ¼ cup

Method:

Ground together the chillies, pepper, turmeric, mustard, aniseed and salt along with vinegar.

Rub a portion of the ground masala over the meat pieces and keep aside for some time.

Fry the meat pieces in oil and drain.

Fry the cloves, cardamom and cinnamon. Mix in the meat pieces and the ground ingredients with vinegar and when the gravy thickens sufficiently turn off the flame.

Adjust the salt and allow it to cool and bottle.

MIXED VEGETABLE PICKLE

Ingredients:

Mixed vegetable pieces (carrots, peas, cauliflower, radish, mango, Brinjal) – 1 kg

Asafoetida powder – 1 pinch

Vinegar – 1cup

Red chilli powder – 100 g

Salt -100 g

Mustard dhal -25 g

Gingely oil – 100ml

Turmeric powder – 25g

Method:

Mix the vegetables with salt and turmeric powder and dry in sun for 2 to 3 hours.

Heat the oil in a pan and add mustard and asafoetida. Add the vegetables and fry for 15 minutes and keep aside.

Add all the powders and fry. Mix in the vegetables and vinegar. Add a pinch of sodium benzoate to preserve(optional).

Cool and bottle

APPENDIX 03**TESTS TO DETECT ADULTERATION IN FOODS**

Food is essential for sustenance of life. Adulteration of food deceives the consumer and can cause risk to their health. This manual lists out common methodologies available for food adulterants generally found in India and to induce awareness among the consumer.

Common items adulterated and simple methods to identify.

EXPT. NO.	EXPERIMENT	PROCEDURE	OBSERVATION
1	Adulteration of paraffin wax and hydrocarbon in vegetable ghee	Heat small amount of vegetable ghee with acetic anhydride. Droplets of oil floating on the surface of unused acetic anhydride indicate the presence of wax or hydrocarbon.	Appearance of oil floating on the surface
2	Adulteration of dyes in fat	Heat 1mL of fat with a mixture of 1mL of conc. H ₂ SO ₄ and 4mL of acetic acid.	Appearance of pink color.
3	Adulteration of argemone oil in edible oils	To small amount of oil in a test tube, add few drops of conc. HNO ₃ & shake.	No red color observed
4	Adulteration of various insoluble substances in sugar	Take small amount of sugar in a test tube and shake it with little water.	Pure sugar dissolves in water but insoluble impurities do not dissolve.
5	Adulteration of chalk powder, washing soda in sugar	To small amount of sugar in a test tube, add a few drops of dil. HCl.	No brisk effervescence observed.

6	Adulteration of yellow lead salts to turmeric powder	To sample of turmeric powder, add conc. HCl.	Appearance of magenta color
7	Adulteration of red lead salts in chilli powder	To a sample of chilli powder, add dil. HNO ₃ . Filter the solution and add 2 drops of KI solution to the filtrate.	No yellow ppt.
8	Adulteration of brick powder in chilli powder	Add small amount of given red chilli powder in a beaker containing water.	Brick powder settles at the bottom while pure chilli powder floats over water.
9	Adulteration of dried papaya seeds in pepper	Add small amount of sample of pepper to beaker containing water and stir with a glass rod.	Dried papaya seeds being lighter float over water while pure pepper settles at the bottom.
10	Argemone seeds in Mustard	Argemone seeds have rough surface & on pressing is white inside.	Mustard is yellow inside
11	Washing powder in Ice cream	Put some lemon juice	Bubbles are observed if washing powder is present
12	Chicory in Coffee	Gently sprinkle the coffee powder on surface of water in a glass.	The coffee floats over the water but chicory begins to sink down within few seconds. Also the falling chicory powder particles leave behind them a trail of color, due to large amount of caramel they contain

13	Water in Honey	A cotton wick dipped in pure honey burns when ignited with a matchstick	Presence of water will not allow the honey to burn, and if it does, it will produce a cracking sound.
14	Tea coloured leaves in Tea powder	Rub leaves on white paper	Artificial colour comes out on paper.
15	Used tea in Tea powder	Tea leaves sprinkled on wet filter paper.	Pink or red spots on paper show colour
16	Iron filings in Tea powder	Move a magnet through the sample.	Iron will stick to the magnet.
17	Metanil Yellow or Lead Chromate in Pulses	Extract the colour with luke warm water from the sample of pulses. Add drops of HCl.	A pink colour indicates presence of Metanil yellow / Lead Chromate.
18	Malachite green in Green vegetables like Chilli, Peas, etc.,	Take a small part of the sample and place it over a moistened white blotting paper.	Color impressions on paper indicates the presence of Malachite green
19	Starch in Paneer, Condensed milk, Koya	Take a small portion of the product in a test tube add water and boil. Cool to room temperature. Add 1-2 drops Iodine solution.	Blue colour indicates the presence of starch.
20	Sand / Dirt in Wheat flour	Shake a small sample with 10ml CCl ₄ . Allow to stand.	Sand will collect at the bottom

www.sitaramdixit.4t.com, www.dixitsitaram.itgo.com

www.cbseportal.com

Nutrition Through The Life Cycle

Learning Outcomes

- To understand the nutritional needs of different age groups.
- To compute the nutritional status of the community.
- To implement normal diet for the different age groups.

Introduction

The nutritional needs of an individual depends on age, gender, physiological condition and physical activity levels. This section deals with the nutritional needs of individuals of different groups. The various topics discussed in this section include:

1. Assessment of Nutritional Status.
2. Nutrition during Pregnancy.
3. Nutrition during lactation.
4. Nutrition during infancy.
5. Nutrition for a preschool child.
6. Nutrition for a school going child.
7. Nutrition for an adolescent.
8. Nutrition for an adult person.
9. Nutrition for labourer.
10. Nutrition for an elderly person.

Assessment of Nutritional Status

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Nutritional status is the current body status of an individual or a population and it is related to their state of nourishment. It is determined by a complex interaction between both external (food safety, cultural, social and economic situations) and internal factors (gender, nutrition, behavior, physical activity, disease conditions).

Nutritional assessment is the systematic process of collecting & interpreting information in order to make decisions about the nature of cause of nutrition related health issues that affect an individual. It should be assessed at regular intervals. The simplest approach to assessment of nutritional status is the comprehensive ABCD method. (1) Anthropometric measurements of body composition. (2) Biochemical measurements of blood fluids and tissues (3) Clinical assessment for altered levels of nutrients in the body, manifested as excess/deficiency signs (4) Dietary Assessment.

Aim

- 1) To assess the height and weight of the student/participants in the class/programme.
- 2) To categorize the students /participants based on the BMI value
- 3) To interpret anthropometric measurements based on nutritional status.

Materials & Procedure

Equipment required

1. Stadiometer.
2. Weighing machine.

Procedure:

1. *To assess the height and weight of the student/participants in the class / programme.*

Height : The person is made to stand erect, bare foot, with chin parallel to the stadiometer. The investigator presses the headpiece on top of the head. The head piece should press down the hair. Reading should be taken at eye level to avoid parallax error.

The reading is repeated thrice and height is recorded in cm.

Weight: The person is made to stand on the weighing scale erect, barefoot and with minimum clothing. The investigator reads the weight directly downwards. In case of a digital scale the reading is obvious but in case of a manual scale, reading should be taken directly downwards to prevent parallax error. The reading is repeated thrice and weight is recorded in kg.

2. *To categorize the students /participants based on the Body Mass Index (BMI)*
BMI is interpreted by taking weight (in kg) divided by height (in m²).

Table 1: BMI status of the students

Sl No:	Name of the student/participant	Height (in cms/m)	Weight (kgs)	BMI=Weight (in kg) / Height (in m ²)	Interpretation of BMI

3. *To interpret anthropometric measurements based on nutritional status.* The results of the anthropometry can be presented by distributing the participants/ students using an appropriate diagram/figure/chart, based on the ICMR (2016) classification of BMI values given below.

Table 2: Interpretation of BMI

Status	BMI (Asian)
Under weight	< 18.5
Normal	18.5 – 22.9
Over weight	23.0-24.9
Pre obese	25.0-29.9
Obese	≥ 30

Conclusion

The purpose of nutritional assessments is to identify individuals or population groups at risk of becoming malnourished so as to plan and design health care programmes that meet their nutritional needs. It can also be used as a tool to monitor the effectiveness of the nutritional programs / interventions.

