FUNCTIONAL FOODS

PRACTICAL MANUAL - II

M.Sc., FOODS AND NUTRITIONAL SCIENCES (First Year)

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M.Sc. (Foods & Nutritional Science), First Year

Practical Paper – II: FUNCTIONAL FOODS

SYLLABUS

PRACTICAL EXERCISES:

1. Market research analysis of functional foods

2. Product development by using any techniques.

3. Selection and screening of panel for sensory evaluation

4. Training of panel for sensory evaluation

5. Ranking, rating, description and sensitivity tests and preparation of score cards

6. Product development evaluation with trained, semi trained and consumer panel members.

1. MARKET RESEARCH ANALYSIS OF FUNCTIONAL FOODS

AIM:
- To study the scenario of functional foods
- To know the survey on locally available foods.

INTRODUCTION:

The institute of Medicines, Food and Nutrition had defined functional foods as any food / food ingredient that may provide a health benefit beyond the traditional nutrients it contain. In Japan, functional foods are classified as pharma foods, Nutraceuticals and Phytochemicals Nutraceuticals are the substances that may be considered as food of part of prevention and treatment of disease. These are isolated as nutrients processed foods, herbal products (genetically modified foods).

Fish oil supplements and antioxidants reduce the damage caused by atherosclerosis, stoke, peripheral, vascular disease, β.Carotene prevents the risk of human cancer, calcium, decrease osteoporosis and help women deal with stress, anxiety symptoms of free menstrual cycle after menopause, fiber to reduce coronary artery disease and cancer. Zinc, lowers the susceptability to variety of infection, disease and hence the immune response has increased. According to Japanese ministry of health and welfare functions, functional foods are dietary fibers, sugars alcohol, oligosaccharides, amino acids, protein and peptides, pupa's, vitamins and minerals.

TABLE I: CEREAL GRAIN PRODUCT

Sl. No.	Cereal Grain products	Price – Rs./Kg.
1.	Bajra	7.00
2.	Barley	26.00
3.	Jowar	10.00
4.	Bombai Ravva	14.00
5.	Maize	15.00
6.	Ragi	11.00
7.	Vermicelli – Pillisbury	36.00
8.	Ragi flour	10.00
9.	Rice parboiled	72.00
10.	Rice raw milled	17.00
11.	Basmathi Rice	80.00
12.	Puffed Rice	17.00
13.	Rice flakes	30.00
14.	Wheat	13.00

15.	Whole wheat flour – Annapurna	22.00
16.	Refined Wheat flour	13.00
17.	Wheat Semolina	15.00
18.	Bread Bombino	10.00

Sl. No.	Pulses	Price – Rs./Kg.
1.	Bengal gram dhal	27.35
2.	Bengal gram whole	50.00
3.	Bengal gram roasted	35.25
4.	Black gram dhal	32.00
5.	Green gram whole	31.25
6.	Green gram dhal	36.25
7.	Horse gram	8.00
8.	Lentil	26.00
9.	Peas	40.00
10.	Red gram dhal	90.00
11.	Soyabeans	60.00

Sl. No.	Green leafy vegetables	Price – Rs./Kg.
1.	Amaranth (Bunches – 3)	2.00
2.	Ambat chukka (3 Bunches)	1.00
3.	Cabbage	8.00
4.	Coriander Leaves (1 Bunch)	8.00
5.	Pudina leaves (1 Bunch)	1.00
6.	Fenugreek leaves (1 Bunch)	1.00
7.	Ponnaganni leaves (3 Bunches)	2.00
8.	Gogu (5 Bunches)	2.00
9.	Curry leaves	1.00
10.	Spinach (3 Bunches)	2.00

TABLE – IV: SPICES AND CONDIMENTS

Sl. No.	Species and condiments	Price – Rs./Kg.
1.	Asafoetida	518.00
2.	Cardamom	80.00
3.	Cinnamon	30.00
4.	Red chillies	34.00
5.	Cloves	50.00
6.	Coriander	125.00
7.	Cumin seeds	45.00
8.	Garlic	40.00
9.	Mau	500.00
10.	Nutmeg	95.00
11.	Omum	60.00
12.	Pepper	200.00
13.	Poppy seeds	58.00
14.	Tamarind pulp	60.00
15.	Turmeric	30.00
16.	Red Chilli powder	30.00
17.	White Chilli powder	60.00
18.	Red chilli	24.00

TABLE – V: MILK AND MILK PRODUCTS

Sl. No.	Milk & Milk products	Price – Rs./Litre
1.	Buffalo milk	12.00
		16.00
		15.00
2.	Cow's milk	30.00
3.	Curd (1 Cup)	6.00 / 5.00
4.	Milk maid	60.00

TABLE – VI: FRUITS

Sl. No.	Fruits	Price – Rs./Dozen
1.	Apple	36.00
2.	Banana	35.00
3.	Guava	24.00
4.	Musambi	15.00
5.	Orange	18.00
6.	Pomegranate (big-3)	30.00
7.	Sapota	30.00
8.	Lemon	36.00
9.	Grapes (black and green)	25.00
10.	Papaya (Big-1)	10.00
11.	Pineapple (Big-1)	25.00

TABLE – VII: VEGETABLES

Sl. No.	Vegetables	Price – Rs./Kg.
1.	Yam	10.00
2.	Onions	20.00
3.	Lemons	10.00
4.	Green Chillies	10.00
5.	Mango (raw)	30.00
6.	Ashgourd	15.00
7.	Plantain green	15.00
8.	Bottle gourd	18.00
9.	Cucumber	13.00
10.	Brinjal	15.00
11.	Ladies Finger	16.00
12.	Ridge ground	25.00
13.	Kovai	15.00

TABLE – VIII: SUGARS

Sl. No.	Sugars	Price – Rs./Kg.
1.	Sugar	20.00
2.	Honey (Ginjar)	210.00
3.	Jaggery white	30.00
4.	Jaggery black	35.00
5.	Sago	25.00

WEANING FOODS:

Product	Manufacturing	Composition of Basic	Cost	Type of packing	Purpose of manufacture
Cerelac Rice	Glaxosmith Klen Asia (P)	Energy – 43 K.cal CHO – 68 g. Fat – 9g. Prokin – 15g. Iron – 17 mg. Calcium – 430 mg. Sodium – 115mg. Vit – A 360µg.	112%	Tetrapack	Vit, Minerals Rich Infant food
Cerelac Multigrain 5 fruits	Glaxosmith Ltd.	Energy – 409 k.cal CMO – 67g. Protein – 16g. Calcium – 450mg. Na – 100mg. Vit – A – 350mg.	123%	Tetrapack	Vit Minerals Rich Infant Food
Cerelac Wheat Orange	Glaxosmith Klen Asia (P) Ltd.	Energy – 411 K.cal CHO – 67.5g. Fat – 9 gm. Calcium – 450mg	121%	Vaccum Packing	All nutrients Rich Infant Food
Nestle NANI	Glaxosmith Klen Asia (P) Ltd.	Energy–2070 K.cal Fat – 23.7g. Calcium – 260g. Vit-A – 390mg. Choline – 50mg. Vit-E – 3.3mg.	240%	Vaccum packing	High nutrients foods for lowbirth weight babies.
Nestle Lactogen	Glaxosmith Klen Asia (P) Ltd.	Energy – 489 k.cal EHO – 58.4 mg. Fat – 23g. Calcium – 440mg. Iron – 5.9mg. Sodium – 190mg. Vit-A – 390mg. Vit – D – 325mg.	170%	Vaccum packing	Stage one infant mix

READY TO EAT FOOD :

Dates	Quarter	Energy – 390 k.cal Protein – 15.2gm Fibre – 10.0gm Fat – 0.6gm CHO – 62.mg Iron – 4.5gm	30/-	Vaccum packing	Low fat fibre rich foods
Protein – 15g. Fibre – 17g.					
Chaco Matrel	Feasters	Energy – 381 k.cal Protein – 10gm Fat – 1gm CHO – 83gm Fibre – 15gm Sodium – 0.8mg	50/-	Vaccum packing	Low in fat No cholesterol
Navaratan Kurma	Priya	Calories – 160k.cal Fat – 8gm Calcium – 260mg Iron – 16mg Fibre – 14gm CHO – 126gm	45/-	Vaccum packing	Ready to eat curry
Rasangulla	MTR	Energy – 175 k.cal Protein – 8gm CHO – 34gm Fat – 3gm Fibre – 3gm Fibre - 0	60/-	Tin packing	Ready to eat sweet
Tea	Testley	Energy – 120k.cal Protein – 19gm CHO – 40gm Calcium – 500mg Iron – 30mg	86/-	Vaccum packing	Naturally Rick in Antioxidant

AYURVEDIC MEDICINES:

Product	Manufacture	Composition	Cost	Daily Dose	Purpose
Madhunt arclan	Sri Jain Ayurvedic pharmacy	Cumini – 250mg Chirala – 250mg Sanctum – 250mg Album – 40gm Chebula – 40gm Officinalis – 40gm	90/-	2 tps	Control diabetes
Chyavana fork	Dr.Rav's	Astavarga– 125mg Dasamula- 125mg Balamula-125mg Karkatakes- 125mg Bhumyalata- 125mg	68/-	2-3 tps	Control diabetes
Tripala	Baidyanath	Karkura – 125mg Punarnava- 125mg Ela – 125mg Calcium – 37mg Vit – A – 18mg.	32/-	2-3 tps	
Apple Drink	Feasters	Energy – 58k.cal CHO – 143g. Sugar – 14.29	43%	Bottle packing	Acidity regulator

Product Manufacturing	Composition of Basic	Cost	Types of packing (Daily clox)	Purpose of manufacturing
	Chandana – 125mg Mushtaka – 125mg Vidari – 125mg Vasamula – 125mg			Useful for obesity patient
Simlim Bherpe up simlim Neutral	Garcinia – 1200mg Bouninia – 80mg Pholmider – 600mg Chebula – 400mg Mukul – 250mg' Satirum – 150mg		2 capsules 180/per day	Positive role to fat metabolier
Punarnavasara Dr.Rao's	Combogia – 1200mg Variogation – 80mg Pholmidin – 60mg Allumsali – 450mg Kunoca – 80mg Excipiants – 1mg	56%	4 tps	Beneficial for heart disease

Medicine:

Product	Manufacture	Composition of Basic	Cost	Dosage	Purpose
Adlofit	Aglouned	CHO, Protein Vit – c Niacinamid –B	Each 1-50/-	Directed by physician	Ferel cold cough
Monizon	Galphaphama Lenticles	Dicla knac Soclium 7 p 50mg	Each 5/-	Directed by physician	Headache Levels cold
Digenic	Cadilapharma Lenticles	Diclofenac Sodium 750mg	Each 1.50/-	Physician	Headache Fever
Nimeplinutenplex	Dr.Reddy's lab	Nimsulphide 100mg	Each 3.50/-	Physician	
Omeccapsule Gas trouble	Reddy's lab	Omeprazole 200mg	Each 14.50/-	Physician	
Begoseles Capsules	Bomma Sameles industrialaxia	Thiaminca B2-10mg, B12, B6	Each Rs.1/-	2 cap/daily	
Erocin suspension	Glaxosmith Klen Asia (p) Ltd.	Each 5 ml. contains paracetmol – 120mg	1925/-	Physician	Fever
Gramong	Best labels Ltd.	5ml acid – 30mg Colomletrazene In a flavoured suspension	16.00/-	Physician	Child motion
Ampicillin colaxacilin	Bio-Chem Pharmaceutical	Anhydrous Ampicillin	80/-	2 cap/ daily	Antibiotic
Zevil forte	Remidex Pharma pvt ltd.	Vit-A – 500mg Vit-E – 15mg Vit-B1 – 1mg Vit-B2 – 10mg Vit-B6 – 2mg Vit-B12 – 7.5mg Vit-B3 – 50mg	19.50/- (10 capsules)	2 cap / daily	Antibiotic

DISCUSSION:

The food products belonged to a wide range of categories like multi nutrients, protein rich foods, artificial sweetness, Wearing foods, Pharma, Ayurvedic, Ready to eat rises etc. These were

found in market survey regarding locally available foods was done and cost composition of nutrient was listed to study the market strategy.

