



Volume 8, Issue 3,

July 2019,

www.ijfans.com

e-ISSN: 2320-7876

**INTERNATIONAL JOURNAL OF FOOD AND
NUTRITIONAL SCIENCES**

IMPACT FACTOR ~ 1.021



Official Journal of IIFANS

Research Paper

Open Access

SHELF LIFE STUDY OF A PRODUCT-NUTRILACTO BITES

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A shelf life study of a nutritious product was standardized for lactating mothers with an aim to improve breast feeding by mother. WHO states that breastfeeding for 6 months is important for optimal growth of the child. Diet of lactating mother and nutritional status during pregnancy affects quality and quantity of breast milk. Galactogogues are foods which promotes lactation in humans and other animals. So a healthy snack was developed-“Nutralacto Bites” in order to promote lactation. The main ingredients used in this product are whole wheat flour, malted ragi bran along with almonds, cashew nuts, coconut, pistachio, edible gum, poppy seeds, pival seeds, sunflower seeds, date powder, sugar, and ghee and nutmeg powder. “Nutralacto Bites” had enough amount of energy, carbohydrates, fats, and total fibres along with good amount of Omega-3 fatty acid, Folic acid, B-complex and vitamin A. A shelf life study for 1 month was done by sensory evaluation using scoring test-hedonic scale on attributes such as appearance, texture, taste, after taste, overall acceptance. Microbial analysis and moisture content was done in order to ensure food safety. Other aspects covered in the study was packaging, labelling, budgeting and marketing.

Keywords: Nutralacto Bites, Lactation, Galactogogues, Nankhatai

INTRODUCTION

‘Nutralacto Bites’ are kind of nankhatai which is an Indian sweet, shortbread biscuits. This product can prove to be good for lactating mothers. This was made to improve milk production in the lactating mothers. As, in India, as per ‘National Family Health Survey -4’ (2015-16) only 54.9% children were exclusively breastfed until 6 months (Deepika Kinhal, 2018).

The objective of the study were

- To innovate a traditional recipe for lactating mothers.
- To standardize a product which is cost effective and acceptable and storable.
- To study the shelf life of product using sensory evaluation.

- To learn how to design a nutrition label.
- To find a cost effective packaging material.

After a brainstorming session many products were thought off like: lactose-free yogurt, Soup premix, whey protein powder. Residue of ragi bran which was derived from preparation of soup premix was used to make Nutralacto bites. Nutralacto bites were finalised after sensory evaluation test which was made as a galactogouge. Galactogouges are substances used to induce, maintain, and increase milk production in human beings (Felipe Penagos Tabares *et al.*, 2014).

In this study nankhatai was made using different ingredients like whole wheat flour, malted ragi bran along with almonds, cashew nuts, coconut, pistachio, edible gum,

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poppy seeds, piyal seeds, sunflower seeds, date powder, sugar, ghee and nutmeg powder.

Base to prepare nankhatai was whole wheat flour and malted ragi bran it has high fiber content and vitamin B-complex (Marasco, 2008). The millets are source of antioxidants, like phenolic acids and glycosylated flavonoids. Millet foods are characterized to be potential prebiotic and can enhance functionality of probiotics with health benefits. The bran of millets contains high amount of fiber and phytochemicals (Issoufou Amadou *et al.*, 2013). The techniques like malting, roasting not only reduce the effects of inhibitors but also increases the bioavailability of certain minerals like calcium and iron (Singh and Raghuvanshi, 2012). High calcium food such as nuts and seeds are also good source of omega-3 fatty acid. Nutrition of mother during pregnancy and lactation affect infant's nutritional status to larger extent. Omega 3 fatty acids are important for brain development and function of infant. After birth, breast milk is only source of polyunsaturated fatty acids. The content of polyunsaturated fatty acids in breast milk depend upon the intake of these fatty acids in diet (Rombaldi Bernardi *et al.*, 2012). Sunflower seeds, piyal seeds and coconut are powerhouse source of nutrients that helps in milk production (Kristina Martin, 2015).