Diet for a Pregnant Women

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Pregnancy is a normal physiological phase where rapid growth takes place in the mother's body. During pregnancy, additional requirements for all the nutrients occur to enable the foetus to grow normally in the uterus. Hence strict dietary guidelines need to be followed in order to ensure that all the nutrients required for both the mother and the foetus are met.

Dietary Characteristics

- The diet should be high in calories to maintain a desirable body weight.
- High protein is needed for rapid growth of foetus and uterus.
- The diet should be rich in vitamins and mineral.
- The fluid content of the diet must be sufficient.

Dietary guidelines

- Small and frequent meals should be given.
- More fibre should be included in the diet to prevent constipation. High fibre diet including greens and whole grains are to be included in the diet.
- Iron rich foods should be given to prevent anaemia and to build up iron stores in foetal body.
- Diet should be rich in calcium to prevent osteomalacia.
- Inclusion of green leafy vegetables daily ensures B complex vitamins, calcium and iron.
- Less salty and spicy foods should be included.
- Fried and concentrated foods should be avoided.
- Caffeine containing beverages should be restricted.
- Plenty of water should be taken to keep the bowel movements normal.

Recommended dietary allowance – Pregnant Women

Nutrients	Amount
Additional EER* (Kcal)	+ 350
Protein (gm)	+9.5 (2 nd trimester) +22.0 (3 rd trimester)
Calcium (mg)	1000
Iron mg)	27

*EER – Estimated Energy Requirement

A day's menu for a pregnant woman

Meal	Menu
Early morning	
Breakfast	
Mid-Morning	
Lunch	
Teatime	
Dinner	
Late Night	

Total oil used per day =

Nutritive Value of the planned diet for a Pregnant Woman

Food items	Food volume/no.	Raw weight (gm)	Calories (Cal)	Proteins (gm)	Fats (gm)	Calcium (mg)	Iron (mg)

Diet for a Lactating Mother

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The nutritional requirements are maximum during lactation. The requirements even exceed the needs during pregnancy or any other age group in a women's life. Hence the diet should be balanced to meet the requirements. The following guide lines are helpful in planning a balanced diet for a nursing mother.

Dietary Characteristics

- The diet should be high in calories and proteins, adequate in fats and carbohydrates.
- Increased amount of calcium is needed.
- Increased amount of fluid is necessary for sufficient milk production

Dietary guidelines

- Diet should contain foods which stimulates the milk production.
- Inclusion of green leafy vegetables daily ensures mineral like calcium and iron.
- Less salty and spicy foods should be included.
- Fried and concentrated foods should be avoided.
- Caffeine containing beverages should be restricted.
- Plenty of water should be taken to keep the bowel movements normal and for the adequate milk production.

Recommended dietary allowance – Lactating Mother

Nutrients	0-6 months	7-12 months
Additional EER (Kcal)	+600	+520
Protein (gm)	+17	+13
Fat (gm)	30	30
Calcium (mg)	1200	1200
Iron (mg)	23	23

A day's menu for a Lactating Mother

Meal	Menu
Early morning	
Breakfast	
Mid-Morning	
Lunch	
Teatime	
Dinner	
Late Night	

Total oil used per day =

Nutritive Value of the planned diet for a Lactating Mother

Food items	Food volume/no.	Raw weight (gm)	Calories (Cal)	Proteins (gm)	Fats (gm)	Calcium (mg)	Iron (mg)

Diet During Infancy

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Infancy is a period from 14 days after birth up to one year. The main food of the infant is breastmilk, along with soft and mashed foods. During early infancy much of the nutrient requirement are met by breast feeding. As growth during infancy is very rapid dietary adaptation is required.

Dietary Characteristics

- The diet should be high in calories.
- Proteins requirements are higher per kg body weight.
- Infants require sufficient amount of calcium and phosphorus for rapid growth of body. And calcification of bones.
- Food should be soft, easily chewable and easily digestible

Dietary guidelines

- Give freshly prepared food always
- Introduce only one food at a time.
- Allow the infant become familiar with the food before trying another.
- Give only a small amount or any new food during beginning.
- Strained fruit juices cereal preparation and pulses preparation and veg. preparation n are well accepted during younger ages.

Recommended dietary allowance – Infancy

Nutrients	0-6 months	6-12 months
Estimated Average Requirement (EAR) for Energy (Kcal)	530	660
Protein (gm)	8	10.5
Calcium (mg)	300	300
Iron (mg)	0	3

Balanced diet for Infants

Food groups	gm/portion	No. of portions (6-12 months)
Cereals and millets	30	0.5
Pulses	30	0.25
Milk (ml) and milk products	100	4*
Roots and tubers	100	0.5
Green leafy vegetables	100	0.25
Other vegetables	100	0.25
Fruits	100	1
Sugar	5	2
Fat	5	4

*Quantity indicates top milk. For breast-fed infants, 200ml top milk is required

A day's menu for an Infant

Meal	Menu
Early morning	
Breakfast	
Mid-Morning	
Lunch	
Teatime	
Dinner	
Late Night	

Total oil used per day =

Nutritive Value of the planned diet for an Infant

Food items	Food volume/no.	Raw weight (gm)	Calories (Cal)	Proteins (gm)

Diet for a Preschool Child

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The year between one to six is very important as the major part of brain development takes place in during these periods. Hence the nutrients need is very high. Activities also increase as the child becomes mobile and thereby increasing the needs for nutrients.

Dietary Characteristics

- High calories are needed for the growth and activity.
- There is an increased need of proteins to help the growth of muscles and bone tissues.
- Minerals like calcium and iron are very essential, deficiency leads to poor skeletal structure.

Dietary guidelines

- The diet should be planned according to the likes and dislikes of the child.
- Maximum amount of nutrients must be provided in one single bite by making use of combined food stuffs.
- Spicy, carbonated and caffeinated food must be avoided.
- Iron rich foods should be given to prevent anaemia.
- Diet should be rich in calcium and iron to prevent deficiencies.
- Inclusion of green leafy vegetables daily ensures mineral like calcium and iron.
- Food should be attractively served

Recommended dietary allowance – Preschool Child

Nutrients	1-3 years	4-6 years
EAR for Energy (Kcal)	1110	1360
Protein (gm)	12.5	16
Calcium (mg)	500	550
Iron (mg)	8	11

Balanced diet for Preschool Child

Food groups	gm/portion	No. of portions	
		1-3years	4-6 years
Cereals and millets	30	2	4
Pulses	30	1	1
Milk (ml) and milk products	100	5	5
Roots and tubers	100	0.5	1
Green leafy vegetables	100	0.5	0.5
Other vegetables	100	0.5	1
Fruits	100	1	1
Sugar	5	3	4
Fat	5	5	5

A day's menu for a Preschool Child

Meal	Menu
Early morning	
Breakfast	
Mid-Morning	
Lunch	
Teatime	
Dinner	
Late Night	

Total oil used per day =

Nutritive Value of the planned diet for a Preschool Child

Food items	Food volume/no.	Raw weight (gm)	Calories (Cal)	Proteins (gm)	Fats (gm)	Calcium (mg)	Iron (mg)

Diet For School Going Child (~~7-9~~ Years)

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School going age has been called as the period of rapid growth and development. Diet should be a balanced diet, which provides all the nutrients in required amount and proper proportion. The dietary guidelines are as follows

Dietary characteristics

- Adequate energy, proteins, fats and carbohydrates according to their requirements
- Small meals at frequent intervals, based on their activities

Introduce novel foods with adequate protein, fat, vitamins and minerals

Dietary Guidelines

- The diet should contain foods from all the five food groups.
- Include fruits and vegetables plenty according to the seasonal availability.
- Pulses and legumes are good sources of proteins for vegetarians.
- Include sea foods, lean meats, egg and poultry for non vegetarians.
- Provide variety of meals with respect to colour, flavour, texture and taste.