CONCLUSION:

By this experiment, the market survey enabled us to know the current market scenario of functional foods.

QUESTIONS:

1. Describe the market analysis of functional foods and tabulate what are the functional foods available in the market?

2. STANDARDIZATION OF RECIPIE

BASIC RECIPIE: Green Gram Dosa

Ingredients:

Green Gram Dhal– 25g.
Ground nut oil - 2 ml.
Salt   - 2 pinches

Method:

1. Soak green gram dhal in water for 4 hrs in a vessel.
2. Grind the soaked dhal into a paste.
3. Add required amount of salt to the better.
4. Dosa's are made with the batter by pouring a few (or) little amount of Groundnut oil.

DISCUSSION:

The basic product developed was given to all the panel members. Each one had their own opinion. The panel member's acceptance is Mox. The preparation and cost of the product is low and acceptability is more. The basic recipie was only green gram dosa. To this variations were done like variation. I, we added vegetables like carrots, curns, coriander leaves while in variation – II. We added semolina upma to the veg, stuffed dosa because it is high in nutrients, attractive and acceptance is high and suggested to all age groups.

VARIATION-I: Vegetable stuffed Dosa.

Ingredients:

Green gram dhal   – 25g.
Carrots   - 10g.
Beet routs   - 10g.
Curry leaves   - 10g.
Coriander leaves   - 10g.
Groundnut oil   - 2ml.
Salt   - 2 pinches.

Method:

1. To the basic (dosa), add cutted pieces of carrot, beet roots, curry leaves, coriander leaves etc.
2. Make Dosa with these ingredients.

Nutritive value calculations for standardization of Recipie – Upma veg stuffed Dosa

Ingredients	Amount (9)	Protien (9)	Fat (9)	Energy (k.cal)	Calcium (mg)	Iron (mg)	Carotene (mg)	Trimine (mg)	Ribo flavin (mg)	Nlacin (mg)	Vit-C (mg)
Greengram	25	6	0.325	83.5	31	1.1	23.5	0.117	0.067	0.525	0
Carrots	10	0.09	0.25	4.8	8	0.1	18.9	0.004	0.002	0.06	0.3
Beetroots	10	0.19	0.01	4.3	1.83	0.19	0	0.004	0.009	0.04	1
Curryleaves	10	0.60	0.10	10.8	83	0.09	756	0.008	0.021	0.23	0.4
Coriander leaves	1.0	0.3	0.06	4.4	18.4	0.1	691	0.005	0.006	0.08	1 set
Oil	5	-	5	45	-	-	-	-	-	-	-
Semolina	25	2.6	0.2	87	5.75	0.4	-	0.03	0.0075	0.4	0
Total	-	9.76	5.715	239.8	147.98	1.98	1659.5	0.168	0.1125	1.335	15.2

VARIATION-II: Upma and vegetable stuffed Dosa.

INGREDIENTS:

Green gram dhal — 25g.
Carrots - 10g.
Beet roots - 10g.
Curry leaves - 10g.
Coriander leaves - 10g.
Groundnut oil - 2ml.
Salt - 2 pinches
Semoli - 25g.

METHOD:

1. Upma is prepared by using Semolina.
2. Dosa is made by using the batter.
3. Little amount of upma is kept on the dosa and few vegetables like carrot, beat roots, curry leaves and coriander leaves were added to it.

DISCUSSION:

The basic recepie developed was Green Gram dosa. To this basic recipie, variations were done. In variation-I, we added vegetables like carrot scrap, beetroot scrap, curry leaves, coriander leaves. While compare to the basic recipe, nutrient values are increased in variation-I. In variation-II we added Semolina upon to the vegetable stuffed dosa. While compare to the variation-I, nutrient values are increased highly in variation-II. When this recipie was given to panel members, their

acceptance is more the preparation and cost of the product is low and nutrient values are high in this recipe. The panel member acceptance is more for variation-II because of its content of nutrients, attractive and palatable and it is suggested to all age groups. The nutritive value in this recepie mainly contains high calories, calcium, and high carotene. The fat content is normal, Vit-C is normal, B-Complex vitamins also normal. Thus, this product contains nutrients which are needed to our body for various metabolic junctions.

CONCLUSION:

Compared to the basic recipe, the veg, stuffed and upma with vegetables have the increased nutritive values. These dosa may be served when they are hot. These products acceptance is more and suggested to all age group.

QUESTIONS:

1. Write in detail about how to standardize the recipe?

REFERENCE:

1. B. Sri Lakshmi (1998). "Cereals and cereal products". Text book of Food science. 4th Edition, Chapter – 2, Page Number – 58 to 63.

3. SELECTION AND SCREENING OF PANEL FOR SENSORY EVALUATION

A. ODOUR IDENTIFICATION TEST

AIM: - To identify the ability to distinguish odour.

INTRODUCTION:

The odour of food immeasurably contributes to the pleasure of eating. It may be a valuable index to the quality of a food even to its wholesome and edibility. Information regarding the odour of food is obtained through the olfactory epithelium, a yellow pigmented area about the size of a postal stamp located in a upper part of the nasal cavity and above the turbinate bones. Olfactory cells are located in this area through these cells, the odours were detected. Each olfactory cells terminate in a number of hair like projections or extension of the cell wall called "cilia". Which extended into the mucous lining of the olfactory epithelium. Nerre endings from the first crania nerve make contact with nerve fibers from the olfactory bulb cell by way of the olfactory bulb which is just above the ordour detecting area and separation from it by the perforated ubriform plate, the nose is also innerated with fibers from the fifth cranial nerve which senses pain, a fact account for the sensitivity of the nose to popper.

