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A STUDY OF NUTRITIONAL FUDGE MADE BY USING GHEE EXTRACTS AND ORANGE PEELS

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A shelf life study was undertaken to standardize an innovative product for consumer acceptance. The product designed was Nutritional Choco Fudge, a confectionery food product which is made from edible food waste which we normally don't consume. It is made with zest of orange, ghee residue, chocolate powder and Almond (nut). The product provides good amount of fiber, vitamins and minerals, functional properties (antioxidants) and also has a good satiety value. Shelf life study included sensory evaluation by scoring method based on a five point scale. Evaluation was done on sensory attributes like color, texture, taste, aroma and overall acceptability of the product. The other aspects covered in the study were budgeting, packaging, nutritional labeling and marketing.

Keywords: Ghee extracts, Nutritional fudge, Orange peels, Budgeting, Packing, Marketing

INTRODUCTION

Fudge is a type of confectionery with smooth creamy consistency which is usually made by mixing sugar, butter and milk. The ghee residue fudge is made of ingredients which, although having nutritional benefits are not utilized and extracted. Nutri Choco Fudge is a rich snack which provides good amount of nutrition and satiety value. Ghee residue is often served in parties or other special occasions as it is liked by most of the people. It can be incorporated in various types of recipes with different ingredients. It is a semi- solid product and can take any shape when stored in a container. The product is rich in proteins and antioxidants. Ghee residue and orange zest (candy) are the main ingredients of the delicious product.

Ghee residue is a rich source of lipids, proteins and carbohydrates. Ghee residue can be utilised in a number of products like chocolate burfi, samosa filling, chapattis, etc.

The chemical compositions of different sources are as follows:

The second main ingredient is the orange zest (candy). It is rich in fiber, it has high amount of flavonoids which contains nutritional benefits (Flavonoids are compounds found in many foods. They are known to have antihypertensive and anti-inflammatory effects, which relieve pressures on the heart. Orange zest contains vitamins A, C B6 and B5; calcium; riboflavin; thiamine; niacin and folate.

- * A study conducted by Kawthar AE Diab (2015) observed many beneficial effects of orange zest in cancer. It has antioxidant, high in vitamin C and A and anticarcinogen.
- * A study conducted by Jae – Hee Park (2014) observed activity of antioxidants of orange zest and how the phytochemicals in the fruits skin helps in preventing hypertension, diabetes, heart disease, cancer, etc., he trapped the orange zest and applied varies test to see the activities of antioxidants.

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Source of ghee-residue	Average % fat of source	Chemical composition (%)					Yield (Kg/100 Kg source)
		Moisture	Fat	Protein	Lactose	Ash	
<u>From buffalo milk</u>							
Desi butter	77.0	13.4	33.4	32.8	15.4	5.2	1.6
Creamery butter (unsalted)	85.0	5.7	65.0	25.5	Trace	3.8	1.2
Sweet cream	67.0	4.1	63.2	18.0	12.3	2.4	7.7
Sour cream	67.0	8.0	38.8	41.6	7.3	4.3	5.1
Washed sweet cream	71.0	1.7	80.8	16.2	Trace	1.3	3.5

Almonds are also added in the fudge to increase its functional value. The health benefits of almonds are extensive, and they are frequently used as a healthy solution for relief from constipation, respiratory disorders, coughs, heart disorders, anemia, impotency, and diabetes. It also helps in maintenance of healthy hair, skin care (psoriasis), and dental care. It also has anti-inflammation properties and helps to fight cancer.

* A study conducted by Stephaine Nishi, 2014 observed that regular consumption of almonds showed decrease risk of CHD.

The benefits of the product is summarized as follows:

1. It has a good nutritional value,
2. It is easy to make and prepare
3. It is cost efficient
4. Edible food waste with functional properties is being utilized.
5. The product can be stored for a longer duration of time in a cool place, as it has a good shelf life and can be consumed by all age groups.