Recommended dietary allowances- School Going Child

Nutrients	7-9 years	10-12 years	
		Girl	Boy
EAR for Energy (Kcal)	1700	2060	2220
Protein (gm)	23	33	32
Calcium (mg)	650	850	850
Iron (mg)	15	28	16

Balanced diet for School Going Child

Food groups	gm/portion	7-9 years	10-12 years	
			Girl	Boy
Cereals and millets	30	6	8	10
Pulses	30	2	2	2
Milk (ml) and milk products	100	5	5	5
Roots and tubers	100	1	1	1
Green leafy vegetables	100	1	1	1
Other vegetables	100	1	2	2
Fruits	100	1	1	1
Sugar	5	4	6	6
Fat	5	6	7	7

A day's menu for a School going Child

Meal	Menu
Early morning	
Breakfast	
Mid-Morning	
Lunch	
Teatime	
Dinner	
Bed Night	

Total oil used per day =

Nutritive value of the Planned diet for a School going Child

Food items	Food volume/no.	Raw weight (gm)	Calories (Cal)	Proteins (gm)	Fats (gm)	Calcium (mg)	Iron (mg)

Diet for an Adolescent Girl (13-15 Years)

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Adolescent period is said to be a period of storm and stress by all means physically, mentally, emotionally and it is the transition stage from childhood. So there is an increased demand for nutritional requirements. It is important that the foods to be included in the diet should meet all the nutritional requirements.

Dietary characteristics

Adequate energy based on their activities to prevent malnutrition-obesity and underweight

Adequate protein, fat to meet the growing needs

Adequate vitamins and minerals with special emphasis on iron and calcium

Dietary guidelines

The diet should contain foods from all the five food groups

Include fruits and vegetables plenty according to the seasonal availability

Enough calcium is required to increase bone density and prevent osteoporosis

Include iron rich foods to prevent iron deficiency anaemia

Pulses and legumes are good sources of proteins for vegetarians and should be included daily

Include sea foods, lean meats, egg and poultry for non-vegetarians as protein sources

Provide variety of meals in terms of colour, flavour, texture and taste

Recommended dietary allowances

Nutrients	13-15 years		16-18 years	
	Girl	Boy	Girl	Boy
EAR for Energy (Kcal)	2400	2860	2500	3320
Protein (gm)	43	45	46	55
Calcium (mg)	1000	1000	1050	1050
Iron (mg)	30	22	32	26

Balanced diet for Adolescents

Food groups	gm/ portion	10-12 years		13-15 years		16-18 years	
		Girl	Boy	Girl	Boy	Girl	Boy
Cereals and millets	30	8	10	11	14	11	15
Pulses	30	2	2	2	2	2.5	3
Milk (ml) and milk products	100	5	5	5	5	5	5
Roots and tubers	100	1	1	1	1.5	2	2
Green leafy vegetables	100	1	1	1	1	1	1
Other vegetables	100	2	2	2	2	2	2
Fruits	100	1	1	1	1	1	1
Sugar	5	6	6	5	4	5	6
Fat	5	7	7	8	9	7	10

A day's menu for an Adolescent Girl

Meal	Menu
Early morning	
Breakfast	
Mid-Morning	
Lunch	
Teatime	
Dinner	
Bed Night	

Total oil used per day =

Nutritive value of the planned diet for an Adolescent Girl

Food items	Food volume/no.	Raw weight (gm)	Calories (Cal)	Proteins (gm)	Fats (gm)	Calcium (mg)	Iron (mg)

Diet for an Adult Person

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A wide range of nutrients are essential for leading a healthy life for humans. So for providing all nutrients, a good nutrition in relation to body's need is required. An adult male and female must take care of their diet. It is important that the foods to be included in the diet should meet all the nutritional requirement. Diet should be a balanced diet, which provides all the nutrients in required amount and proper proportion.

Dietary characteristics

- Adequate energy based on their age and activities
- Adequate protein, fat, vitamins and minerals

Dietary guidelines

- Include whole grains, like oat meal, millet and brown rice
- Include 4-5 servings of fruits and vegetables (1 serving =100gm)
- Pulses and legumes are good sources of fibre and proteins for vegetarians
- Include sea foods, lean meats, egg and poultry
- Use fat free or low fat milk, yogurt and cheese that are high in vitamin D and C

Recommended dietary allowances- Adult Man

Nutrients	Sedentary worker	Moderate worker	Heavy worker
EAR for Energy (Kcal)	2110	2710	3470
Protein (gm)	54	54	54
Calcium (mg)	1000	1000	1000
Iron (mg)	19	19	19
Vitamin C (mg)	80	80	80

Recommended dietary allowances- Adult Woman

Nutrients	Sedentary worker	Moderate worker	Heavy worker
EAR for Energy (Kcal)	1660	2130	2720
Protein (gm)	46	46	46
Calcium (mg)	1000	1000	1000
Iron (mg)	29	29	29
Vitamin C (mg)	65	65	65

Balanced diet for adults

Food groups	gm/portion	Man			Woman		
		Sed	Mod	Heavy	Sed	Mod	Heavy
Cereals& millets	30	12.5	15	20	9	11	16
Pulses	30	2.5	3	4	2	2.5	3
Milk & milk pdt	100	3	3	3	3	3	3
Roots and tubers	100	2	2	2	2	2	2
Green leafy veg	100	1	1	1	1	1	1
Other vegetables	100	2	2	2	2	2	2
Fruits	100	1	1	1	1	1	1
Sugar	5	4	6	11	4	6	9
Fat	5	5	6	8	4	5	6

A day's menu for a sedentary working woman

Meal	Menu
Early morning	
Breakfast	
Mid-Morning	
Lunch	
Teatime	
Dinner	
Late Night	

Total oil used per day =

Nutritive value of the Planned diet for a sedentary working woman

Food items	Food volume/no.	Raw weight (gm)	Calories (Cal)	Proteins (gm)	Fats (gm)	Calcium (mg)	Iron (mg)

Diet for a Labourer

A laborer is an individual who is involved in heavy work. The requirements for calories is the highest amongst all the age groups. Accordingly the requirements for all other macro and micronutrients are also high.

Dietary Characteristics

- The diet is high in calories
- The amount of carbohydrates, proteins and fats is accordingly high
- The requirement for vitamins and minerals are also proportionately high.

Dietary Guidelines

- Include large number of portions sizes at all meals to meet the calorie requirement.
- The foods included should be low cost
- Choose locally available and seasonal foods like drumstick leaves, papaya, guava, gooseberry, green leafy vegetables, tapioca, yam, colocasia, coconut, tamarind,
- These foods are less expensive but rich in nutrients.

Refer to Diet for an adult person for the RDA for Heavy worker (laborer)

A days Menu for a Labourer (woman)

Meal	Menu
Early morning	
Breakfast	
Mid-Morning	
Lunch	
Teatime	
Dinner	
Late Night	

Total oil used per day =

Nutritive Value of the planned diet for a Labourer (Woman)

Food items	Food volume/no.	Raw weight (gm)	Calories (Cal)	Proteins (gm)	Fats (gm)	Calcium (mg)	Iron (mg)

Diet for an Elderly Person

Smt Meera DK

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Govt College for Women, Thiruvananthapuram

Old age refers to ages nearing the final stage of the normal life span or life expectancy of human beings. It is also defined as the age of retirement that is 60 years and above. So many physiological changes are taking place during this ageing period because changes are occurs in individual cells and whole organs. Majority of these population are at risk of poor nutrition due to economic problems, poor dental health, loss of mobility, gloominess, loneliness and insufficient consumption of food. It's very important to provide them meals and snacks which are high in nutrients, attractive, tasteful and also in acceptable consistency.

Dietary Characteristics

- The diet should be adequate in calories to maintain a desirable body weight and sustain physical activity.
- Proteins should provide 10-15% of the total calorie intake
- Fat is restricted to 20-25% of total calories. Saturated fats and cholesterol rich foods are restricted. PUFA fats are included in the diet.
- High calcium and iron rich foods are to be included. All vitamin requirements are same as adult requirement
- Food should be soft, easily chewable and easily digestible

Dietary guidelines

- A minimum of 5 servings of fruits should be taken because vegetables and fruits are good sources of antioxidants
- High fibre diet including greens and whole grains are to be included in the diet
- Limit saturated fat intake because too much fat intake will leads to weight gain
- Less salty and spicy foods should be included
- Fried and concentrated foods should be avoided
- Caffeine containing beverages should be limited to prevent insomnia
- Steamed foods are preferable like idli, idiyappam, puttu, appam because it is easily digestible

Recommended dietary allowance an Elderly person

Nutrients	Old man	Old woman
EAR for Energy (Kcal)	1700	1500
Protein (gm)	54	45.7
Calcium (mg)	1200	1200
Iron (mg)	19	19

A days Menu for a Labourer (woman)

Meal	Menu
Early morning	
Breakfast	
Mid-Morning	
Lunch	
Teatime	
Dinner	
Late Night	

Total oil used per day =

Nutritive Value of the planned diet for an Elderly Woman

Food items	Food volume/no.	Raw weight (gm)	Calories (Cal)	Proteins (gm)	Fats (gm)	Calcium (mg)	Iron (mg)

Therapeutic Nutrition

Learning Outcomes

- To understand the dietary modifications required to treat disease conditions
- To execute therapeutic diets for disease condition.