SINGLE PARTICIPANT ODOUR IDENTIFICATION TEST

Sl. No.	CODE	FOOD ITEM	ODOUR IDENTIFICATION
1	A	Turmeric	X
2	B	Chilli powder	v
3	C	Elachi	v
4	D	Cinnamom	X
5	E	Garlic	v
6	F	Coriander Seeds	v
7	G	Pepper	X
8	H	Coriander leaves	v
9	I	Cloves	v
10	J	Mint	v
11	K	Ginger	v
12	L	Asafetida	v
13	M	Curry Leaves	v
14	N	Bay Leaves	X
15	O	Mustard Powder	X

Normally most of the inhaled air flows part of the olfactory area, but does not directly upon it. However, in the act of the swallowing a slight vacuum is found in the nasal cavity and as food starts down the oesophagus a small facts of odour from the food is drawn up into the olfactory area. Siniddling to the better sense, a odour also drawn air upto this organ. The concentration at which substance can be detected vanilla can be sensed when the concentration is only 2×10{ ¹gl liter of air, a low concentration indeed.

PROCEDURE:

Use samples of food substances or food such as lemon, orange peel, onion slices, garlic bills, coffee powder and clove oil gingelly oil. Place the samples in tubes. Stop preferably with glass stopper. Take powder / extract of samples between two layers of odour free muslin cloth to avoid inhalation of powders. These samples were arranged randomly.

DISCUSSION:

15 different types of food samples such as spices and condiments are given to the panelist and asked them to identify the samples by smelling out. 10 members were able to identify more than 50% of the products. Out of three on could identify all and six could not identify the coriander seeds, coriander leaves, cloves, Bay leaves, Mustard powder. None of the panel members except two could identify cloves elachi, garlic, ginger, turmeric, Chilli powder and asafetida. Thus 4 members were selected as panelist and training was conducted for them.

CONCLUSION:

The odour identification test was learnt and panelist were selected.

QUESTIONS:

1. Explain how to identify the odour of spices and condiments?

REFERENCES :

American Pong Boin and Roenlet. (1985). "Principles of sensory Evaluation".
Chapter – 3, Olfaction, Academic Press – Page number – 147 to 170.

B.TASTE CONCENTRATION TEST – SWEET

AIM:

To test the ability to distinguish between different levels of concentration

INTRODUCTION:

The sense of taste refers to the ability of the taste organ to perceive and recognize the four basic tastes – Sweet, Sour, Salt and bitter. These qualities are independent of one another and are analogous to the skin sense (touch, warmth, cold and pain). The task sensation is therefore responsible for taste are non-volatile compounds. They must be in solution or dissolve in saliva to produce situated on the tongue surface, but in part they are spread overall the oral cavity and down the oesophagus and ever on the trachea and layer.

Fungi from papillae and the taste buds they contain are found on the dorsal surface and towards the front of the tongue as they are filiform papillae. The latter contains no taste buds but are sensitive to touch. Foliate papillae are found on the slides of the tongue and few (1-10) circum vallate papillae across the back arranged in a v-shape. The central surface the tongue contains no taste buds.

The taste buds are made up of number of cells grouped in a knob like cluster microscopic in size and surrounded by a depression called a "pure" in which the saliva collects. Cells which make up the bud are of two types. Supporting cells and taste cells. The no. of taste buds in humans is estimated to be 9000 – 10,000 much fewer than the number separated in such animals as the anticope cells which constitute a taste bud degenerate and are replaced over a seven-day period. As an individual grows old, the no. of taste buds decline. A trophy of the papillae begins when one is about 45.

The sensation known as sour is associated which hydrogen 10ns supplied by acids such as cream of tarter which is commonly found on the kitchen shelf. The intensity of the sour sensation produced by an acid depends more upon the hydrogen ion concentration do not run parallel.

Salt taste is due to 10ns of salts. The NaCl are the most common source of the salt sensation in foods. Nacl is said to be the only salt with the pure salt sensation even so indilute concentration it is frequently identified as salt.

Alkaloids such as caffeine and quinine and strychinine are bitter, so glycosides of phenolic compounds such as Maringin in grape fruit and miscellaneous group of substance conducting bile salts and the salts of Magnesium etc. There are many groups in understanding of the sense of taste. Some individuals approximately ¼ th of the population are said to be "taste blind".

CODE NUMBER	INTENSITY RANKING					
	5	6	7.6	10	12.5	15
A	v					
B		v				
C			v			
D				v		
E					v	
F						v

A set of sucrose solution with b varying concentration are prepared and the candidate is asked to arrange them in the increasing order of their sweetness. The solution prepared should have the sucrose concentration of 5,6, 7.6,10,12.5 and 15. After arranging the solution in the said manner. The results are entered in the evaluation card. The format of which is enclosed on the adjacent page.

DISCUSSION:

A set of sucrose solution with concentration of 5mg, 6mg, 7.6 mg, 10mg, 12.5mg and 15mg were prepared by panel members. The solutions were prepared by dissolving in 100 ml of water. I participated in this practical to arrange the given solution in an ascending order of sweet concentration of solution. I arranged all the concentrations in a correct sequence i.e. A (5mg.), B (6mg.), C (7.6mg.), D (10mg), E (12.5mg.), F (15mg.)

Through this experiment, I conclude that my sensitivity towards sweet high and I selected as a panel member.

CONCLUSION:

By this test, I learned how to test the ability of taste of different concentration and selection of panel members who had higher threshold frequency.

QUESTIONS:

1. Describe how to conduct taste concentration test for sweet

REFERENCES:

PIGOT: J.R.SENSORY ANALYSIS OF FOODS;
Chapter No.1 – The sense of taste;
Page Number – 14 to 15.

C.TASTE CONCENTRATION TEST – SALT

AIM:

To taste the ability to distinguish between different levels of concentration of salt solution.

INTRODUCTION:

The classic sensory Modalities of olfactory 10ns and taste represent with the cutaneous modalities of Mechane, thermo and noception, the group of "lower senses", "higher sense" i.e. vision and oudition reveal a higher and more rational cavity is locking for the chemical and cutaneous Modalities to such a degree that some people having lost their ability to smell only complain. "I cannot taste", infact lack of rationality might also enable more direct access to deeper layers of personality as food scientist and others.

