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## MULTINUTRIENT LADDU

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Multinutrient laddu (galactagogue) was developed and standardized largely for the lactating mothers. The laddu composed of Pearl millet (bajra flour), Edible gum (dink), Jaggery, Ground nut, Dry coconut, Dry dates, Fenugreek seed powder, Rava, Cardamom powder, Oil. Ranking test was used for standardization of the product. Sensory evaluation was carried out before packaging to assess the acceptability and attributes such as texture, taste and sweetness using the composite scoring test with the help of semi trained panelists. Microbial analysis was also carried out for two week to know whether the product keep well. Other aspects such as a packaging, a nutrition label, budgeting and marketing were also covered in this study.

**Keywords:** Multinutrient laddu, Galactagogue, Lactating women, Fenugreek seeds, Edible gum, Sensory evaluation, Standardization, Microbial analysis, Shelf life

### INTRODUCTION

Development of a Multinutrient laddu for lactating women was prepared as part of Undergraduate studies with added functional foods which would increase the breast milk output such as fenugreek seed powder, edible gum, etc. A study by Ghasemi *et al.* (2015) observed that fenugreek seed powder improved the breast milk output. "Use of edible gum was believed to increase the breast milk of lactating women" (Barrian Morris, 1996). "Edible gum was a potential alternative food energy source especially in feeding programs for the lactating and pregnant mothers" (Tiwari and Sharma, 1989).

Other ingredient in the laddu was dry coconut; Limited research suggested that coconut improves infant's nutrition (Seema Kumar, 2002). Pearl millet (Bajra flour) was also one of the ingredients of multinutrient laddu which had many medicinal uses such as treating anemia, constipation, diabetes, bone growth development and repair, weight loss, antiallergic properties. It had dietary carbohydrate, omega 3 fatty acid, omega 6 fatty acid, vitamin A, B complex

(Thiamine, Riboflavin and niacin), vitamin C, vitamin E, vitamin K, folate, panthothenic acid, calcium, iron, magnesium, phosphorus, potassium, sodium, zinc. Copper, manganese, selenium, protein. Pearl millet was a rich source of energy comparable with commonly consumed cereals (Shweta Malik, 2015; and [www.foodofy.com/pearl-millet.html](http://www.foodofy.com/pearl-millet.html)). Other ingredients included were Ground nut, jaggery, rava, dry dates which contain vitamins and minerals ([www.nutrition-and-you.com/peanut.html](http://www.nutrition-and-you.com/peanut.html) and <https://ayurtimes.com/jaggerynutritional-valuenutrition-facts-analysis>).

### OBJECTIVES

- To develop a healthy and cost effective product and standardize it.
- To choose a suitable packaging material.
- To develop and create an attractive nutrition label for the product.
- To understand all the aspects of budgeting.

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- To study the shelf life of the developed product through sensory evaluation and microbial analysis.
- Entrepreneurship skill.

**METHODOLOGY**

A food product was developed which had to be cost effective, had longer shelf life as well as nutritious. Keeping these points in mind a multinutrient laddu was developed for lactating women.

For the standardization of the product “Ranking test” was done. 3 samples with varying ingredients were made

Table 1: Standardized Recipe	
Ingredients	Amount (g)
Bajra flour	50
Rava	25
Jaggery	100
Dry coconut	30
Dry dates	5
Groundnut	30
Fenugreek seed powder	1 tsp
Edible gum (dink)	2 tsp
Cardamom powder	Pinch
Oil	5

and coded as A, B and C and evaluated by 18 semi trained panelists.