Introduction

A therapeutic diet is a meal plan that controls the intake of certain foods or nutrients. It is part of the treatment of a medical condition and are normally prescribed and planned by a dietician in consultation with the physician. A therapeutic diet is usually a modification of a regular diet. It is modified or tailored to fit the nutrition needs of a particular person.

The normal diet may be modified,

- To provide change in consistency as in fluid and soft diets;
- To increase or decrease the energy value;
- To include greater or lesser amounts of one or more nutrients, for example, high protein, low sodium, etc;
- To increase or decrease bulk-high and low fibre diets; and
- To provide foods bland in flavour.

Here we plan and prepare therapeutic diets for disease conditions such as:

1. Routine Hospital diets
2. Peptic ulcer
3. Typhoid
4. Tuberculosis
5. Constipation
6. Obesity
7. Cirrhosis liver
8. Hypertension
9. Diabetes
10. Acute glomerulonephritis
11. Renal calculi
12. Atherosclerosis
13. Iron deficiency anaemia
14. Night Blindness
15. Kwashiokor

Routine Hospital Diets

Dr. Mini Joseph

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Introduction

In hospitals, the normal diet is altered to meet the nutritional needs of a sick patient. The underlying disease conditions, duration of the disease, severity of the symptoms and tolerance level of the patients determines the type of diet that has to be administered to the patient. The aim is to provide maximum nourishment with minimum effort to the body to ensure adequate rest and a speedy recovery. The planned meals should provide adequate amounts of macronutrients, micronutrients, fibre and fluids according to the patient needs. All meals should be served attractively to stimulate the poor appetite which is commonly seen in hospitalized patients.

The diets that are routinely administered in hospitals include i) Clear fluid diet ii) Full Fluid diet iii) Soft diet.

i) Clear fluid diet

Dietary characteristics

This diet consists of clear fluids that are easy to digest and non-irritating to the functioning of the Gastrointestinal tract (GIT). This diet is given for a short duration of time (24 to 36 hours) and is inadequate in most nutrients. It provides 250- 300calories and minimal minerals per day. This is given in post-surgery, during acute illness, during severe vomiting, diarrhoea, post dental treatment and acute inflammatory conditions of the GIT. The commonly used clear fluids includes tender coconut water, rice gruel water, clear vegetable soups/broth, strained fruit juices,

ii) Full Fluid diet

Dietary characteristics

This consists of foods that have a fluid consistency. These meals if planned properly can provide adequate quantity and quality of nutrients. It can be given for prolonged periods of time with no fear of deficiencies. These liquid diets are given at 2-3 hour intervals in volumes ranging from 200 to 300ml/meal.. It can provide 1800-2000 calories, 50-60 gm of proteins per day. Full fluid diets are administered to patients who are recovering from surgeries, who find it difficult to chew, post dental procedures, oral cancers, suffering from high fevers and acute infections and patients on prolonged

treatment for burns. The commonly used fluid diets include milk based drinks, thick cream, soups, custards, porridges, thick cream, thick creamy soups, commercially available supplements and fruit smoothies.

iii) Soft diet

Dietary characteristics

This diet consists of foods with a soft consistency. These foods are easy to digest and are nutritionally balanced. It consists of foods that have little residue, low in fiber and bland in flavour. The patient consumes a soft diet before progressing to a normal diet. These diets provide 2000 calories, 50-60gm proteins/day. It is usually administered to patients who find it difficult to chew, post-surgery patients, patients in the cardiac ICU who require maximum rest, those using dentures and other chewing issues. The foods given in this diet plan are cooked to a very soft consistency, steamed and boiled foods are preferred to fried foods, spices are reduced and minimum oil is used in cooking.

Table 1: Foods Allowed in Routine Hospital Diets

Food Items	Clear Fluid diet	Full Fluid Diet	Soft Diet
Cereals	Clear gruel like barley water, rice kanjee	Porridges of all cereals- Ragi/ Rava/ Rice flour/ porridge	Double cooked rice, idli, idiyapam, soft Bread
Pulses	Dal clear soup	Thick dal soups	All dal preparations
Vegetables	Clear broth	Thick vegetable soups	Well-cooked and mashed vegetables
Fruits	Strained fruit juices	Whole fruit juices	Pureed and soft cooked fruits, steamed banana, Stewed apples, all ripe fruits without skin and seeds
Nuts	Coconut water	Cashew nuts, almonds can be ground and added to drink	Not allowed
Milk	Not allowed	Milk smoothies/shakes	Custard, paneer, cheese, yoghurt, Curds
Fish/Chicken	Clear broths	Thick creamy fish/chicken soups	Bland preparations of fish and chicken
Eggs	Not allowed	Egg nog (egg beaten with milk)	Poached/soft boiled/ scrambled eggs. No fried eggs

Diet in Peptic Ulcer

*Dr. Gayathry CP,
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Peptic ulcer is an erosion in the lining of the stomach, duodenum or oesophagus. An ulcer is a sore or erosion that forms when the lining of the digestive system is corroded by the acidic digestive juices, if neglected, leads to formation of a hole.

Dietary characteristics

A high calorie, high protein, high in vitamins and minerals, soft bland diet.

Dietary guidelines

- A patient on a bland diet or regular diet, should be aware of foods needed for a nutritionally adequate diet and the importance of including these daily.
- He/she should select food from a wide variety of foods, omitting foods known to distress to the patient.
- Moderate use of seasonings are permitted.
- Regularity of mealtimes is essential. The patient gets benefited by small and frequent meals.
- In between meals, protein rich snacks should be taken.
- Moderate amounts of food should be eaten. Heavy meals should be avoided. Volume of any foods sufficient to exert astral pressure against the stomach wall stimulates gastric secretion through the gastric mechanism.
- The diet should be planned in consultation with patient, taking into consideration his preferences, cultural pattern and economic status.
- Meals eaten outside the house will not cause any problem if good judgement is used in food selection.
- Meals should be eaten in a relaxed atmosphere and should forget personal or family problems while eating.
- A short rest before and after meals may be conducive for greater enjoyment of meals.

A Day's Menu for a person suffering from Peptic ulcer

Meal	Menu
Early morning	
Breakfast	
Mid-Morning	
Lunch	
Teatime	
Dinner	
Late Night	

Total oil used per day =

Nutritive Value of the planned diet for a patient with Peptic Ulcer

Food items	Food volume/no.	Raw weight (gm)	Calories (Cal)	Proteins (gm)	Fats (gm)	Calcium (mg)	Iron (mg)

Diet In Typhoid

Dr. Gayathry CP,
Assistant Professor in Home Science,
NSS College for Women, Neeramankara

Typhoid is caused by Salmonella typhi and Paratyphoid B by S.scottmulleri is an infectious disease with an acute fever of short duration.

Dietary characteristics

A high calorie, high protein, high carbohydrate, low fat, high fluid, low fibre bland diet.

Dietary guidelines

- A soft fluid diet is suggested
- Small feedings in more intervals are better
- All irritating fibres, highly flavoured and spiced food items should be avoided
- High carbohydrate drinks and cereal gruels should be included as mid feeds
- High protein beverages and soups, also protein supplements in fruit juices etc are good options to increase the protein content of the diet
- Fluid intake must be liberal, 3-5 litres of fluid intake is essential

A Day's Menu for a person suffering from Typhoid

Meal	Menu
Early morning	
Breakfast	
Mid-Morning	
Lunch	
Evening	
Dinner	

Total oil used per day =

Nutritive Value of the planned diet for a patient with Typhoid

Food items	Food volume/no.	Raw weight (gm)	Calories (Cal)	Proteins (gm)	Fats (gm)	Calcium (mg)	Iron (mg)

Diet in Tuberculosis

Dr. Mini Joseph

Assistant Professor in Home Science

Govt College for Women, Thiruvananthapuram

Tuberculosis is caused by the bacterium *Mycobacterium tuberculosis*. This is characterised by chronic low grade fever that can last from several weeks to years. The other symptoms include exhaustion, persistent cough with sputum, loss of appetite and loss of weight.

Dietary characteristics

A high calories, high protein, high Calcium and Vitamin A rich diet is recommended. It should be adequate in all other macronutrients and micronutrients.