Nutmeg powder is used to enhance the flavour in order to make it acceptable. Nutmeg powder is natural antioxidant and is an antimicrobial (Ashish Deep Gupta and Deepak Rajpurohit, 2011).

Dry date powder is good substitute of sugar. This can be helpful to improve the shelf-life. It is high in fiber, minerals and dense in carbohydrates. Dates are also good source of vitamin B-6 and folic acid (Annamalai Manickavasagan *et al.*, 2015).

Ghee is more acceptable than butter due to its characteristic flavour. Ghee has stable shelf-life largely because of its low moisture content and possible antioxidative properties. Ghee may contain high amounts of conjugated linoleic acid, which is anticarcinogen (Mohammed Serunjogi *et al.*, 1998).

STANDARDIZATION

Many food products were thought off like: lactose free yoghurt, soup premix, whey protein powder, etc. Soup premix was made using malted ragi and rice flour, moong dal flour, dehydrated tomato, carrot, spinach, garlic, ginger, curry leaves powder, pumpkin seeds, kasuri methi, black pepper,

salt, chilli powder, sugar. Sensory evaluation test for soup premix was carried out, it was not acceptable because appearance of soup was not accepted. While preparation of soup premix ragi bran was extracted. After making a soup the residue of ragi was used for the present food product development. Nankhatai was made using ragi bran which was made as a galactagogue.

MATERIALS

The final standardized product comprised of malted ragi bran, wheat flour, almond, cashewnut, pistachio, dry coconut, dink, poppy seeds, piyal seeds, sunflower seeds, dry date powder, ghee, sugar, nutmeg powder.

All the nuts were roasted to increase the acceptance. Roasting is a traditional step in processing tree nuts and oilseeds a wide range of products. Due to this step lipid oxidation, critical factor in limiting shelf life, may be controlled by minimizing changes of nut microstructure (Rainer Perren and Escher, 2013).

Standardised Product

Table 1: Amount of Ingredient Used for Standardization	
Ingredients	Amounts
Ragi	8.3
Whole Wheat Flour	12
Sugar	18.85
Ghee	21.3
Nutmeg	0.2
Almonds	1.85
Cashewnut	1.65
Poppy seeds	0.45
Pistachio	0.45
Coconut	2.35
Dink	0.55
Charoli	1.15
Sunflower seeds	1.15
Dates	4.7
Total	74.95

Method of Preparation

Malt ragi and then grind it. Separate the flour from the bran.
↓
Mix whole wheat flour + malted ragi bran + powdered sugar
↓
Chop almonds, cashewnuts, and pistachio. Grate dried coconut.
↓
Roast dink in ghee followed with other nut and dried coconut.
↓
Mix whole wheat flour + malted ragi bran + powdered sugar + nuts + dink + ghee + nutmeg powder
↓
Mix well and make dough. Preheat the oven at 160 degree.
↓
Roll it into round shape and cut nankhatai using moulds.
Add Piyal seeds and sunflower seeds on top.
↓
Spread nankhatai on baking tray and bake nanakhatai at 160 degree for 15 minutes. Nankhatai is ready to serve.

SENSORY EVALUATION RESULTS

Sensory evaluation of the product was done in order to check the acceptability and it was done periodically for four weeks to check the acceptance. The scale used was hedonic scale with 7 point rating scale. Characteristics evaluated were appearance, texture, taste, after taste, and overall acceptability.

Scoring out of 7 where, 7 = Like Extreme, 6 = Like very much, 5 = Like slightly, 4 = Neither like nor dislike, 3 = Dislike slightly, 2 = Dislike very much, 1 = Dislike extremely

Result of sensory evaluation for acceptability after standardisation is shown in the Figure 1.

Above figure shows that, all the attributes were between 5-6.6. This means the product was between like slightly to like very much. So, the product was acceptable.

Result of sensory evaluation for shelf life by periodic testing is shown in the Figure 2.