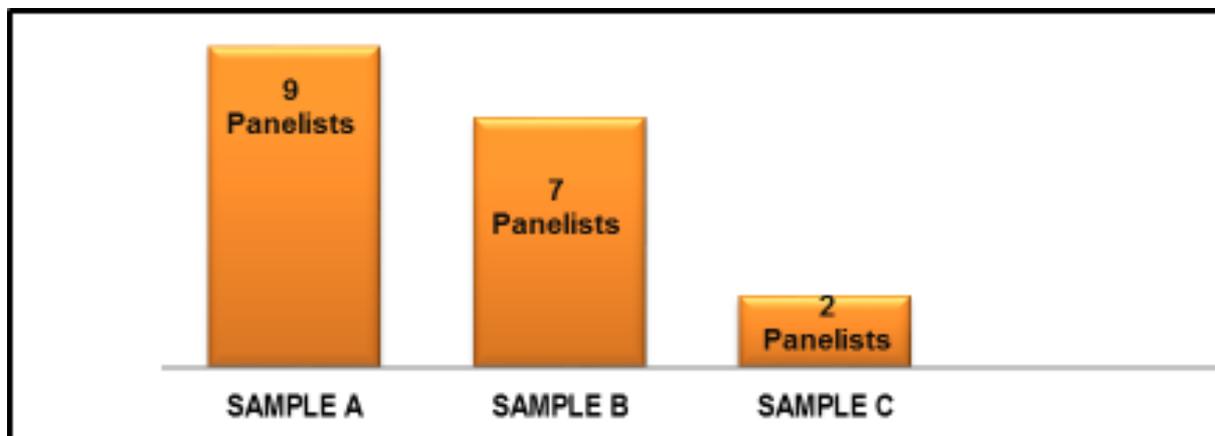
From Figure 1, it can be observed that sample A ranked the highest by 9 panelists, whereas sample B ranked second and the sample C as third.

As the sample A was found to be most acceptable, it was finalized for further study.

**Method**



**Figure 1: Sensory Evaluation for Standardization of the Product**



### Sensory Evaluation of Standardized Product

For the assessment of acceptability, Composite scoring test was carried out to determine acceptability of various attributes such as Taste, Texture, Sweetness and overall acceptability, where Texture = 25, Taste = 20, Sweetness = 25 and Overall acceptability = 30. The product was evaluated by 13 semi trained panelists.

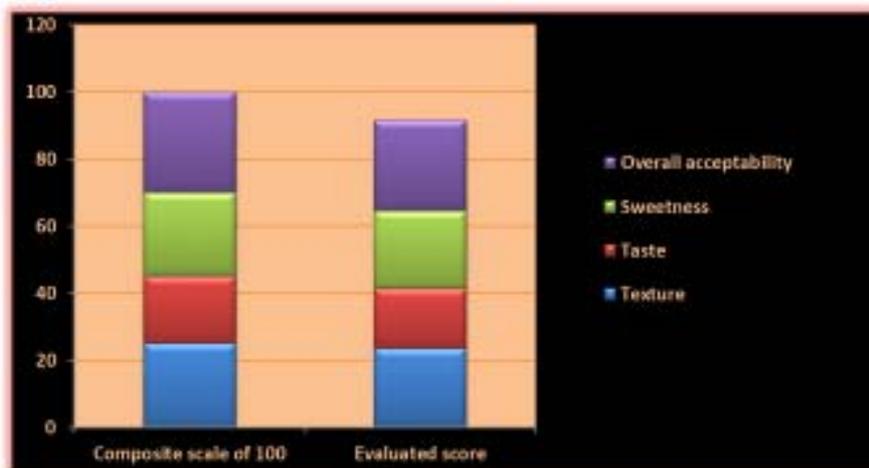
The result of the evaluation was that Texture scored as 23.53/25, Taste = 17.92/20, Sweetness = 23.15/25 and overall acceptability = 26.84/30. This indicates that the food product was very highly acceptable among the panelists.

### Packaging Material

The main aim of packaging material was to keep the food product in good condition until it is sold and consumed by consumers and also to encourage maximum customers to purchase the product. Correct packaging helps to prevent wastage such as leakage or deterioration also good packaging and presentation attracts the customers to buy product.

Packaging material used for multinutrient laddu was BOPP (Biaxially Oriented Polypropylene). “BOPP had very low moisture transmission rate than other packaging films, which improves the shelf life of the product” ( h t t p : / /

**Figure 2: Sensory Evaluation of the Standardized Product Before Packaging**



**Figure 3: Packaging Material**



www.glenroy.com/tools/flexiblepackaging). It had good clarity, transparency and gloss as well and also resistant to U.V light.

### Nutrition Label

All products in the market should come with a nutrition label in order to give information of the product to the consumers. The nutrition label provides key information such as serving size, price, weight, nutritive values, ingredients, etc. Nutrition label also helps the consumers to purchase better product by comparing the products through nutrition label on the basis of cost, nutrition, etc.