Thus the present study had the following objectives:

- 1) To develop and standardize a product with consumer acceptance.
- 2) To analyze the shelf life of the product and check the degradability.
- 3) Packaging, labeling and marketing of the product to check consumer acceptability.

MATERIALS AND METHOD

Different ideas were considered for making product like laddos, barfi or making a powdered form of the product to use in soups or vegetables before deciding on making a fudge including nuts in it to improve its nutritional value more and to provide a satiety value.

Sources of Raw Materials

The raw materials such as ghee residue (milk solids), orange zest (candy), chocolate powder, rose water, caster sugar, almonds, etc., were procured from the local market. The Table 1 shows the amount of ingredients used for preparation of the product.

Preparation of Nutri Choco Fudge

Nutri chocofudge for type I was made simple with just ghee residue, chocolate powder, rose water, orange zest (candy) and caster sugar for sweetness. After evaluating

it was found to be simple in taste, and the texture of the product was grainy in appearance and not extravagant. Further, the type II product was made with high amounts of orange zest and chocolate powder to improve flavor and almonds were added to improve nutritive value. But lacked smooth texture.

Ingredients	Type I	Type II	Standardization
Ghee residue (milk solids)	20 g	20 g	20 g
Orange Zest (candy)	3 g	5 g	5 g
Chocolate powder	3 g	3 g	5 g
Rose water	¼ tsp	¼ tsp	¼ tsp
Milk	-	-	15 ml
Caster Sugar	½ tsp	-	½ tsp
Almonds	-	1 g	1 g

Sensory Evaluation of Standardized Recipe

Ranking test was carried out for type I, type II and standardized product. 24 naïve panelists participated in the evaluation.

RESULTS AND DISCUSSION

The results of the evaluation were:

Type I: 25%

Type II: 33.33%

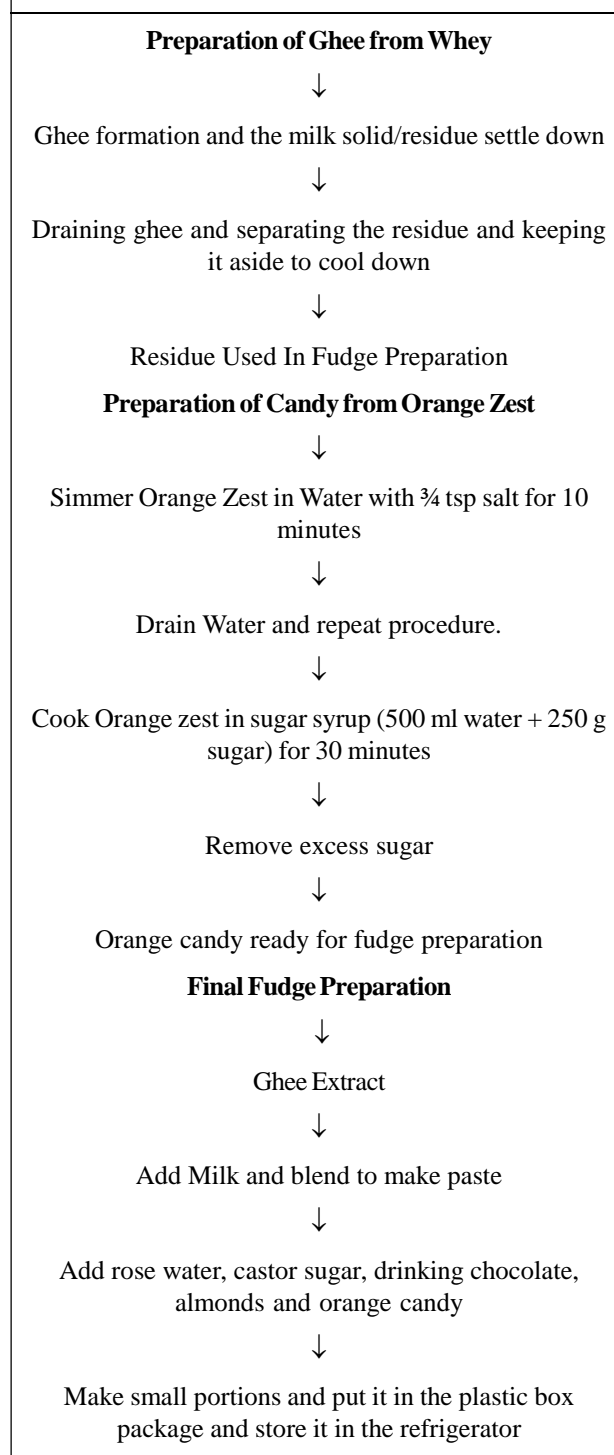
Standardized: 41.67%

After assessing the drawbacks of the products the final product was made by adding the mixture in the grinder and making it into a thick paste without any granules in the ghee residue because it is the base of the fudge, addition of almonds cut into fine Julian pieces as it is a functional food, along with the other Ingredients and thus the product was Standardized.

SENSORY EVALUATION OF NUTRI CHOCO FUDGE

Scoring test was done with the help of naïve panelists.

Figure 1: Flow Chart for the preparation of Nutri Choco Fudge



Attributes to be considered were Color, Texture, Taste and Aroma which were scored Based on composite scoring.