Hatin et. Al (1938) concluded that human thereshold for a just perceptible salty taste are about equal for all sodium salts. Beilder (1953) reported a more uniform electro-physiological responses to a series of a sodium salt of the equivalent concentration than for cation series, from these results the suggested salts may act in an unassociated form in a medium of dielectric constant.

Taste plays an important role in an oral test for control of appetite and food intake does not act alone but is part of a complex or facial sense. This include olfactory and sonata sensory information on the content of the oral cavity. The participating somato sensory information on the content of the oral cavity. The participating consists not only of thermo and mechano receptive data but also of a pain precursor which for instance are elicited by pepper of capsicum.

The basic taste quantities are sweet, sour, bitter and salty. Sub-qualities of taste may be alkaline, metallic tastes.

RESULTS OF SINGLE PARTICIPANT FOR TASTE CONCENTRATIDAL TEST – SALT

Concentration	Codes						
	A	B	C	D	E	F	G
2mg	v						
2.5mg		v					
2.7mg			v				
2.9mg				v			
3mg					v		
3.2mg						v	
4mg							v

PROCEDURE:

Give a set of salt solution with five varying concentrations in a random manner and ask the candidate to arrange them in ascending order of their saltiness. The solution used should have a salt concentration of 2.0%, 2.5%, 2.7%, 2.9%, 3%, 3.2%.

DISCUSSION:

A set of salt solution with concentration of 2mg, 2.5mg, 2.7mg, 2.9mg, 3mg, 3.2mg were prepared by panel leaders. The solution where prepared by dissolved in 100ml of water. I participated in this practical to arrange the given solution in an ascending order of salt concentration solution. I arranged all the salt solutions incorrect sequence through these, I conclude that my sensitivity towards salt is high.

CONCLUSION:

By conducting this practical, I can conclude that the salt concentrations were identified by all the panel members and we learnt how to identify different concentration of salt solution.

QUESTIONS:

1. Describe how to conduct taste concentration test for salt

REFERENCES :

1. PIGOT : J.R. SENSORY ANALYSIS OF FOODS;
   Chapter No.1, the sense of taste.
   Page number : 14 -15.

2. HELEN CHARLEY FOOD SCIENCES
   Chapter No.1, Evaluation of Foods,
   Page Number : 10 – 16.

D.DIFFERENCE TESTS – PAIRED COMPARISON TESTS

AIM:

To test the difference between two stimuli are two among several stimuli by conducting difference tests paired comparison test.

INTRODUCTION:

Most information on human responses to physical and chemical stimuli has been obtained in laboratories under very specific conditions laboratory panels can provide answers to two general questions relative to the sensory properties of food. Perane (1958) is much clearer in defining difference tests as those which determine a difference regardless of its nature or direction. Difference testing is the most fundamental approach to sensory analysis of foods. There are three basic types of differences which may be sought.

1. Simple difference.
2. Directional difference of a defined criterion.
3. Quality preference difference.

Simple difference tests are used affectionately for obtaining information in several fields of investigation. In physiological and psychology basic information on human response to stimuli, isolate and combined is obtained through these procedures.

Simple difference testing requires the observer to respond in one of the two ways. "There is a difference" or "there is no difference". Directional difference tests, comparison tests, Duo-trio test, triangle test and Ranking test under this difference.

RESULTS OF A SINGLE PARTICIPANT FOR SINLGE DIFFERENT TEST (PAIRED COMPARISON TEST)

Sl. No.	Sample	Code No. of sample pairs		Judgment of Difference	Score
1.	Sample – I	A	B	Mango pickle	v
2.	Sample – II	A	B	Thumsup – Pepsi	v
3.	Sample – III	A	B	Slice – Maaza	v
4.	Sample – IV	A	B	50-50, Crack – Jack	X

P

Comparison of two samples is commonly referred to as the paired stimuli or paired comparison test. In two difference tests, the judge is presented with two stimuli and asked to indicate whether there is a difference between them. In a directional test, two stimuli are presented for comparison and the judge must determine which of two samples has the greater intensity of specific well defined and well understood characterizes in either test, the samples can be presented simultaneously / successively.

The presentation of two samples simultaneously is referred to as the paired comparison method. The response in this case can be either "these is a difference, there is no difference" requiring a different response in all cases has been found to give better results than allowing "no difference" response in a paired test. The paired comparison procedure tends to minimize the munory effect associated with the single stimulus procedure. Administration of two sample difference tests is more important. Judge must be informed of the probability of receiving identical / difference stimuli. Complete randomness of preservation is essential so that the observer responds to each trial independently.

FIELD OF APPLICATION:

This test helps to prepare foods of good taste, texture, acceptance, colour difference preference in consumer analysis of food. This is also applicable in screening and testing of panel list used to found. Single difference and directional difference in a specific characteristics.

PROCEDURE:

Present coded samples in pairs, in each pair one being the control and other the test sample identical. Samples in a few pairs may be given to test the individual discriminative ability as a panel list. In a sample difference test the panelist to test whether in each pair. The same or different.

DISCUSSION:

Four pairs of samples were presented to their panelist and lists to identify whether there is difference between the two samples present in the same pair. The four pair in each pair, one being the control and other the test sample in few pair may be given those are Pepsi – Thums up, 50-50, krack-jack, Maaza, Slice, Mango pickle – Fresh stale. I identified 3 samples correct of; those are pickles, cool drinks, slice – Maaza.

➢ In biscuits, one was good and the other was hard crispy from the other one.
➢ Thums up has strong concentration and gas than pepsi.
➢ Slice consistency is thickness than Maaza.
➢ Fresh Mango pickle is good in taste and attractive, spicy than stale Mango pickle.

CONCLUSION:

The practical enables us to learn about taste difference that is present in the samples and how to conduct a panel list and select the panel members.

QUESTIONS:

1. Explain in detail about how to conduct the paired comparison test for selection of panel members

REFERENCES:

American, Pong Boin and Roenlet,
"Principal of sensory Evaluation of Foods".
Chapter -&, Academic Press – 1465.
Page Number – 321 to 340.

E. DUO – TRIO DIFFERENCE TEST

AIM:

To identify the sample is matching with the reference sample in triplet sample given.

