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Research Article

Shelf Life Study and Acceptability of Calpro Ladoo

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Abstract

A successful attempt was made to standardize and assess the shelf life of an innovative nutritious product calpro ladoo for its consumer acceptance, After brain storming and coming up with various innovative products such as Multi grain galactogouge ladoo, Karanji etc, a nutritionally rich Calpro ladoo was finalized and standardized as it had a better consumer acceptability. Calpro ladoo majorly contains Ragi which will partly fulfil the requirement of calcium. Besides calcium it also provides fair amount of protein, fat, iron, phosphorus and fibre. Shelf life study included sensory evaluation by scoring method based on a five point scale. Evaluation was done on sensory attributes like appearance, colour, texture, taste, and odour. Microbial analysis was carried out to see its shelf life. The other aspects covered in the study were packaging, budget, nutritional labeling and marketing.

Keywords: Calcium Rich; Ragi; Food Product; Calpro Ladoo

Introduction

The modern food industry has developed and expanded because of its ability to deliver a wide variety of high quality food products to consumers on a nationwide and worldwide basis. This feat has been accomplished by building stability into the products through processing, packaging, and additives that enable foods to remain fresh and wholesome throughout the distribution process. Consumer demands for convenience have fuelled new innovations in the food product development, packaging and chemical industries, and the widespread desire for products to use in the microwave oven has added further impetus to this effort. Shelf-life studies can provide important information to product developers enabling them to ensure that the consumer will see a high quality product for a significant period of time after production. of course long shelf life studies do not fit with the speed requirement and therefore accelerated studies have been developed as part of innovation.

There was a time in early 19th century when nutritional deficiency diseases like pellagra, goitre, rickets, scurvy were widely prevalent among the people. This lead to fortification of foods with β complex and C vitamins in late 19's to address the issue. To further improve the nutritional status of the population development of novel and nutritious innovative Food products were designed [7].

Dr. B.M.N College of Home Science under the syllabus of Food Product Development which had an objective of developing Entrepreneurship skills gave us an opportunity to develop an innovative low cost nutritious product.

Ragi also known as Finger Millet is widely produced in Asia and Africa, Botanical name for Ragi is "Elucine Coracana". Ragi is considered as rich multi nutrient millet in India, and is cultivated from ancient times in India [1]. The calcium content is higher than all the cereals. Ragi has best quality protein along with the presence of essential amino acids, vitamin A, B and phosphorus [2]. Ragi is a boon to people suffering from diabetes as it has hypoglycaemic effects. It is good for obese people as its digestion is slow and glucose is released very slowly into the blood [9]. Since Ragi does not contain gluten it is also beneficial to the gluten- sensitive people.

Ladoo is one of the most sought after products which are relished by almost every age group. It is long lasting and has an excellent shelf life. Many foods can be added to increase its nutritional value without blemishing its taste.

Ragi now a days is an abandoned food in our diet as millets are not a sought after item. It is slowly finding its place in the kitchens in Multigrain attas. As it is low cost and is a source of calcium, we

decided to make a ladoo and named it CALPRO ladoo. CALPRO ladoo majorly contains Ragi which will partly fulfil the requirement of calcium. Besides calcium it also provides fair amount of protein, fat, iron, phosphorus and fibre [2].

Objectives

- To identify and modify a nutritious product which will be accepted by the consumer of all age groups.
- To standardise the given product using sensory analysis.
- To design a nutritional label
- To select a proper packaging material
- To study the shelf life of the given product by sensory evaluation and microbial analysis.
- To understand the budgeting, and marketing aspects.
- To develop Entrepreneurial skills.

Methodology and outcomes

Before standardisation of CALPRO LADOO two more products were tried out. These products targeted lactating mothers because the ingredients used in them were galactogogues such as til, shatavari, fenugreek seeds etc and the products were rich in protein.

The products were sensory analysed by trained panel members on the basis of appearance, colour, texture, taste, and odour on a 5 point scale. The products were as follows:

1. Multigrain ladoo incorporated with galactogogue: the product was scored low because of the aftertaste.
2. Karanji: karanji was stuffed with a mixture of ingredients used in ladoos but it was not very appealing.
3. Calpro Ladoo: Ragi was the main ingredient of this ladoo with other dals, pulses, nuts, ghee, etc. this product ranked the highest in terms of all the characteristics analysed. Thus, the present study was designed using CALPRO ladoos.

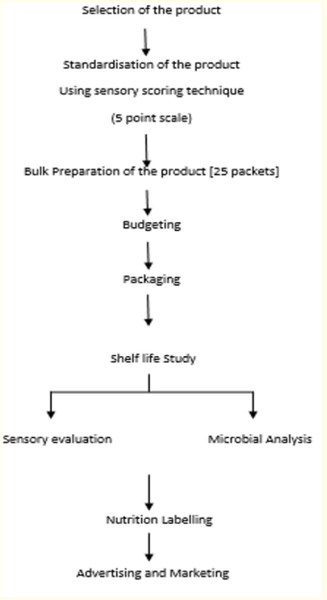

Figure a

Standardization

Ingredients	Amount
Ragi	1 kg
Wheat flour	200 gm
Bengal gram dal	300 gm
Whole green moong	200 gm
Green gram dal	200 gm
Poppy seeds	50 gm
Dry coconut	100 gm
Dry dates	250 gm
Almonds	50 gm
Sugar	750 gm
Ghee	1 kg

Table 1: Calpro Ladoos - (for 90 ladoos).

