

# Development of Millet Ladoo Mix

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**Abstract:** Nutrition dense food is the current interest of the generation due to the increase in disease condition and changes in life style from the yester generations. Increasing awareness among the consumers has led to value addition to foods and bringing millets back to the lifestyle. An investigation was under taken to develop calcium rich millet ladoo mix. Standardization trails indicated that incorporation of Finger millet 5.71%, sorghum 4.28%, pearl millet 4.28%, flax seeds 5.71% palm sugar 7.14% cardomom 1.42%, ground nut 5.71%, jaggery 35.71%, gingerly seeds 5.71%, poppy seeds 5.71%. Edible gum 11.42%, desiccated coconut 7.14% ghee 1.2%. was highly accepted. The present study aimed at sensory evaluation, proximate analysis and shelf life study of the millet ladoo mix. The products were subject to sensory evaluation by 15 semi trained panellist. Sensory qualities included appearance, colour, texture, taste, odour and overall acceptability. A 9-point hedonic scale was used. There was a slight statistical significant difference with respect to texture. The developed product contained protein 3.03g, fat 10.38g, fibre 1.63g, carbohydrate 76.1g, energy 365.29kcal, calcium 193.221mg, ash 2.31% moisture 6.52% per 100g on dry weight basis with shelf life of 10-12 days. this would be a good source of calcium for calcium deficient group and vulnerable group.

**Keywords:** millets, calcium, women, nutrient dense, edible gum, value addition

## 1. Introduction

The phase of adolescence, pregnancy and lactation, nutrient requirement is highest. Adolescence is the transitional phase of growth and development between childhood and adulthood with a rapid skeletal growth and calcium requirement substantially increases during pregnancy and lactation in women's.

Loss of bone mass on depletion of calcium from the bones due to catabolism and physiological changes especially in women with a lack of calcium in the diet on daily basis may leads to severe conditions such as osteoporosis in later stages.

Consumption of junk food is increasingly higher in the fast moving world and most preferred by youngsters for the taste and due to easy accessibility to food, instead of junk foods with empty calories a healthy snacking habit helps to maintain a good health status and food habits.

Millets are cereals with high amount off calcium and other essential macro and micronutrients and gluten free providing as good satiety on consumption due to high fibre content.

## 2. Materials and Methods

A millet ladoo mix that can be consumed as such or made into ladoos or used as fillings in modaks (traditional Indian dish) as healthy snacking among children's, adolescence and calcium deficient people.

Two variation were prepared with varying proportion of ingredients using trial and error method. the most accepted product was selected Table 1 shows different variation of millet ladoo mix.

Sensory evaluation was done to find the acceptability of the millet ladoo mi using 9 point headonic scale by 15 semi trained panellists. orgoleptic characteristics i.e., appearance, colour, texture, odour and taste and overall acceptability were scored from a rating 9-1. nutritional composition proximal analysis (moisture, ash, fibre, fat, protein energy and calcium) of the final standardized product using different methods and (physio chemical method) shelf life studies were conducted under two condition refrigerated (0-5°C) and at room temperature (34°C). Food graded plastic containers were used as packaging material