The above graph shows that during 4 weeks test, in all the attributes the results were almost equal in fact in attributes like appearance and overall acceptability the result were good then the previous test. Therefore considering all the attributes which were between 5 and 6.7 that is between like slightly and like very much. This shows the product was acceptable and the product can stand out in the market.

Figure 1: Standardisation Sensory Evaluation

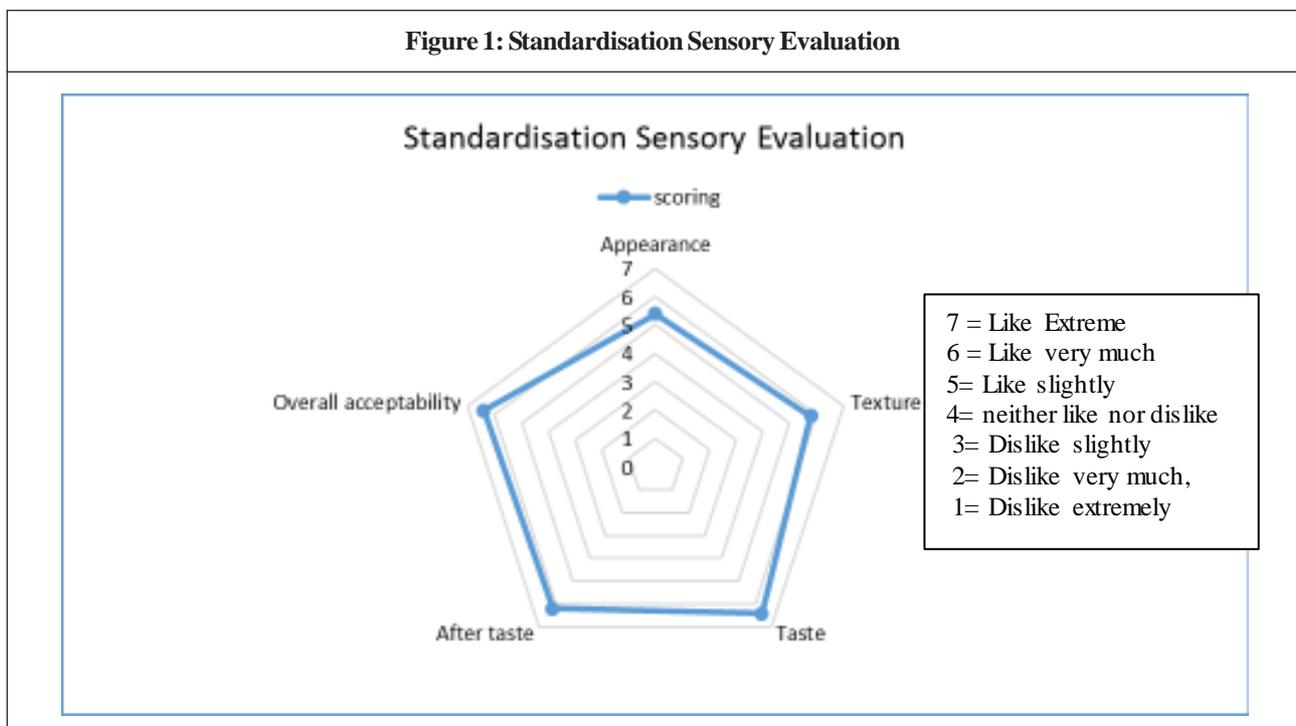
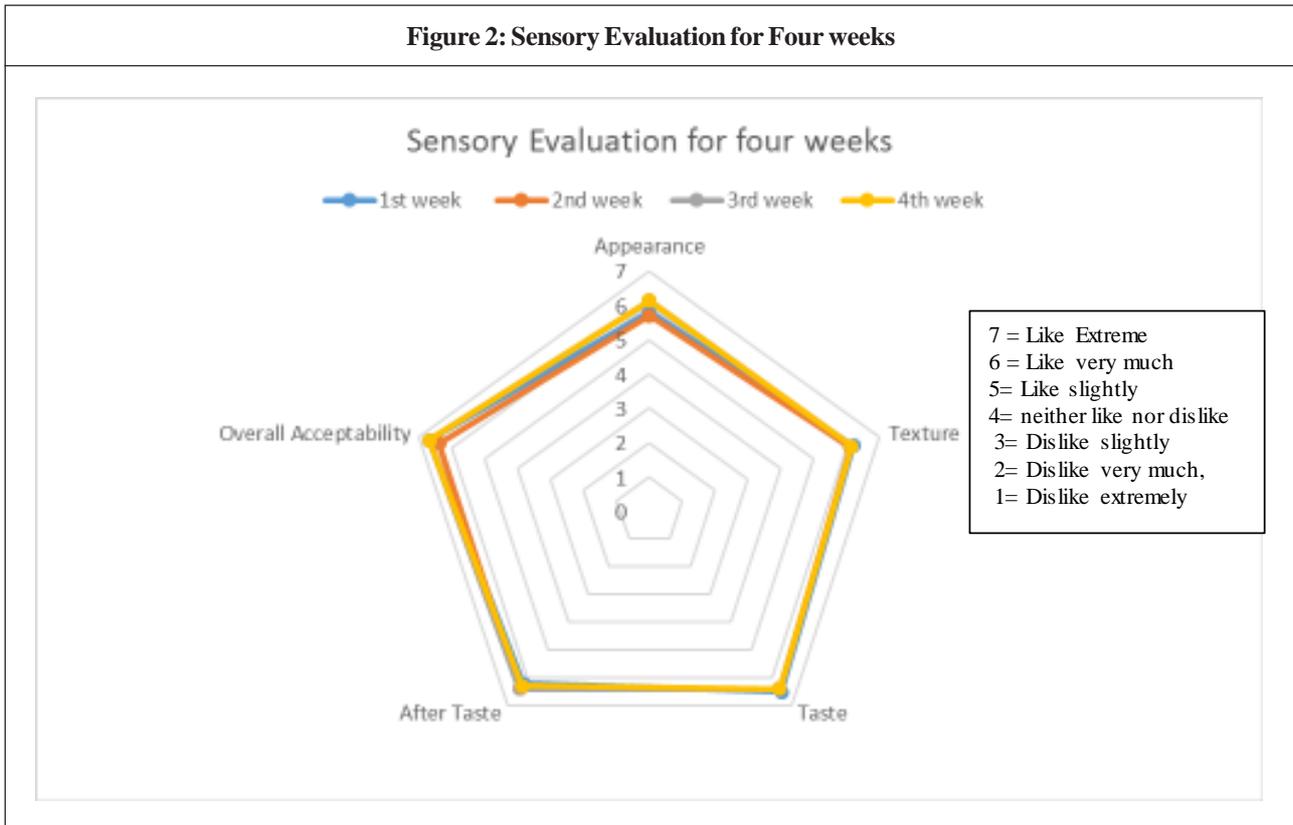