Dietary guidelines

- A soft diet is recommended during the acute phase of fever.
- The meals should be given in small amounts at frequent intervals of time.
- Bland foods are preferable. It varies with patient tolerance.
- Soft egg preparations, minced chicken/ fish/ egg nog, custard, cheese, milk based drinks, protein supplements help to increase the protein content of the diet
- A variety of foods should be attractively served to stimulate appetite in these patients.

A days Menu for a Person suffering from Tuberculosis

Meal	Menu	Ingredients
Early morning		
Breakfast		
Mid-Morning		
Lunch		
Evening		
Dinner		
Bedtime		

Total oil used per day =

Nutritive Value of the planned diet for patient with Tuberculosis

Food items	Food volume/no.	Raw weight (gm)	Calories (Cal)	Proteins (gm)	Fats (gm)	Calcium (mg)	Iron (mg)

Diet In Constipation

*Dr. Gayathry CP,
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Constipation is a condition resulting from insufficient frequency of defecation, deficient quantity of stool or production of abnormally hard and dry stools.

Dietary characteristics

A normal calorie, normal protein, high complex carbohydrate, low fat, high fluid, high fibre, low spicy diet.

Dietary guidelines

- Eat a well-balanced, high-fiber diet that includes legumes, bran, whole grains, fresh fruits, and vegetables.
- Highly refined and concentrated items like maida, fried foods, excessive sweetened pickles and papads and chutneys are not permitted.
- Potassium rich vegetables must be included in the diet.
- A regular time for meals is very important.
- Drink plenty of liquids, include at least 8-10 glasses of water.
- Exercise regularly.
- Setting aside time after breakfast or dinner for undisturbed visits to the toilet.

A Day's Menu for a person suffering from Constipation

Meal	Menu	Ingredients
Early morning		
Breakfast		
Mid-Morning		
Lunch		
Evening		
Dinner		
Bedtime		

Total oil used per day =

Nutritive Value of the planned diet for a patient with Constipation

Food items	Food volume/no.	Raw weight (gm)	Calories (Cal)	Proteins (gm)	Fats (gm)	Calcium (mg)	Iron (mg)

Diet in Obesity

Dr. Gayathry CP,
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NSS College for Women, Neeramankara

An increase in ten per cent over the ideal weight or optimal weight is called obesity. Excessive weight gain is mainly due to high intake of food and its inadequate utilization. Dietetic management mainly aims at maintaining and restoring good nutrition along with gradual reduction in body weight. The nutritional principles are;

Dietary principles

Low calorie (20kcal/kg body weight for a sedentary worker and 25kcal/kg body weight for a moderate worker), normal protein (0.8-1 g/kg body weight), vitamin and mineral (except sodium), restricted carbohydrate, fat, liberal fluid and high fibre

Dietary guidelines

- Reduce the calories by 500 cal/day so that the person loses ½ kg per month
- Reduce the portion sizes
- Reduce the consumption of fats. The Saturated fats should not exceed 10% of the total fats
- Avoid refined foods like maida, bakery products. Use whole grain cereals.
- Avoid fried and sugary foods
- Reduce the intake of sodium by restricting salt in cooking, salted foods like chips, pickles, sauces
- Include a variety of fruits and vegetables in each meal
- Substitute whole fat milk with skimmed or semi skimmed milk.
- Choose lean cuts of meat. Remove visible fats from meats before cooking. Chicken skin has to be removed before cooking.
- Pulses and legumes are good sources of proteins with very little fats. Encourage vegetarian meals at least 3-4 times a week
- Avoid carbonated drinks. Drink plenty of water and other low calorie drinks like buttermilk, clear broths, black tea/coffee
- Exercise regularly

A Day's Menu for a person suffering from Obesity

Meal	Menu	Ingredients
Early morning		
Breakfast		
Mid-Morning		
Lunch		
Evening		
Dinner		
Bedtime		

Total oil used per day =

Nutritive value of the planned diet for an obese patient

Food items	Food volume/no.	Raw weight (gm)	Calories (Cal)	Proteins (gm)	Fats (gm)	Calcium (mg)	Iron (mg)

Diet in Liver Cirrhosis

Dr. Gayathry CP,
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NSS College for Women, Neeramankara

Cirrhosis is the end point of many types of liver damages, characterized by necrosis, fatty infiltration and fibrosis and nodular regeneration. Cirrhosis takes few months to many years to develop. Once cirrhosis has developed, it is irreversible, but the damage may stabilize if the underlying cause is removed or treated.

Dietary principles

High calorie (2000-2500 kcals), high protein (1.2g/kg body weight), high carbohydrate (60% of the calories), moderate or restricted fat (20g/day) and high vitamin diet, supplementation of fat soluble vitamins, restricted sodium (400-800mg/day) if ascites is present, fibre is restricted in case of oesophageal varices and portal hypertension.

Dietary guidelines

- Select foods from all food groups: small frequent feeds are well tolerated.
- Choose soft, almost a bland diet low in fibre and spices.
- Choose low fat foods, avoid rich pastries and deep fried foods. Use only coconut oil as it contains medium chain triglycerides which do not need bile for its digestion.
- Avoid salty foods, salt in cooking, and salt at the table. Anything that tastes salty (such as tomato sauce, salsa, soy sauce, canned soups) probably has too much salt.
- Fresh foods usually are a better bet than processed foods.
- Read food labels when shopping. Check the amount of sodium in the foods you are buying.
- Choose unsalted butter.
- Red meats are high in sodium. When possible, consider vegetarian (meat-free) alternatives

A Day's Menu for a person suffering from Cirrhosis

Meal	Menu	Ingredients
Early morning		
Breakfast		
Mid-Morning		
Lunch		
Evening		
Dinner		
Bedtime		

Total oil used per day =

Nutritive value of the planned diet for an obese patient

Food items	Food volume/no.	Raw weight (gm)	Calories (Cal)	Proteins (gm)	Fats (gm)	Calcium (mg)	Iron (mg)

Diet in Hypertension

*Dr. Gayathry CP,
Assistant Professor in Home Science,
NSS College for Women, Neeramankara*

Hypertension or high blood pressure is a condition in which systolic pressure exceeds 160 mm Hg and diastolic pressure exceeds 95 mm Hg. With diastolic pressures of 100 or more therapy should be initiated with medicines along with diet.

Dietary characteristics

Low calorie (20kcal/kg body weight for a sedentary worker and 25kcal/kg body weight for a moderate worker), low fat (20g/day), low sodium diet (1000mg/day) with normal protein and normal amount of vitamins and minerals.

Dietary guidelines

- Choose variety of foods from all healthy sources, give importance to seasonal foods.
- To reduce sodium content in the diet, avoid table salt, eat low salty foods, processed foods, cured meats, fast foods, ketchups etc.
- Increase the fibre content of the diet by adding more fruits and vegetables in the diet by way of salads and fruit cups.
- Restrict the intake of animal fat and other hydrogenated fats.
- Avoid red meat, prefer fish to meat. Eat only egg whites.
- Restrict the consumption of coffee by one or two a day. Prefer tea to coffee.
- Practice regularity in meal timings.
- Alcohol consumption should be restricted

A Day's Menu for a person suffering from Hypertension

Meal	Menu	Ingredients
Early morning		
Breakfast		
Mid-Morning		
Lunch		
Evening		
Dinner		
Bedtime		

Total oil used per day =

Nutritive value of the planned diet for a patient suffering from Hypertension

Food items	Food volume/no.	Raw weight (gm)	Calories (Cal)	Proteins (gm)	Fats (gm)	Calcium (mg)	Iron (mg)

Diet in Diabetes Mellitus

*Dr. Gayathry CP,
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NSS College for Women, Neeramankara*

Diabetes is a chronic metabolic disorder that prevents the body from using energy from carbohydrates. This inefficiency may be partial or complete in diabetes.

Dietary Principles

Low fat, restricted carbohydrate, high protein diet is recommended. Alcohol is completely restricted.

Dietary Guidelines

- In the diet for a diabetes patient, 60% of the calorie should come from carbohydrates. 15 -20% from proteins and 20 -25% from fats.
- Major calorie should come from cereals and pulses.
- The calorie should be equally distributed among three major meals, which then can be sub divided among mid meals.
- Mid feeds/snacks are inevitable in the diet for healthy distribution of calories and to avoid hypoglycemia.
- Heavy fats, deep fried foods, fruit juices, simple sugars, desserts etc. are restricted in the diet.
- Salad can be included with all major meals to reduce the glycemic index, and to provide safety.
- Fifty percent of the protein should be from plant sources.
- Select fish over meat, lean meat over red meat and egg white over whole egg.
- Basic five food groups should be judiciously included in the day's menu.