The healthy and nutritious product “multinutrient laddu” has been labeled with information such as name of the product, ingredients, nutritive values, weight, manufacturing date, expiry date, and veg mark. Consumers mostly look for the product which do not contain any added preservatives and are safe and nutritious. As the product did not contain any preservatives, was 100% organic, it would be interesting to see its marketability.

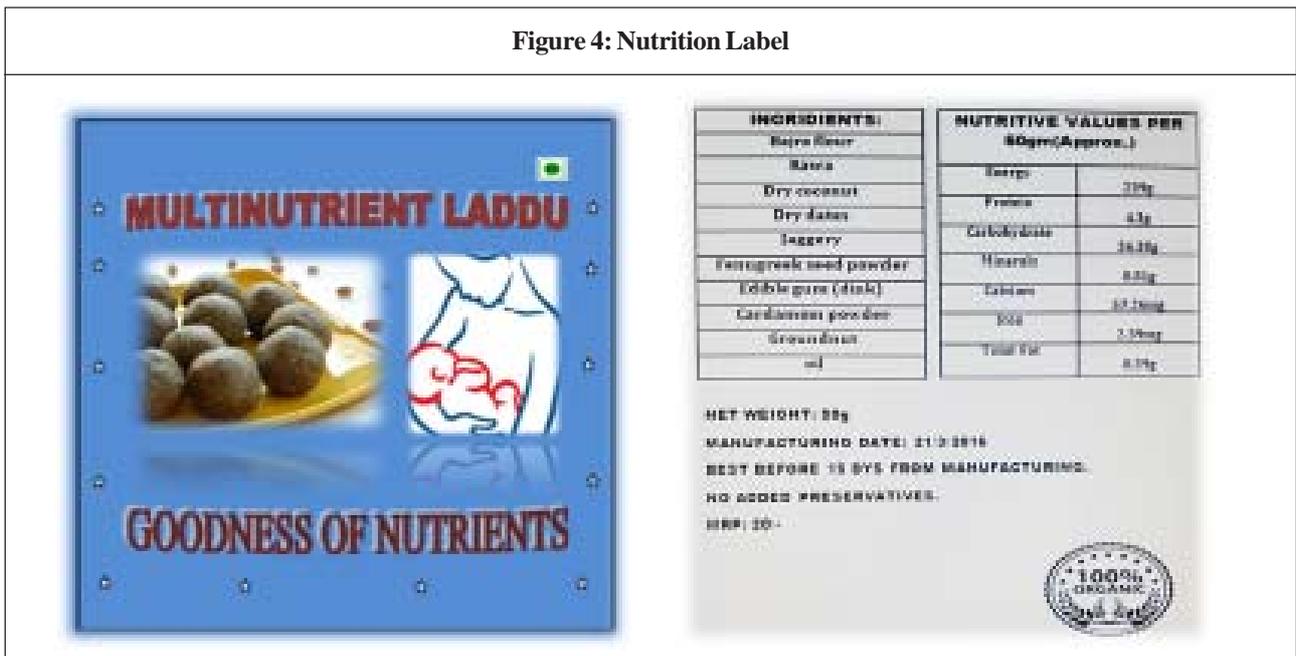
### Budgeting

Budgeting is also one of the most important aspect of entrepreneurship and most effective tool for managing the money. It is said that “with budgeting you can control your money and not your money controls you” (Gregory, 2008). Budgeting also provides a clear picture of amount

<b>Ingredients</b>	<b>Price (Rs.)</b>
Bajra flour	10
Dry coconut	58
Dry dates	4
Jaggery	62
Groundnut	19
Rawa	5
Fenugreek seed powder	2
Cardamom powder	10
Edible gum (Dink)	5
Electricity and Gas	50
Packaging material	25
Nutrition label	50
Rent	25
Labour	25
<b>TOTAL</b>	<b>350/-</b>

being spent on ingredients and profit made from it. All the ingredients and packaging material were purchased in bulk to reduce cost.

**Figure 4: Nutrition Label**



30 Packets of multinutrient laddu were made with each packet containing 5 laddoos. Packets were kept for shelf life study whereas remaining 25 packets were sold. Total cost for production of 25 packets were Rs 350/-. The Market Per packet price was Rs 20/-. After selling all 25 packets the total amount gained was Rs 500/- out of which the profit was Rs 150/-. If 1000 packets were to be sold. The total gain would be Rs 20,000/- with the profit of Rs 6000/-.