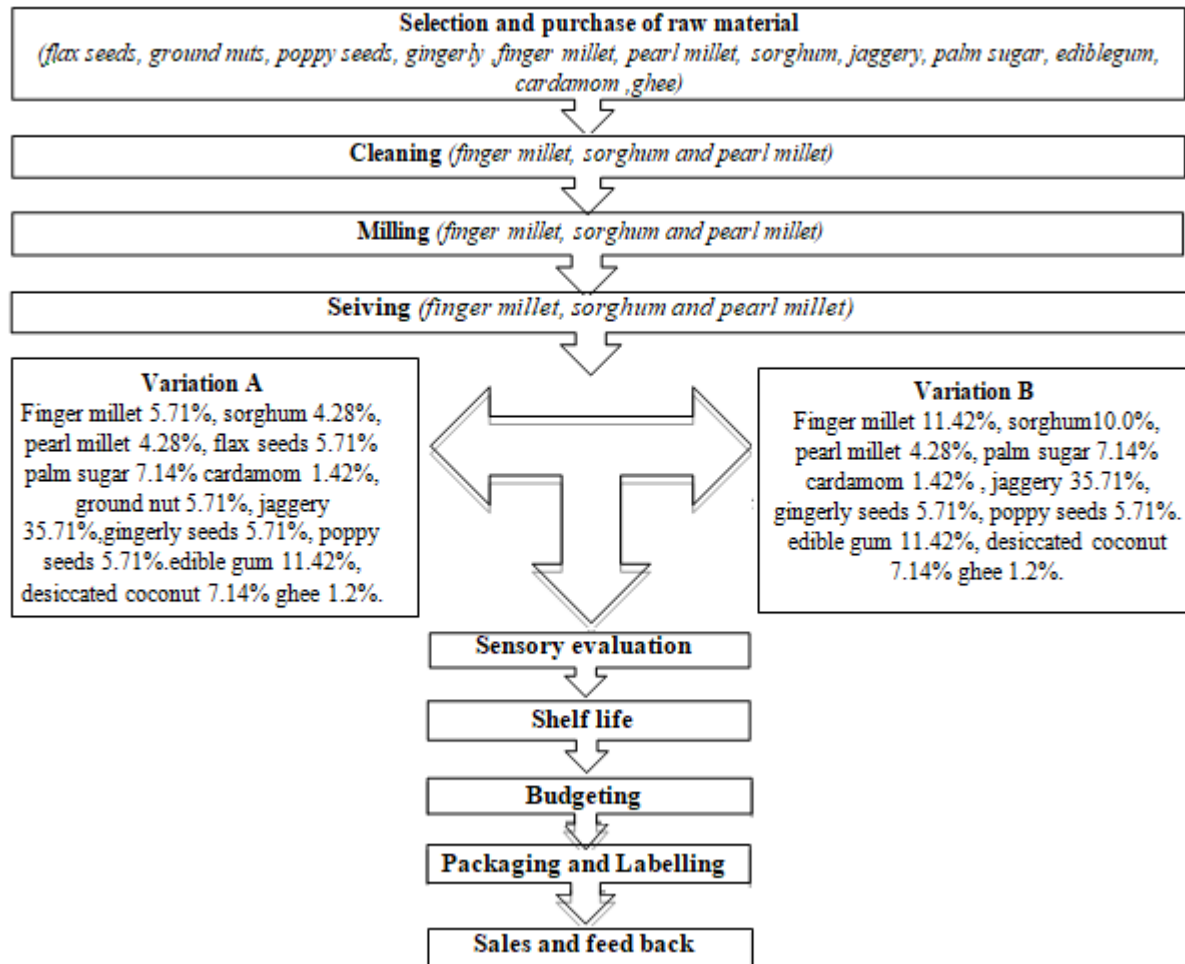


Figure 1: Flow Chart of Value Added Millet Ladoo Mix

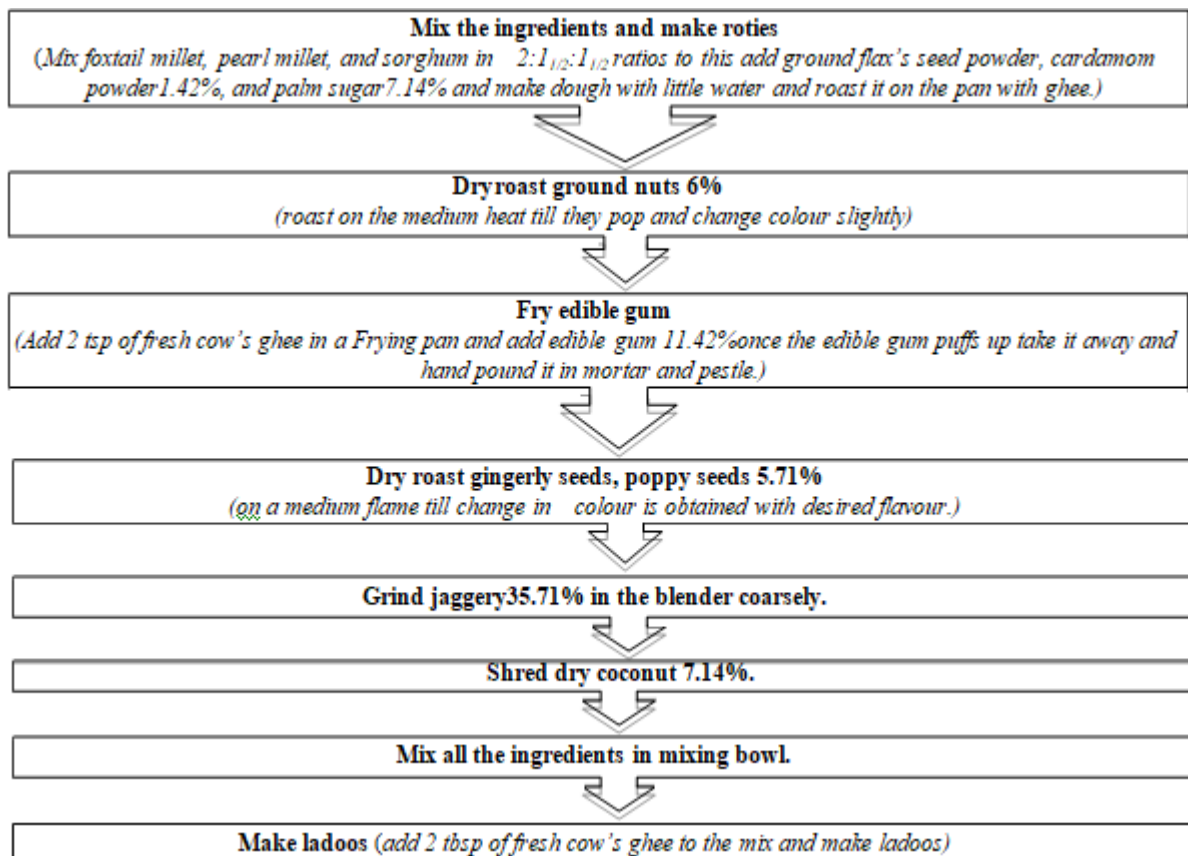


Figure 2: Flow chart of standardization of value added millet ladoo mix

**Table 1:** Variation 1 versus Variation 2 of Millet Ladoo Mix

	Variation	N	Mean	Std. Deviation	T test statistic, p-value
Appearance	Variation1	15	8.8000	.41404	1.560,
	Variation2	15	8.5333	.51640	0.130
Colour	Variation1	15	8.2667	.45774	-1.890,
	Variation2	15	8.6000	.50709	0.069
Texture	Variation1	15	8.9333	.25820	3.130,
	Variation2	15	8.4667	.51640	<b>0.005</b>
Taste	Variation1	15	8.9333	.25820	7.559,
	Variation2	15	7.6000	.63246	<b>&lt;0.001</b>
Odour	Variation1	15	8.6667	.48795	0.367,
	Variation2	15	8.6000	.50709	0.716
Overall Acceptability	Variation1	15	8.7333	.20931	4.525,
	Variation2	15	8.3600	.24142	<b>&lt;0.001</b>

Variation 1 (A)

Variation 2 (B)

### 3. Results and Discussion

Two variation were made with different combination of ingredients one variation without flax seeds and roasted groundnuts and the other with flax seeds 5.71% and roasted groundnuts 5.71%, variations with basic ingredients like Finger millet 5.71%, sorghum 4.28%, pearl millet 4.28%, palm sugar 7.14%, cardamom 1.42%, jaggery 35.71%, gingerly seeds 5.71%, poppy seeds 5.71%. edible gum 11.42%, desiccated coconut 7.14% ghee 1.2%.