A Day's Menu for a person suffering from Diabetes mellitus

Meal	Menu	Ingredients
Early morning		
Breakfast		
Mid-Morning		
Lunch		
Evening		
Dinner		
Bedtime		

Total oil used per day =

Nutritive value of the planned diet for a person with Diabetes mellitus

Food items	Food volume/no.	Raw weight (gm)	Calories (Cal)	Proteins (gm)	Fats (gm)	Calcium (mg)	Iron (mg)

Diet in Acute Glomerulonephritis

Dr. Mini Joseph

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Govt College for Women, Thiruvananthapuram

This is an acute infection affecting the glomerulus and small blood vessels of the nephron. It is seen mostly in children between the ages of 3 and 10 years of age. A common precipitating factor is a post streptococcal infection of the throat. With good medical treatment and nutritional support, the condition can be completely cured.

Dietary characteristics

Adequate calories, proteins, vitamins and minerals for the child's age should be provided through a balanced diet. Low protein diet is recommended in case of kidneys dysfunction (oliguria-reduced urine output). Fluids will be restricted in case of oedema. Sodium and potassium will be restricted in case of high blood levels.

Dietary guidelines

- The diet should be carefully planned to meet the growing needs of the child.
- The calorie content of the meals can be increased by adding simple sugars like honey, glucose, table sugar.
- Protein foods may need to be restricted to give rest to the kidneys. However in case of normal urine output, proteins of high quality should be given and this should be uniformly distributed throughout the day.
- Foods rich in sodium may need to be restricted in case of oedema. In such instances, food items like cooking salt, sauces, pickles, soups, salted chips, nuts, salt biscuits and papads should be voided.
- Potassium rich foods like fruits and vegetables are restricted during kidney dysfunction. Leached vegetables (soaking in hot water and throwing out the water) is provided to prevent an overload of potassium levels in the blood. Spices, coffee, cocoa, green leafy vegetables, are high in potassium and should be avoided.
- All meals should be served attractively to stimulate appetite.
- Small meals at frequent intervals may be better accepted by the patient.

A days menu for a child suffering from Acute Glomerulonephritis

Meal	Menu	Ingredients
Early morning		
Breakfast		
Mid-Morning		
Lunch		
Evening		
Dinner		
Bedtime		

Total oil used per day =

Nutritive Value of the planned diet for a child with acute glomerulonephritis

Food items	Food volume/no.	Raw weight (gm)	Calories (Cal)	Proteins (gm)	Fats (gm)	Calcium (mg)	Iron (mg)

Diet for a Patient with Renal Calculi

Dr. Mini Joseph

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Govt College for Women, Thiruvananthapuram

Renal stones or calculi are composed of minerals or acids. They commonly deposit in the kidneys, ureters, urinary bladder or the urethra. A small foci is formed in the concentrated urine and around these the urinary salts precipitate resulting in renal calculi. The common renal calculi include calcium oxalates, calcium phosphates, uric acid, magnesium ammonium phosphate.

Dietary characteristics

A high fluid diet of 3 to 5 litres per day is recommended. A low oxalate and low uric acid diet is recommended in case these calculi.

Dietary guidelines

- A high fluid intake is necessary to dilute the urine and dissolve the urinary salts.
- Plain water, coconut water, juices, soups can add to the total fluid intake.
- In case of oxalate stones, oxalic rich foods like green leafy vegetables, tea, chocolate, cocoa, beans, beef, yam, nuts, grapes is restricted.
- In uric stones, a low purine diet is recommended. Foods like meat, gravies, organ meats, kidneys, heart, brain, liver, sardines, mackerel are best avoided.

A days menu for a person suffering from Renal Calculi

Meal	Menu
Early morning	
Breakfast	
Mid-Morning	
Lunch	
Evening	
Dinner	
Bedtime	

Total oil used per day =

Nutritive Value of the planned diet for a patient suffering from Renal calculi

Food items	Food volume/no.	Raw weight (gm)	Calories (Cal)	Proteins (gm)	Fats (gm)	Calcium (mg)	Iron (mg)

Diet in Atherosclerosis

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Atherosclerosis is the hardening and narrowing of arteries due to the build-up of plaque along the walls of arteries. This condition may lead to heart attacks, strokes, and peripheral vascular disease, which all together called cardiovascular disease. High cholesterol, high triglycerides, smoking and other sources of tobacco, insulin resistance, obesity or diabetes, inflammation from diseases, such as arthritis, lupus or infections are some causes of atherosclerosis. So it is important to adopt a heart-healthy eating habits as an important part of healthy life style.

Dietary characteristics

Low calorie, low fat particularly low saturated fat, low cholesterol, high in PUFA, and low carbohydrate, adequate protein, adequate minerals and vitamins. A high fibre diet with increased amount of antioxidants is recommended

Dietary guidelines

Include fruits, vegetables, whole grains, fish, lean meats and poultry, low-fat dairy products, nuts, seeds, and legumes (dried beans and peas)

Limit sodium, saturated and trans fats, refined carbohydrates

Include low-fat milk, cheese, and yogurt.

Avoid or limit full-fat milk and other dairy products

Animal proteins are not suggested. Use of animal fat, organ meats, egg and sea food are restricted

Low glycaemic diet food reduce plasma fatty acid

Along with diet do some physical activities to keep heart healthy

A days menu for a person suffering from Atherosclerosis

Meal	Menu
Early morning	
Breakfast	
Mid-Morning	
Lunch	
Evening	
Dinner	
Bedtime	

Total oil used per day =

Nutritive Value of the planned diet for a patient suffering from Atherosclerosis

Food items	Food volume/no.	Raw weight (gm)	Calories (Cal)	Proteins (gm)	Fats (gm)	Calcium (mg)	Iron (mg)

Iron Deficiency Anaemia

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Anemia is a medical condition in which there is not enough healthy red blood cells to carry oxygen to the tissues in the body. Women who are pregnant are at a higher risk for developing anemia due to the excess amount of blood the body produces to help provide nutrients for the baby. The most commonly experienced types of anemia during pregnancy are due to a deficiency of iron, folates or Vitamin-B 12.

Dietary principles

A well balanced diet with adequate calories and good quality protein, foods rich in iron, folic acid, vitamin B12 and vitamin C need to be taken.

Dietary guidelines

- Eat often and eat small meals that help in better absorption and digestion
- Include protein-rich foods
- Do not drink tea or coffee with your meals. Take it an hour before or after the meal.
- Do not combine an iron-rich meal with too many calcium-rich foods like milk, cheese, paneer etc.
- Too much fiber in the diet also affects the iron absorption.
- Take Vitamin C-rich foods like amla, guava, berries, melon, mango, pineapple, citrus fruits, lime juice etc. along with your meals.
- Use of double fortified salt (iron + iodine) is recommended.
- Avoid refined and processed foods – limit intake of pasta, noodles, polished rice, ready-to-eat foods, etc.
- Fluids intake should be minimum of 2½ -3 litres / day

Nutritive value of the planned diet for a patient suffering from Iron Deficiency Anaemia

Meal	Menu
Early morning	
Breakfast	
Mid-Morning	
Lunch	
Evening	
Dinner	
Bedtime	

Total oil used per day =

Nutritive Value of the planned diet for patient with Iron Deficiency Anaemia

Food items	Food volume/no.	Raw weight (gm)	Calories (Cal)	Proteins (gm)	Fats (gm)	Calcium (mg)	Iron (mg)

Diet For A Person With Night Blindness

Dr. Sithara Balan V¹, and Aparna H Nath ²

- 1. Assistant Professor in Home Science, Govt. College for Women, Thiruvananthapuram*
- 2. Research Scholar in Home Science, Govt. College for Women, Thiruvananthapuram*

Night blindness is a type of vision impairment also known as nyctalopia. In this condition the eye is unable to adapt to low-light conditions, such as at nighttime. Night blindness itself is not a condition but the result of an existing eye disorder. Night blindness may exist from birth, or be caused by injury or malnutrition (vitamin A deficiency). It can be described as insufficient adaptation to darkness. The symptoms are inability to see at night, problems with driving due to lack of visibility at night, trouble adjusting eyes to changing light, dry eyes and blurred vision.