### Sensory Evaluation for Shelf Life Study

To study the shelf life of multinutrient laddu, sensory evaluation was conducted periodically on the first and second week after the packaging of laddu with the help of 16 semi trained panelists. Composite scoring test was carried out to determine the acceptability of various attributes such as Texture, Taste, Sweetness and Overall acceptability which was scored out of 100 where, Texture = 25, Taste = 20, Sweetness = 25 and Overall acceptability = 30.

From Figure 5, it can be observed that there was slight decline in taste and sweetness. As few panelists felt an aftertaste due to fenugreek seed powder. This can be overcome by reducing the amount of fenugreek seed powder in the product. Also there was a decline in texture, it might be because of the higher amount of dry coconut which gave a dehydrated look, but the overall rating of the product was found to be good. The product remained pretty acceptable even in the second week and showed no deterioration.

### Microbial Analysis for Shelf Life Study

Microbial testing was done on the first and second week after packaging the laddu as part of shelf life studies.

Pour plate method was used for microbial testing. The multinutrient laddu was diluted twice and 1 ml of each diluted sample poured into two different blank petri plates. After which the nutrient agar was poured into the same petri plate and mixed well with the sample. Later, it was kept for sometime till the agar set and incubated for 24 hours at 37°.

From Tables 3 and 4, observed that the number of colonies formed in first and second week were in acceptable range. Hence the product was safe.

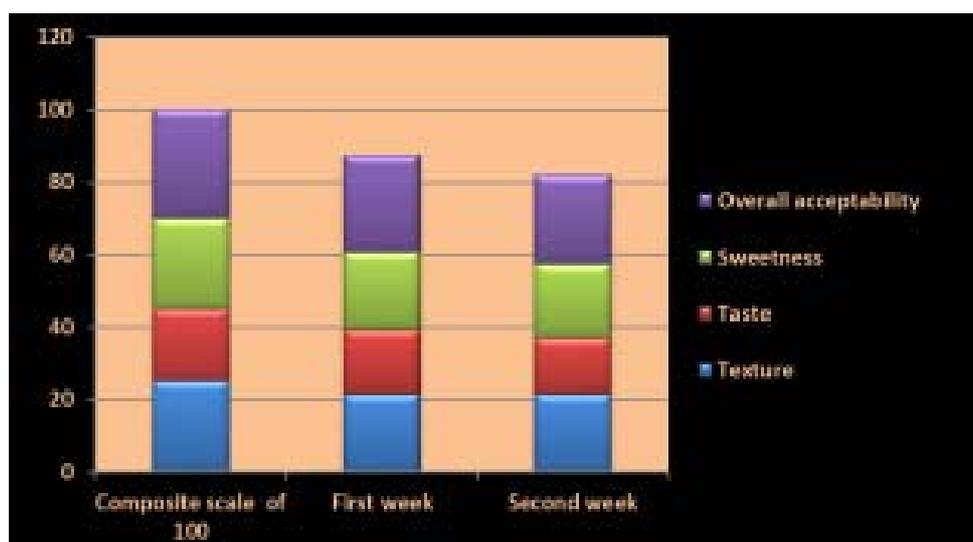
**Table 3: Result of Microbial Testing (First Week)**

Dilutions	No. of Colonies
10 <sup>1</sup>	4
10 <sup>2</sup>	3

**Table 4: Result of Microbial Testing (Second Week)**

Dilutions	No. of Colonies
10 <sup>1</sup>	8
10 <sup>2</sup>	4

**Figure 5: Sensory Evaluation for Shelf Life Study**



## CONCLUSION

Multinutrient laddu, a galactagogue, developed for lactating women was found to be highly acceptable. Each laddu was enriched with many ingredients which improved its nutrient content and can be consumed by any age group. Multinutrient laddu had a shelf life of 15 days as the sensory evaluation and microbial analysis proved that it is safe for consumption. Laddu had a good biological value; it can be increase by adding other ingredients such as varieties of nuts, Dates, Garden cress seeds, chia seeds etc.

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