Recipe

Preparation

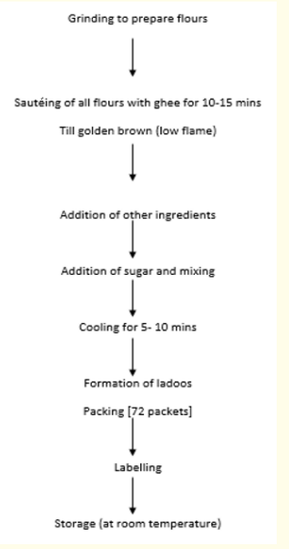

Figure b

Figure 1: Sensory Evaluation Scores of Standradised Calpro Ladoo.

Calpro Ladoo were sensory evaluated by 6 trained panel members on the following characteristics using a 5 point scoring method on following attributes:- Appearance, colour, texture, taste and odour.

The observations from Figure 1 is as follows:

- **1st week:** It can be observed that taste and odour ranked the highest when compared to appearance, colour and texture which were fairly acceptable.
- **2nd week:** Compared to the 1st week appearance and colour were ranked high maybe because of absorption of ghee by ladoo, texture and odour got less marks maybe because of corse flour of ragi and taste was still the same.
- **3rd week:** Appearance, colour, taste scores came down because of unpleasant colour and taste of ragi. Texture and odour were same as in 2nd week.
- **4th week:** Scores of appearance declined day by day and colour, texture, taste, odour were same as 3rd week.

Microbial test

Microbiological testing is almost always an integral part to assure the safety of food. Microbiological tests such as testing for pathogens and spoilage organisms are required. This way the risk of contamination under normal use conditions can be examined and food processing outbreaks can be prevented.

Microbial test were conducted periodically to check the shelf life of the product over 3 weeks using serial dilution (dilution factor: -10^{-2}) using pour plating method. Nutrient Agar was used to do the pour plating. The results were checked by Total Plate Count of the microbial colonies. From the table 2, it can be concluded that the product had a good shelf life.

Days of test	Colonies of micro organisn found
7th Day	3-4 colonies
14th Day	6-7 colonies
21st Day	8-9 colonies

Table 2: Microbial test results.

Food labelling

Labelling is an important process in the food processing chain and should not be overlooked. The label is the first point of contact between a consumer and the producer. It is used to identify one product from another and also to make a decision over which product to purchase. The label is therefore the most important marketing tool for a product. It should be attractive and eye catching while at the same time being informative. A dirty, confused, untidy label will not help to sell a product [10].

Small scale food processors should aim to label their products with the best label they can obtain or afford in relation to the value of the product.

The purpose of a food label:

- To provide consumers with information on the product
- To advertise the product
- To distinguish the product from that of competitors (establish a brand)
- It is a legal requirement

Figure 2: The Nutritional Label designed for Marketing.

Packaging

Packaging includes a co-ordinated system of preparing goods for transport distribution, storage, retailing and use, a means of ensuring safe delivery to the ultimate consumer in sound condition at optimum cost and a techno-commercial function aimed at optimising the cost of delivery by maximising sales [5].

Functions of packaging:

- Containment
- Protection
- Convenience
- Communication

Polypropylene:

- Linear polymer containing little or no unsaturation.
- It has low density (900 kg $m^{-}3$)
- Higher softening point (140 to $150^{0}C$) than the polyethylene.
- High tensile strength.
- High chemical resistance.

- High temperature performance than High Density Polyethylene.
- Very low permeability to moisture, vapour and gas.
- High transparency.
- Chemical inertness.
- Low cost [6].

Considering all the above points polypropylene was selected as a packaging material for these ladoos.

Budgeting

Budgeting is one important aspect for deciding price and profit margin of the product.

Food budget means a right way of spending money on food. Budgeting helps in providing insight to where your money is being allocated and how to most effectively manage it. It helps in achieving a target and to gain maximum profit. For bulk production all the ingredients were taken from whole seller to reduce the cost.

Budgeting of the product was carried as per 72 packet of CALPRO LADOOs. Each packet contained 60gms (2 pieces) which costs Rs 20.

Items	Rs
Ragi	60
Green whole moong	20
Bengal gram dal	50
Dry dates	50
Poppy seeds	80
Dry coconut	16
Sugar powder	54
Ghee	450
Wheat flour	10
Almonds	75
Packaging	50
Gas and making charge	75
Total	990

Table 3: Budgeting for 72 packets.

The profit per packet is Rs 6.25. Budgeting for 1000 packet the cost price will be Rs 20000 and the profit earned will be Rs. 6250. It can be a viable product as the profit margin is quite acceptable and it can be taken up as an entrepreneurial venture.

Marketing of the product

The product was made on a medium scale (neither large nor small) and advertised within the limits to an approximately 1200-1500 students and subsequently marketed among the student. And it was observed that most of the population liked it [3,4,11].

Discussion and Conclusion

Although the taste and colour of ragi is not very appealing, CALPRO LADOO's were found to be highly accepted by the consumers because it had ghee, coconut, nuts which made it acceptable due to its taste and aroma. Suggestions came for improving the colour of the ladoo, but it was not possible as the product was made keeping in mind that it should not contain any artificial colour, flavouring agents and preservatives. The product had a good shelf life.

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