Dietary Characteristics

A high intake of Vitamin A rich foods is recommended. Diet rich in plants that can stimulate the absorption of light on the retina is recommended. Consume antioxidant rich plant food.

Dietary Guidelines

- A high intake of Vitamin A rich foods is necessary to prevent the occurrence or to delay the night blindness.
- Include a portion of yellow vegetables and fruits such as papaya, carrot, pumpkin, orange, mango, jackfruit in daily diet. These are rich in carotenoids which are pro vitamin A foods.
- Green leafy vegetables are also rich in carotenoids and should be consumed weekly.
- A non-vegetarian person can include an egg daily as the yolk is a rich source of Vitamin A
- Meat should be included as it is a rich source of Vitamin A

A days menu for a person suffering from Night Blindness

Meal	Menu
Early morning	
Breakfast	
Mid-Morning	
Lunch	
Evening	
Dinner	
Bedtime	

Total oil used per day =

Nutritive Value of the Planned diet for a patient suffering from Night Blindness

Food items	Food volume/no.	Raw weight (gm)	Calories (Cal)	Proteins (gm)	Fats (gm)	Vitamin A (µg)	Iron (mg)

Diet For A Child With Kwashiorkor

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Kwashiorkor is also known as “edematous malnutrition” It is a form of malnutrition caused by a lack of protein in the diet. It affects mainly preschool children.

Dietary characteristics

A high calorie, high protein diet which is rich in vitamins and minerals.

Dietary guidelines

- The child should be given 150-200 Kcal/Kg body weight /day. Calorie dense foods to be included.
- A high protein intake of 5 g protein/Kg body weight /day is recommended
- Fats should provide 40 % of the total calories. Saturated fats such as butter, milk and coconut oil are preferred because unsaturated fatty acids worsen diarrhoea.
- Include plenty of fruits and vegetables to correct micronutrient deficiencies
- Small feeds at frequent intervals
- The diet should be low cost
- It should include locally available seasonal foods

A day's menu for a Child with Kwashiorkor

Meal	Menu
Early morning	
Breakfast	
Mid-Morning	
Lunch	
Evening	
Dinner	
Bedtime	

Total oil used per day =

Nutritive value of the Planned diet for a child with Kwashiorkor Child

Food items	Food volume/no.	Raw weight (gm)	Calories (Cal)	Proteins (gm)	Fats (gm)	Calcium (mg)	Iron (mg)

Biochemistry-Qualitative and Quantitative Analysis

Compiled by

Dr. Rekha VV, *Assistant Professor*
SN College for Women, Kollam

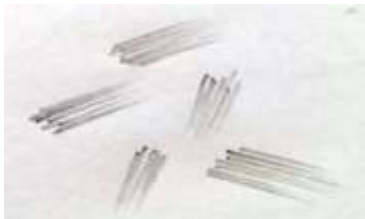
Learning Outcomes:

- To understand the tests used to identify simple carbohydrates and proteins in foods.
- To analyze and estimate selected foods for its macro and micro nutrient content

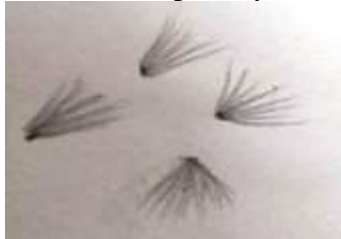
Qualitative Analysis

Estimation of carbohydrate


TEST OF GLUCOSE

PROCEDURE	OBSERVATION	INFERENCE
MOLISCH'S TEST		
To 2 ml of the test solution add few drops of Molisch's reagent ,mix well and add 1 ml of concentrated H ₂ SO ₄ along the sides of the test tube.	A violet ring appears at the junction of the two liquids.	Shows the presence of Carbohydrate.
BENEDICTS TEST		
To 2 ml of the Benedict's solution add few drops of test solution mix well and heat in a water bath .	A reddish orange precipitate is formed	Presence of reducing sugar.
BARFOED'S TEST		
Mix equal volumes of test solution and Barfoed's reagent and heat in a water bath.	A reddish precipitate is formed on the sides of the test tube.	Presence of monosaccharide.
SELIWANOFF'S TEST (RESORCINOL)		
To 2 ml of the test solution add few drops of Seliwanoff's reagent and heat in a water bath.	No change in colour	Absence of Ketose sugar.
OSAZONE TEST		
To 3 ml of the test solution add 10 ml of phenyl hydrazine hydrochloride mixture and heat in a water bath for 30 minutes. Cool it and examine the crystal under a microscope	Yellow crystals of Glucozazone are seen as needle shaped crystals. 	Presence of Glucose.

TEST OF FRUCTOSE

PROCEDURE	OBSERVATION	INFERENCE
MOLISCH'S TEST		
To 2 ml of the test solution add few drops of Molisch's reagent ,mix well and add 1 ml of concentrated H ₂ SO ₄ along the sides of the test tube.	A violet ring appears at the junction of the two liquids.	Shows the presence of Carbohydrate.
BENEDICT'S TEST		
To 2 ml of the Benedict's solution add few drops of test solution mix well and heat in a water bath.	A reddish orange precipitate is formed	Presence of reducing sugar
BARFORD'S TEST		
Mix equal volumes of test solution and Barfoed's reagent and heat in a water bath.	A reddish precipitate is formed on the sides of the test tube.	Presence of monosaccharide.
SELIWANOFF'S TEST		
To 2 ml of the test solution add few drops of Seliwanoff's reagent and heat in a water bath.	A cherry red colour appears	Presence of Ketose sugar.
OSAZONE TEST		
To 3 ml of the test solution add 10 ml of phenyl hydrazine hydrochloride mixture and heat in a water bath for 30 minutes. Cool it and examine the crystal under a microscope	Yellow crystals of Fructozazone were seen as needle shaped crystals. 	Presence of Fructose

TEST OF LACTOSE

PROCEDURE	OBSERVATION	INFERENCE
MOLISCH'S TEST		
To 2 ml of the test solution add few drops of Molisch's reagent, mix well and add 1 ml of concentrated H ₂ SO ₄ along the sides of the test tube.	A violet ring appears at the junction of the two liquids.	Shows the presence of Carbohydrate.
BENEDICTS TEST		
To 2 ml of the Benedict's solution add few drops of test solution mix well and heat in a water bath	A reddish orange precipitate is formed	Presence of reducing sugar
BARFOED'S TEST		
Mix equal volumes of test solution and Barfoed's reagent and heat in a water bath.	No change in colour	Absence of monosaccharide.
SELIWANOFF'S TEST		
To 2 ml of the test solution add few drops of Seliwanoff's reagent and heat in a water bath.	No change in colour	Absence of Ketose sugar
OSAZONE TEST		
To 3 ml of the test solution add 10 ml of phenyl hydrazine hydrochloride mixture and heat in a water bath for 30 minutes. Cool it and examine the crystal under a microscope	Yellow crystals of Lactozazone were seen as powder puff crystals. 	Presence of Lactose.

TEST OF SUCROSE

PROCEDURE	OBSERVATION	INFERENCE
MOLISCH'S TEST		
To 2 ml of the test solution add few drops of Molisch's reagent mix well and add 1 ml of concentrated H ₂ SO ₄ along the sides of the test tube.	A violet ring appears at the junction of the two liquids.	Shows the presence of Carbohydrate.
BENEDICT'S TEST		
To 2 ml of the Benedict's solution add few drops of test solution mix well and heat in a water bath	No change in colour.	Absence of reducing sugar
BARFOED'S TEST		
Mix equal volumes of test solution and Barfoed's reagent and heat in a water bath.	No change in colour	Absence of monosaccharide
SELIWANOFF'S TEST		
To 2 ml of the test solution add few drops of Seliwanoff's reagent and heat in a water bath.	A cherry red colour appears.	Presence of sucrose
OSAZONE TEST		
To 3 ml of the test solution add 10 ml of phenyl hydrazine hydrochloride and heat in a water bath for 30 minutes. Cool it and examine the crystal under a microscope.	Crystals are not formed.	Ozazones are not formed.