Figure 2

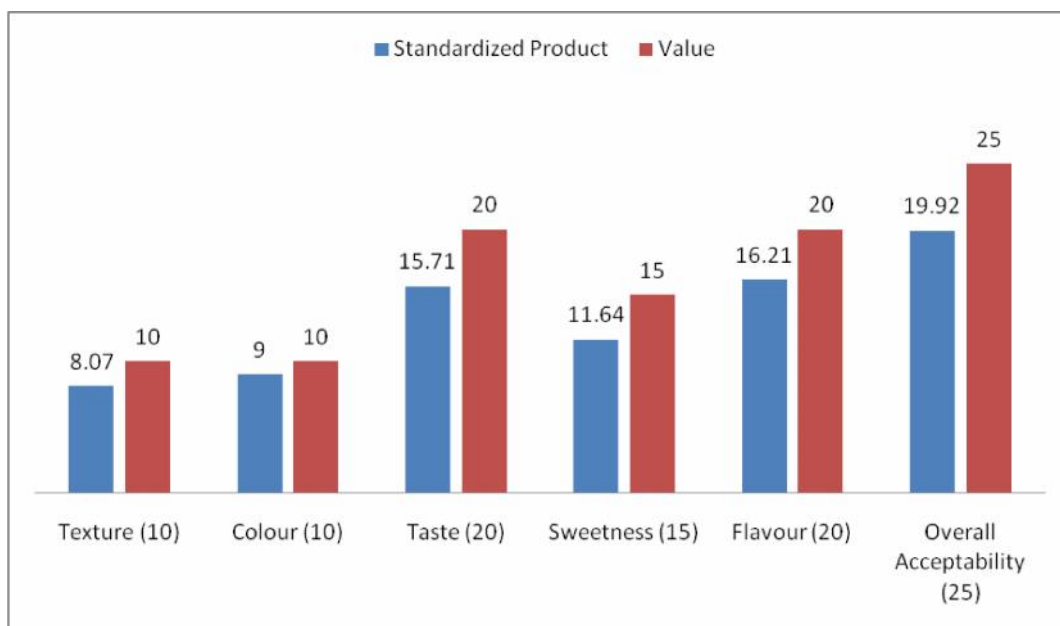
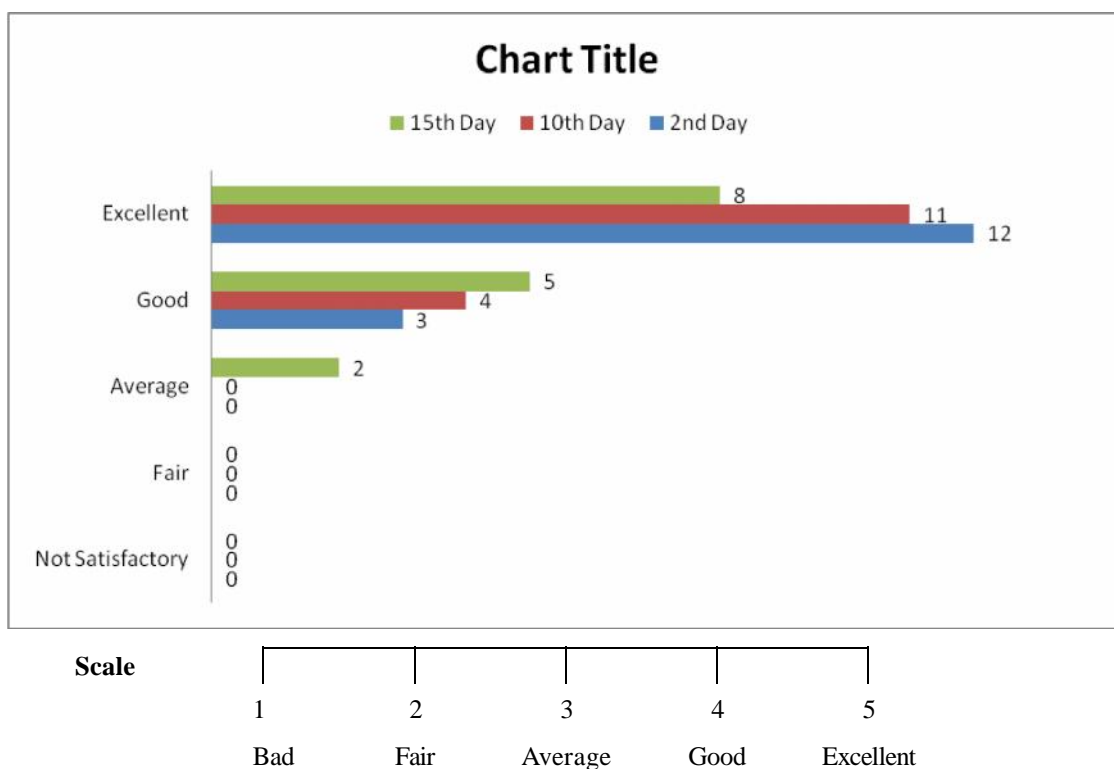


Figure 3: Graph for Overall Acceptability



RESULTS AND DISCUSSION

The sensory evaluation of the Nutri Choco Fudge is seen as follows:

It was observed that taste and texture of the fudge was scored very well and also colour and texture scored well. Thus the product had a good acceptability and was finalized to continue the shelf life.

SENSORY EVALUATION FOR SHELF LIFE STUDY

To study the shelf life of Nutri Choco fudge, sensory evaluation was conducted every 5 days which was done by Naive panel members (total no.= 15). Scoring test was done with the help of naive panelist. Attributes to be considered were Color, Texture, Taste and Aroma and scored out of 5 where 5 = Excellent, 4 = Very good, 3 = Good, 2 = Fair, 1 = Poor.

The test showed that the product was considered at best quality on the second day of manufacture the by 15th day, the quality was lightly lowered and majority of the panelist found it to be good. Hence it was observed that the product lasts in its best quality until 10 days from manufacture, after which slight change in color and flavor was noticed.

Proximate Analysis

About 30 gms of fudge was (1 serve.) was determined as energy – 68.49 kcals, proteins – 1.25 g and fats – 0.79 g respectively.