INTRODUCTION:

The duo-trio was described by peryam and swatz. In this design the observer is first presented with a standard stimulus. After this sample is examined, it is removed and two unknown samples were submitted successively in random order. The judge is requested to indicate which is 01 the two unknown is the samples same as the first sample with a chance probability of half the time interval between the presentation of successive stimuli can be Manipulated depending on the characteristics of the sample i.e. whether they readily induce fatigue. The test also allows for control of the quality of sample taken because originally designed. No retesting is permitted. Normally when the two stimuli of an unknown characteristic difference, both samples are presented randomly as the standard. However peryam & swartz (1950) and Mitchell (1956) have found the discrimination in better when the weaker of the two samples are the one with the more typical or families characteristics is used as the standard. Dawson et. Al (1953) however reported better discrimination in the due-trio when the stronger or more unusual flavor was the old sample.

RESULTS OF A SINGLE PARTICIPANT FOR THE DUO-TRIO TEST

Sl. No.	Code No. of pairs	Code No. of reference sample	Matching sample	Difference Identified
1.	A, B, C	C	A	v
2.	D, E, F	F	D	X
3.	G, M, I	I	G	v
4.	J, K, L	L	J	v
5.	M, N, O	O	M	X
6.	P, Q, R	R	P	v

FIELD OF APPLICATION:

This test is used to detect difference between samples has an orientation factor through a reference sample given it is especially used in the same session for same quality attributes. The test may be used only when the intake sample carry over effects are absent or if present are only slight. This is also used for training and testing of panelist.

PROCEDURE :

The test involves three samples, two identical and one different. Any one of the sample is reference. The test may be duplicate give first one of the identical samples as known reference and the other two as coded. As the panelist to pick but the samples in the coded pair matching with the reference sample.

DISCUSSION:

In the present practical, 6 samples were given as reference and we have to match one of the two samples with the reference one.

Here, identified four samples correctly; these were Pepsi, 50-50 and Fruity, Maaza. In that Pepsi was bit lighter then thums up. The 50-50 was crispy due to the presence of Moisture and finally the old pickle was clearly identified as it was poor in colour, taste and texture.

CONCLUSION :

The practical enables us to learnt about the taste difference that was present in the given samples.

QUESTIONS:

1. Explain in detail about how to conduct the duo-trio difference test for selection of panel members

REFERENCES :

American Pang Born crolerses,
"Principles of Sensory Evaluation of foods",
Chapter-7, Academic press (1965)
Page Number – 321 – 340.

F.TRIANGLE TEST

AIM:

To identify the odd sample Prom the given samples.

INTRODUCTION:

The triangle test was first suggested by Benglsson (1943) & was used by Helm, Trolle (1946) as a method of selecting expert been tasters. Peryam and Joseph Seagram (1941) for quality control and research on whisty since its appearance. The method of foods because of its expensive application. The test by the method has been used by most labs in measuring the sensory properties of foods because of its extensive application, the test has been the most thoroughly studied and criticized of all the test design. It is applied as frequently for determining true differences as for determining directional simultaneously allowing for inter comparison, they could also be presented successively. The triangle test was first applicable to foods in true different tests. The judge is informed that two of the stimuli are identical and one is different and must select add sample.

The triangle test can be used in the same situation as the two sample different test. When the sample are homogenous and especially when the dimension of different is not known is too complex for all oudges to comprehend a like P.Paffaman (1954) and Fillipello (1956) found the power of difference discrimation quite similar in the two tests and slightly infavour of the trial design. Its jalique and adaption are not a problem. The triangle test may be more efficient from the statistical stand point. There are several basis which could effect that statistical effect.

Fillipello (1956) and Paffaman (1954) reported that in repeated testing performance is better than previous attempt when the add sample is kept constant. They attribute this to a learning effect i.e. the observer become familiar with the odd sample and one they identified if their work was complete.

Triangle test is used to detect difference between samples as well as for training and testing panelists statistically this test is more efficient than other difference tests. This is used where inter sample effect are minimum.

RESULT OF SINGLE PARTICIPANT FOR TRIANGLE TEST

Sl. No.	Code of triplets	Code No. of odd sample	Different identification
1.	A, B, C	C	I identified odd sample
2.	D, E, F	E	I identified odd sample i.e. pakodi
3.	G, M, I	G	I did'nt identify the odd sample
4.	J, K, L	L	I did'nt identify the odd sample
5.	M, N, O	O	I identified odd sample
6.	P, Q, R	R	I identified odd sample

PROCEDURE:

Presently each panelist with three coded samples, two identical samples and one test sample. Ask the panelist to indicate which of three is odd sample. In general, it is preferable to give the sample which is stronger in odour and taste as odd sample.

DISCUSSION:

The aim of the test is to develop a product and sensory evolution. The similar products with slight variations in the taste to them and to find out the panel member regarding these scores for this experiment, 6 products with 3 variations are displayed and conducted sensory evolution out of six products, samples identified was four. The first sample consists of tea, the odd sample consists of ginger tea. These codings are A, B, C in this 'C' is the odd sample and identified correctly. The 2nd sample is the Pakodi, Egg Pakodi is the odd one, these codings ar D, E, F. Out of this E is the odd, the third one is the coffee, filter coffee is the odd, these codings are G, M, I and I could not identify "G" as the odd sample, the fourth one is J, K, L samples and I could not identify the odd sample "L", the fifth one is M, N, O samples and the Sixth. One is P, Q, R samples and I, identified the odd samples.

CONCLUSION:

The test is conducted to select the panel members through sensory evalution which can be used for further product development.

QUESTIONS:

1. Explain in detail about how to conduct the triangle test for selection of panel members

REFERENCES:

American Pang Born,
"Principles of sensory evaluation of foods"
Chapter -7, Academic press – 1965.
Page Number – 321 to 346.

G. CONCENTRATION DIFFERENCE TEST FOR TASTE AND AROMA

AIM:

To determine the capacity of panelist to detect difference in taste and aroma between given pairs of foods i.e. Tea and Coffee.

INTRODUCTION:

The ratio of the olfactory threshold determine offer sniffing the undeleted substance to the threshold determined, the diluted is termed the odour intensity. The threshold found after smelling the diluents odour intensity of standard structure intensity of 180 mrs differed considerably odour intensity measured; thus increased but no after a constant point.