Figure 2: Sensory Evaluation for Four weeks



MICROBIAL ANALYSIS

Microbial analysis of food is to ensure the food safety as contamination can lead to food poisoning. To support shelf life study microbial analysis was carried out.

Microbial analysis was conducted on freshly prepared product and stored product over 4 weeks to check shelf life. Analysis was carried out using “Pour plating method”. Nutrient agar was used to carry out this analysis. The result was checked by total plate count of microbial colonies using colony counter.

From the above table it can be concluded that it is safe for consumption till 4 weeks also it has good shelf life.

MOISTURE ANALYSIS

In the city like Mumbai it is so humid and biscuits can catch

Table 2: Result of Pour Plate Method

Sample	Plate-1 (Freshly Prepared)	Plate-2 (Week-4)
Number of colonies	32	130

moisture very quickly when they are exposed to such kind of atmosphere. Low moisture contain ensure that product is generally free from microbial spoilage. If the moisture content is high self-life will reduce as it will absorb moisture from the atmosphere. To check moisture content of product FSSAI method were used. Sample was made into powder. 5 grams of sample was weighed accurately in dish. Dish was placed in oven at 105 degree Celsius for 4 hours. Dish was cooled in desiccator and weigh. Process of drying was repeated at 30 minutes interval and till constant reading or