Nutrients	Amount
Energy	68.49 kcals
Protein	1.25 g
Fats	0.79g

Packaging Material: Polyvinyl Chloride

It is also known as PVC it also has excellent organoleptic properties which means that it imparts no taint or taste to foodstuffs. It captures the aroma and is air tight. Different forms of PVC are used in different work areas.

It is normally tough and, often opaque. It has a good resistance to sunlight, air, relative humidity. The main idea to use this packaging material is because it is cost-effective and as resistant to other sources.

Nutritional Labelling

A nutritional label is designed for the product as it is an

Figure 4: Packaging material: Polyvinyl Chloride

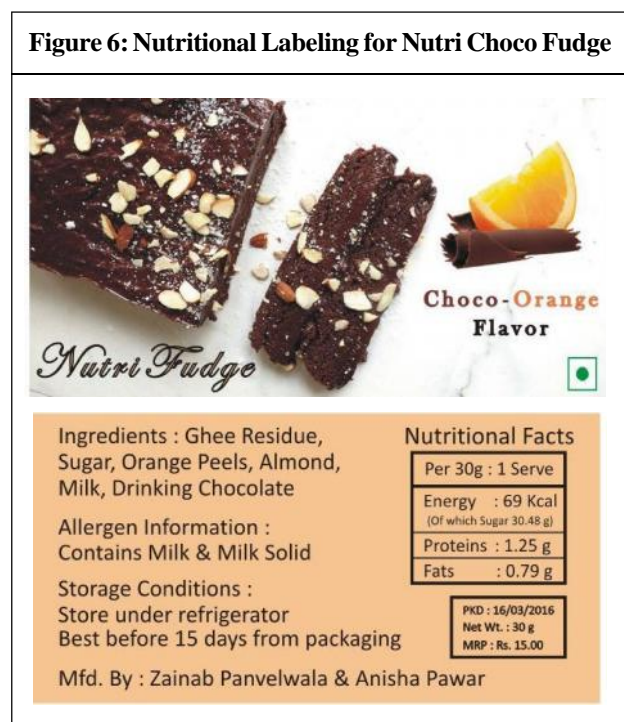


Figure 5: PVC Packed Nutri Choco Fudge



important process in the food processing chain and label is the first point of contact between a consumer and the producer. It is used to identify one product from another and to decide over which product to purchase. The label displays Ingredients, Nutritional Information, Net Weight, Manufacturing or Packaging date, Expiry date, Price, Benefits, etc. This helps to enhance the products sale by innovation for good marketing and to attract more customers.

Nutritional Labeling for Nutri Choco Fudge shown in figure:



Budgeting

Budgeting is an important component to achieve financial success. It makes it easier for people with incomes and expenses of all sizes with conscious decisions about the allocation of money. For the Bulk Production, food ingredients were bought from the wholesale market to reduce the expenses and increase the Profitability.

Packaging material was also bought in bulk, as to reduce cost.

Cost calculation for the ingredients used for Nutri Choco Fudge Per Box (30 g)

Ingredients	Whole Sale Price (Rs.)
Ghee residue(milk solids)	(20 g) 2

Orange Zest (candy)	(3 g)0.5
Chocolate powder	(5 g)3
Rose water	(1.26 ml) 3
Milk	(15 ml) 0.78
Caster Sugar	(2.5 g) 0.15
Almonds	(1 g) 0.6
Packaging material	2
Label Printout	2
Gas	2
Electricity	1
Labour	2
Total	19.03

Total 30 packets were made and all the packets were sold. Total cost for production of Nutri Choco Fudge was Rs. 19.0/-, per packet price the sale was Rs.20/- p.p. After selling the product total gain was Rs. 600/- out of which profit was Rs. 30/-. The ingredients were purchased at wholesale price to reduce input cost.

CONCLUSION

Nutri Choco Fudge is a product providing variety of nutrients and can be recommended for all age groups as it has good biological value proteins. It has a shelf life of 15 days and it should be stored in cool temperatures.

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