Difference tests are used to determine if there is any difference between or among samples. The three basic types of difference testing commonly used are the paired comparison, duo-trio and triangle test. The common true difference tests are referred to a single stimulus paired stimuli, duo-tri and multi sample tests. In tests which so not reveal stationary significantly difference between treatment no further evaluation is needed. When difference are found however direction difference test are used to establish by a laboratory method, consumer may be asked to express preference. In the paired stimuli procedure, judges simply specify whether take difference between them or not. In a directional test two samples, when the judge indicates what sensory characteristic distinguishes the two samples, then the test is called "Paired comparison test".

PROCEDURE:

Use pair food chemical solution or food product or both with definite difference in single taste stimuli in paired comparison test.

a. Pairs of taste solution for Basic comparison test.
   Sweet – Sucrose solution – 1.1 and 1.3%.
   Salt – Salt or Nacl solution – 1% & 1.3%.

Pairs for taste difference with food products which helps panelist appreciable taste due to interaction between taste stimuli.

b. Pairs of aroma concentration for Basic comparison test.
   Tea and Coffee concentration – different test for aroma. Different concentration of coffee and tea were given. Give about 5ml of solution or 20 gms of the food to the panelist for using paired and duo-trio test. Use co-paire of each taste in these tests & vary the concentrations.

Results of single participant for comparison test – Taste

Sl. No.	Code of sample	Your Judgment	Taste conc. Difference
1.	A B	Difference / No Difference	B
2.	C D	Difference / No Difference	D

Results of single participant for concentration difference test – AROMA

Sl. No.	Food item	Code No. of sample	Aroma difference smelling	Identification tasting
1.	Tea	G H	(1)	(1)
2.	Coffee	E F	(1)	(1)
		(1) Correct response		

DISCUSSIONS:

Difference implies comparison either between two stimuli or among several stimuli. Sensitivity is the extension most frequently adopted in selection of a method for determining the difference of two samples, is commonly referred to as paired comparison test or paired stimuli and ask to indicate whether there is a difference between them or not. In a directional test, 2 stimuli are presented for comparison and the judge must identify which of the two has greater intensity of specify well defined characteristics of the food. Four pairs of sample (Sucrose solution), Salt (Nacl solution), coffee and tea were coded as A, B, C, D, E, F, G, H were presented to the subjects identify taste and concentration in sweet and salt solution and aroma concentration in coffee and tea.

CONCLUSION:

By this experiment, we learnt how to detect the concentration difference between taste and aroma.

QUESTIONS:

1. Explain in detail about how to conduct the concentration difference test for taste and aroma for selection of panel members

REFERENCES :

American Pang Born Roessiner,
"Principle of sensory evolution of foods".
Chapter – 9
Page number – 321 to 346.

4.TRAINING OF THE PANELIST

AIM:

To train the selected panelist to acquire higher accuracy in taste, odour and aroma perceptions and make judgement on intensity and quality when occur in normal foods.

INTRODUCTION:

Systematic analysis of the sensory properties of foods involves the use of human subject in a laboratory environment and the sensitivity and reproductibility of the analyte food (in this case, the judge) greatly influence the direction and validity the judgment are obtained also influence the data. In some cases of the result to find difference between trained and panels inability to discrimate had its origin in methodological or statistical deficiency.

Traver and Ellis (1961) believe that following consideration are important in selecting judges for flavor difference tests.

1. Percision or inherent sensitivity for a particular flavor.
2. A tolerance or inherent (sensitivity for a particular flavor) ability to produce a duplicate a difference judgement.

According to Krammer et.al (1961) if the stimulation of consumer reaction is the slide aim obtained panel is not needed and should be avoided. In some cases it may be important to select individuals who are superior in there ability to detect difference various procedure based on institution, rational judgment (or) experimentation have been applied in selecting people. Whose performance is sensory test will be superior to that of an unselected population (Drawson et.al 1963).

Maxsetal (1950) consider that selection and training of judge on the basis of sensivities and consistence are of extreme importance. According to Harper (1955) training as the "Steps" which may be taken deliberately to increase the effectiveness and the rate act which the individual assimilates new of exposure to events (or) occurrence without any systematic attemption the part of another person to focus attention upon what is most important. "Horper states that the judgment 01 trained person comes, very near to the limiting errors of physical measurements.

Plattman et.al (1954) raised the question of how much training is simply familiarization with the tab type of situation. Training could be directed getting towards panel members to disregarded their personal preference which could result in most objective decision. It might also be directed towards screening recognition of small differences, a combination of these of adequacy trained that person of ordinary sensitivity might become satisfying in flavor discrimination test not thought increased sensitivity but merely through the influence of training.

Results for single participant threshold test :

Sl. No.	Subject code	Sweet detection recognition	Salt detection recognition	Sour detect recognition	Bitter detect recognition
1.	Rs.	ABCDEF	ABCDEF	ABCDEF	ABCDEF

Evaluation card for threshold test.

Name – G.Sasi Bargavi.
Product - Basic salt solution
Circle - The approximate level at which it is identified.

D* - Detection   R* - Recognition

Sl. No.	Sample I		Sample II		Sample III		Sample IV	
	D*	R*	D*	R*	D*	R*	D*	R*
1.	A	A	A	A	A	A	A	A
2.	B	B	B	B	B	B	B	B
3.	C	C	C	C	C	C	C	C
4.	D	D	D	D	D	D	D	D
5.	E	E	E	E	E	E	E	E
6.	F	F	F	F	F	F	F	F
	SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE

The main purpose is to improve sensory accuracy the training selected panels was necessary for evaluation of intensity of flavor. So that all panel performance can be decreased by selecting individuals and checking their performance. The panelist should also familiarized themselves with different test methods used in sensory evaluation. Training also helps to the panelist to decide on the Magnitude of difference and variables in test and odour.

To main them, following test must be conducted.

1. Threshold test for Basic test :
Procedure: Given in the beginning of each series given in table.

2. For threshold test: Give 5.8 because depending on the quality of taste. Ask the panelist to evaluate using the threshold scoring card.