Table 3: Result of Moisture Analysis

Sample	Weight of Crucible (W)	Weight of Sample	Total Weight (W1)	After 4 Hours (W2)	After 30 mins (R1)	After 30 mins (R2)	After 30 mins (R3)
Freshly prepared sample	19.83	5	24.83	24.44	24.44	24.44	24.44

difference is less than 1 mg was observed result are as follows:

Above result states that the moisture content is about 7.8% according to the result it can be concluded that it has slightly high moisture to ensure food safety, the products should be kept in dry and airtight container.

NUTRITIONAL LABEL

Nutritional label helps you to make food choices which are best for your health. Nutritional label is designed to provide facts for nutrients that impact common health concerns.

A nutritional label was designed for Nutrilacto Bites which contains the information like net weight, price, whether the product is vegetarian or non-vegetarian, manufacturing date, major nutrients present in the product like energy, carbohydrate, fat, total fibre, omega 3 fats, folic acid, B complex vitamins and vitamin A. The label also includes contact information.

Table 4: Nutritive Value Table

Nutrition Value per Pack	75 gm
Energy	402 kcals
Carbohydrates	37.2 gm
Fat	26.4 gm
Total Fiber	4.17 gm
Omega- 3 fats	14.2 mg
Folic acids	2.1 mcg
Thiamine	0.1 mg
Riboflavin	0.04 mg
Niacin	0.6 mg
vitamin A	61.9 mcg

Nutrilacto Bites

100% veg

Net weight: 75 Gms

MRP: 35/-

MFD:

Best before: 1 month from manufacturing date

Contact information: puva361998@gmail.com ,
palvibhosale2009@gmail.com

Below is the Figure 3, which shows the front side of nutrition label.

Below is the Figure 4, which shows the back side of nutrition label.

Figure 3: Front Side of Nutrition Label



Figure 4: Back Side of Nutrition Label



PACKAGING

The principal function of food packaging are to protect food products from outside influences and damage, to contain the food, and to provide consumers with ingredient and nutritional information (Kenneth Marsh and Betty Bugusu, 2007). Though silver pouches are not eco-friendly but they are cost effective and therefore they are used in this study.

Premium silver pouch is made up of 12 micron metalized polyester laminated with 20 micron natural or LDPE (low density polyethylene).

It can resist the temperature up to 100 degree Celsius, it is non-toxic and leakage proof. The dimensions of silver pouch are accurate.

Silver pouch ensures protection from compression, temperature, and other issues. It also provides contact against oxygen, water vapour, dust, moisture and other food contaminants.

Silver pouches are used for packaging of biscuits, snack food, frozen or sea food, etc.

BUDGETING

In order to reduce the cost the ingredients were bought on wholesale prices. Table 5 shows all the prices for raw

Ingredients	Price
Ragi	11.25
Wheat Flour	10.71
Sugar	22.84
Ghee	335
Nutmeg	9
Almonds	45.6
Cashewnut	36
Poppy seeds	14.5
Pistachio	28.6
Coconut	21.3
Dink	18
Piyal seeds	43
Sunflower seeds	14.4
Dates	28.6
Labour	10
Packaging material	18
Label	150
Electricity	10
Rent	10
Bakery	60
Gas	30
Total	926.8

materials, packaging and miscellaneous expenses for 30 packets.

The final costing was Rs 30/- for each packet considering the profit margin of Rs 5/- the product was decided to be sold at Rs 35/- . Total costing for Nutrilacto bites is Rs 926.8/- for 30 packets with expected profit of Rs 123.2/-.

CONCLUSION

Thus it can be concluded that Nutrilacto bites can be given as galactagogues for lactating mothers as it contains good amount of omega 3 fatty acids, folic acid, B complex vitamins and vitamin A. Shelf life can be increased by adding any class 1 preservative. It requires longer duration studies to be done. If made in large quantity it can give you a good profit margin.

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