TEST FOR STARCH

PROCEDURE	OBSERVATION	INFERENCE
IODINE TEST		
To 1 ml of the test solution add few drops of iodine solution	A blue colour is formed	Presence of starch

Estimation of Proteins

PROCEDURE	OBSERVATION	INFERENCE
MILLON'S TEST		
To 5 ml of the test solution add 3-4 ml of Million's reagent. Mix and bring the mixture gradually to boiling point by heating over a small flame.	A white precipitate is formed which gradually turns red upon heating.	Presence of protein.
XANTHO-PROTEIC TEST		
To 2 ml of the test solution, add 10 drops of con HNO_3 . Heat cool and add ammonia or NaOH in excess.	A white precipitate is formed which on heating turns yellow and finally dissolves imparting a yellow colour to the solution. The yellow colour deepens into an orange colour.	Presence of protein.
BIURET TEST		
To 3ml of the test solution add an equal amount of 10% NaOH solution .Mix well and add 0.5% CuSO_4 solution drop by drop mixing between drops.	A purplish violet colour appears.	Presence of Protein
HOPKIN'S COLE TEST		
To 2 ml of the test solution add an equal volume of concentrated acetic acid .Incline the test tube and add concentrated H_2SO_4 along the sides of the test tube, to form a layer beneath the solution.	A purplish ring appears in the middle of the solution.	Presence of Protein

Quantitative Analysis

Estimation of Vitamin C

AIM:-To estimate the ascorbic acid content in 100 gms of green chillies

PRINCIPLE

Ascorbic acid is a very good reducing agent and can reduce the dye known as 2, 6, dichloro phenol indophenol. In this reaction, the ascorbic acid itself is reduced to dehydro ascorbic acid. Either Oxalic acid or Meta phosphoric acid can be used to dissolve the vitamin C present in the food material and precipitate out the protein which may interfere with the reaction.

APPARATUS

- Centrifuge tubes
- Mortar and Pestle
- Conical Flask
- Burette
- Pipette
- Standard flask.

REAGENTS

- 0.625 % Oxalic acid
- 2,6 Dichlorophenol indophenols

PROCEDURE

All the apparatus are washed in distilled water before use. Weigh out 3 gms of food sample (green chillies) and sock it in 0.625 % oxalic acid for 10 minutes, Grind the food sample to a paste in a mortar and transfer it into centrifuge tube by adding oxalic acid so that all the vitamin C in the food stuff is extracted out. [Filtering using filter paper is not needed] Pour this filtrate into the standard flask and make up the volume to 100 ml with oxalic acid.

Take 2, 6 dichlorophenol indo phenol in the burette and titrate against 10 ml of the extract in the beaker. Calculate the Vitamin C content in the food stuff and express the result as mg/100 gm of food stuff.

CALCULATION

Sl No	Volume of the filtrate taken	Initial Volume ml	Final Volume ml	Titre Value ml
1				
2				
3				

Dye factor @ = 0.152

Titrate value = x

Volume of filtrate used = 10 ml

1 ml of dye will react with @ mg of vitamin C

x ml of dye will react with @ x mg of vitamin C

10 ml of filtrate contain = @ x x mg of vitamin C

100 ml of filtrate contain = $\frac{@ \times x}{10} \times 100$ mg of vitamin C

Weight of green chillies contain = 3 gms

3 gms of green chillies contain = $\frac{@ \times x}{10} \times 100$ mg of Vit C

100 gm of green chillies contain = $\frac{@ \times x \times 100}{10 \times 3}$ 100 mg of Vit C

100 gms of green chillies contain 1.1 mg of vitamin C as per nutrition value table of Dr.C.Gopalan.

Estimation of Calcium

AIM To estimate the percentage of calcium present in the given solution

APPARATUS

Whatman filter paper No. 40

- Beaker
- Conical flask
- Glass rod
- Funnel
- Watch glass
- Pipette
- Burette

REAGENTS

- Saturated ammonium oxalate
- Ammonia
- Acetic acid
- Silver Nitrate solution
- 6N H₂SO₄
- 0.1N KMnO₄

PROCEDURE

Pipette out 10 ml of the ash solution and render it strongly alkaline with ammonia (litmus paper turns blue). Add 20ml of ammonia oxalate in excess and heat the solution to boil. When it is still hot, add a few drop of strong acetic acid and render it acidic (litmus paper turn red). Allow the precipitate to rest for half an hour. Then filter using quantitative filter paper No.40. Wash the precipitate with boiling water and discard the washed water each time. Repeat the washing until the precipitate is free of chlorine. Test for the presence of chlorides using silver nitrate solution. [Pour 1 drop of silver nitrate to the washed water collected in the beaker below. If the water contains chlorides, the water will turn turbid. The water should be repeatedly tested with silver nitrate, till it becomes clear]. Pour 10 ml of 6N H₂SO₄ on the filter paper and collect the acid solution with the precipitate in a beaker.

Titrate the solution against 0.1N KMnO₄ in the burette while it is still hot. Calculate the amount of calcium in 100 gms of the food stuff. The end point in the appearance of pink colour.

CALCULATION

Sl No	Volume of the filtrate taken	Initial Volume ml	Final Volume ml	Titre Value ml
1				
2				
3				

1 ml of .1NKMnO₄ is equivalent to 2 mg of calcium.

Titre value = x

x ml of .1NKMnO₄ = $x \times 2$ mg of calcium

Volume of ash solution taken = 10 ml

10 ml of ash solution contains = $x \times 2$ mg of Ca

100 ml of ash solution contains = $\frac{x \times 2}{10}$ 100 mg of Ca

RESULT

The amount of Ca present in 100 gm of ragi = $\frac{x \times 2}{10}$ 100 mg of calcium

Estimation of Lactose In Milk

AIM:

To estimate the lactose content in 100 ml of milk.

PRINCIPLE

Lactose present in the milk is determined by estimating the volume of protein free milk that can completely reduce 25 ml Benedict's reagent (quantitative) which will be equivalent to 6.7 mg of lactose.

APPARATUS

Volumetric flask

Conical flask

Funnel

Pipette

REAGENTS

10% sodium tungstate

$\frac{2}{3}$ N sulphuric acid

Benedict's quantitative reagent

Anhydrous sodium carbonate

Porous chips

PROCEDURE

Pipette out 20 ml of milk into a 100 ml volumetric flask. Add 12 ml of 10% sodium tungstate followed by 12 ml of $\frac{2}{3}$ N H_2SO_4 (sulphuric acid will precipitate the protein). Mix by rotating the flask gently to avoid forth. Dilute to mark with distilled water and filter it taking care to see that the filtrate is absolutely clear (the filtrate is colourless). Fill the burette with the filtrate.

Pipette out 10 ml of Benedict's quantitative reagent into a beaker and add 2 gms of anhydrous sodium carbonate and a few pieces of porous chips. Heat to boiling keep the mixture gently boiling, add the filtrate from the burette 1 ml at a time till a whitish blue precipitate appears. Then, slowly add the filtrate at the rate of 2 to 3 drops until a white colour is formed. This marks the end point. Repeat the experiment to get concordant value.

CALCULATION

Sl No	Volume of the filtrate taken	Initial Volume ml	Final Volume ml	Titre Value ml
1				
2				
3				

10 ml of Benedict's quantitative reagent will reduce 27 mg of lactose

Titrate value = x

ml of filtrate contains 27 mg of lactose

1 ml of filtrate contains = $\frac{27}{x}$ mg of lactose

100 ml of filtrate contains $\frac{27}{x} \times 100$ mg of lactose

1 ml of milk contain = $\frac{27}{x} \frac{100}{20}$ mg of lactose

100 ml of milk contain = $\frac{27}{x} \frac{100}{20} \times 100$ mg of lactose

RESULT:

The amount of Lactose present in 100 ml of milk = $\frac{27}{x} \frac{100}{20} \times 100$ mg of Lactose

Note

Note

Note

Note

Note

Laboratory Manual for Students of Bsc Home Science

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The Laboratory manual was conceived by the teachers of Home Science courses in Kerala and Calicut Universities as a handy reference for practical experiments in Food Science and Biochemistry done by the students of the three year BSc Home Science.

This book explains the rules and procedures to be followed while working in the Food Science Lab, the procedure for development of recipes, basics of weights and measures in cookery, recipes made from the various food groups like cereals, pulses, fruits, vegetables, meat, fish, egg, poultry and milk.

The nutrition needs during different stages of the Life cycle is explained in the second section. The dietary guidelines, characteristics for each age group is briefly stated.

The manual further describes the modifications that have to be made during various disease conditions like fevers, deficiency diseases, acute and chronic diseases and non-communicable diseases.

The final section deals with the quantitative and qualitative experiments done to estimate the nutrients content of foods.

This book will serve as a comprehensive laboratory manual for undergraduate students of Home science working in the Food Science and Biochemistry Laboratories.

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