Note: The geometric series of solution generally should be used threshold is the minimum concentration of which one can perceive the taste. They are two types of threshold tests.

Direction threshold: It is difference from water where as the solution in concentration series but the basic taste cannot be recognized.

Recognition threshold: By continuing tasting, a concentration is reach where basic taste is recognized correctly.

Terminal threshold: Above certain concentration is reach where basic taste is recognized correctly.

Terminal threshold: Above certain concentration, the increase in concentration content cannot be differentiated. Different threshold is the concentration of at which the difference is recognized.

DISCUSSION :

The panelist was unable to identify i.e. recognize one of the taste i.e. soccer , taste even at higher concentration the detection levels for sweet, salt, souse and bitter are 8 gm., 7.5 gm, 6.5 gm. Respectively. The panelist was unable to recognize the souse taste even at higher connection. So, threshold levels of panelist regarding sources are high indicating low sensitivity for that taste.

CONCLUSION:

By this experiment, we learnt how to conduct threshold tests for basic tastes.

QUESTIONS:

1. How to train the panel members for sensory evaluation of recipe.

REFERENCES:

American, Meynord, Rosemarie, Pang Born and
Roselas, "The sense of taste laboratory studies".
"Principles of sensory evaluation of food Academic press"
Chapter No.46; page No.177 to 289.

5. RANKING, RATING, DESCRIPTION AND SENSITIVITY TESTS AND PREPARATION OF SCORE CARD

TYPES OF TESTS:

Different sensory tests are employed for food evaluation. The tests are grouped into four types.

A. Difference tests.

B. Rating tests.

C. Sensitivity tests.

D. Descriptive tests.

The selection of a particular test method will depend on the defined objective of the test, accuracy desired and personnel available for conducting the evaluation.

A. DIFFERENCE TESTS :

A1. Paired comparison tests:

i. The panel members receive several pairs of samples. These may be different or the same samples in each pair. Samples are always given in code numbers.

ii. Different samples are given in each pair which differ in the intensity of one characteristic, e.g., sweetness, bitterness or rancidity. In each pair, the sample with more or less intense taste will have to be picked out.

* Specimen evaluation card.

Paired Comparison Test

Name : ……………………………………………………………… Date …………………………

Product:………………………………………………………………..

You are given one or several pairs of sample. Evaluate the two samples in the pair for ……………… Is there any difference between the two samples in the pair ?

Code no. of pairs	Yes	No
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Signature

Note : The less preferred sample need not be of poor quality and may still fall in the acceptable category and this should be decided by a separate test.

* Mention the specified sensory characteristic to be studied, e.g. sweetness, texture, flavor or overall quality and used separate cards for each characteristic.

* Source : (For all specimen evaluation cards) : Ranganna, S.1977, Manual of Analysis of Fruit and Vegetable products, Tata McGraw-Hill Publishing Company Limited, New Delhi.

A2. Duo-trio test :

This test employs three samples, two identical and one different. The panel is first given on of the pair of identical samples as known reference sample R and then the other two successively in random order, and asked to match one of these with the first. A positive answer is required even if it is a guess. The chance probability of placing the samples in a certain order is one-half.

Specimen evaluation card

Name : ....   Date :
....

Product :...

The first sample 'R' given is the reference sample.

Taste it carefully.

From the pair of coded sample next given, judge which sample is the same as 'R'

Set No.	Code No. of pairs	Same as 'R'
I	_____	_____\
II	_____	_____
III	_____	_____
IV	_____	_____

Signature

Trained or untrained panelists can be used.

A3. Triangle test:

This test employs three samples, two identical and one different, presented simultaneously to the panel. The judge is asked to determine which of the three is the odd sample. A positive answer is required even if it is a guess. Since all three samples are unknown, the chance probability of placing the sample in a certain order is one-third. Two samples A and B can be presented in two combinations AAB and BBA and for replication in six different arrangements – AAB, ABA, BAA, BAB, ABB and BBA.

Note : With experience it is possible to study another dimension, the degree of difference in this test.

Specimen evaluation card

Triangle Test

Name : .... Date :.............................

Product :...

Two of the three samples are identical. Determine the odd sample.

Set No.	Code No. of samples	Code No. of odd sample	Comment on odd samples
I	_____	_____	_____
II	_____	_____	_____
III	_____	_____	_____
IV	_____	_____	_____

Signature

Hedonic rating test:

Hedonic rating relates to pleasurable or unpleasurable experience. The hedonic rating test is used to measure the consumer acceptability of food products. From one to four samples are served to the panelist at one session. He is asked to rate the acceptability of the product on a scale, usually of 9 points, ranging from 'like extremely' to dislike extremely'. Scales with different ranges and other experience phrases could also be used. The results are analysed for preference with data from large untrained panels.

Semi-trained panels in smaller number are used to screen a number of produces for selecting a few for consumer preference studies.

When pronounced after-effects re met with, precluding testing of a second sample or when independent judgements are sought for, separate cards are used for each product. When relative preference is the object of study, cards with multiple columns for the number of test samples are used.

Specimen evaluation card

Hedonic Rating Test

Name :...

        Date: ....

Product   :...

Taste these samples and check how much you like or dislike each one. Use the appropriate scale to show your attitude by checking at the point that best describes your feelings about the sample. Please give a reason for this attitude. Remember you are the only one who can tell what you like. An honest expression of your personal feeling will help us.

	Code	Code	Code
Like extremely	—————	—————	—————
Like very much	—————	—————	—————
Like moderately	—————	—————	—————
Like slightly	—————	—————	—————
Neither like nor dislike	—————	—————	—————
Dislike slightly	—————	—————	—————
Dislike moderately	—————	—————	—————
Dislike very much	—————	—————	—————
Dislike extremely	—————	—————	—————
Reason	—————	—————	—————

                                                      Signature

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QUESTIONS:

1. Explain in detail about ranking, rating, description and sensitivity tests and preparation of score card.

REFERENCES:

Morr, M.L. "Introductory foods". A laboratory manual of food preparation and evaluation.1970.