Sensory evaluation indicated that variation with flax's seed powder and roasted groundnut was most accepted with highest mean score for all attributes being compared. On comparison with other variation "A" had a mean score of 8.2 to 8.9 than variation B with score of 8.6 highest.

So variation A was standardized and chemically analysed

- 1) At 5% level of significance, there is significant difference between the mean responses for Millet Ladoo Mix between the variation 1 (M=8.93, SD=0.23) and 2 (M=8.47, SD=0.52) with p-value=0.005 with respect to Texture.
- 2) At 5% level of significance, there is significant difference between the mean responses for Millet Ladoo Mix between the variation 1 (M=8.93, SD=0.25) and 2

(M=7.60, SD=0.63) with p-value <0.001 with respect to Taste.

- 3) At 5% level of significance, there is significant difference between the mean responses for Millet Ladoo Mix between the variation 1 (M=8.93, SD=0.25) and 2 (M=7.60, SD=0.63) with p-value <0.001 with respect to overall acceptability.

**Table 2:** Ingredients composition of standardized millet ladoo mix

Ingredients	Quantity per 100G
Finger millet	5.71%
Sorghum	4.28%
Pearl millet	4.28%
Flax seeds	5.71%
Palm sugar	7.14%
Groundnut	5.71%
Gingerly seeds	5.71%
Poppy seeds	5.71%
Edible gum	11.42%
Desiccated coconut	7.14%
ghee	1.2%
cardomom	1.42%
jaggery	35.71%
Total ingredients cost per 100g	100%

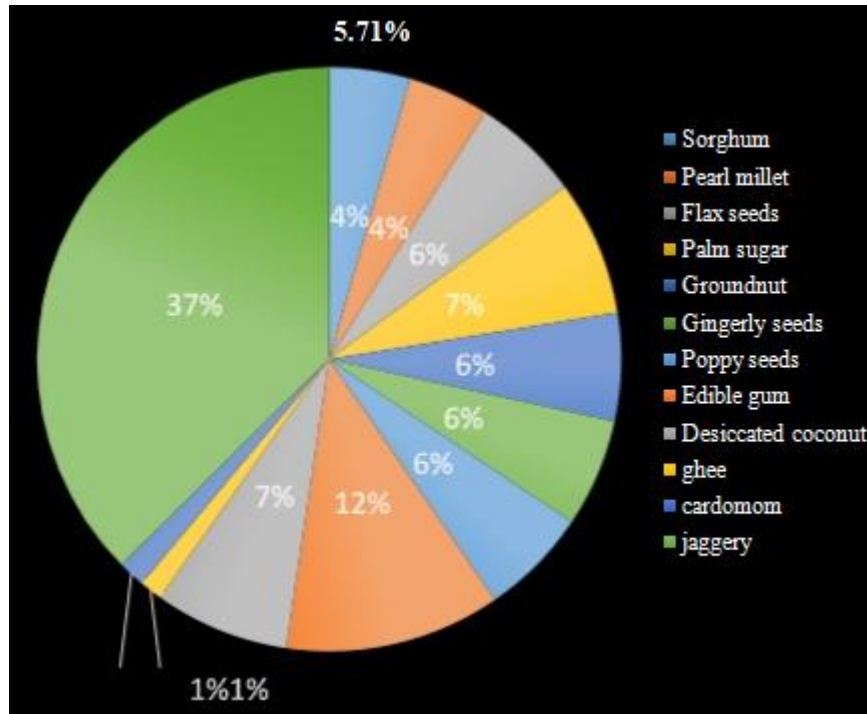


Figure 3: Ingredients Composition of Standardized Millet Ladoo Mix

Table 3: Nutritive Value of Standardized Millet Ladoo Mix per 100g

S. No	Parameter	Results
1	Protein%	3.03
2	Fat%	10.38
3	Fibre%	1.63
4	Carbohydrates%	76.13
5	Energy (kcal/100g)	365.29
6	Ash%	2.31
7	Moisture%	6.52
8	Calcium mg	193.221

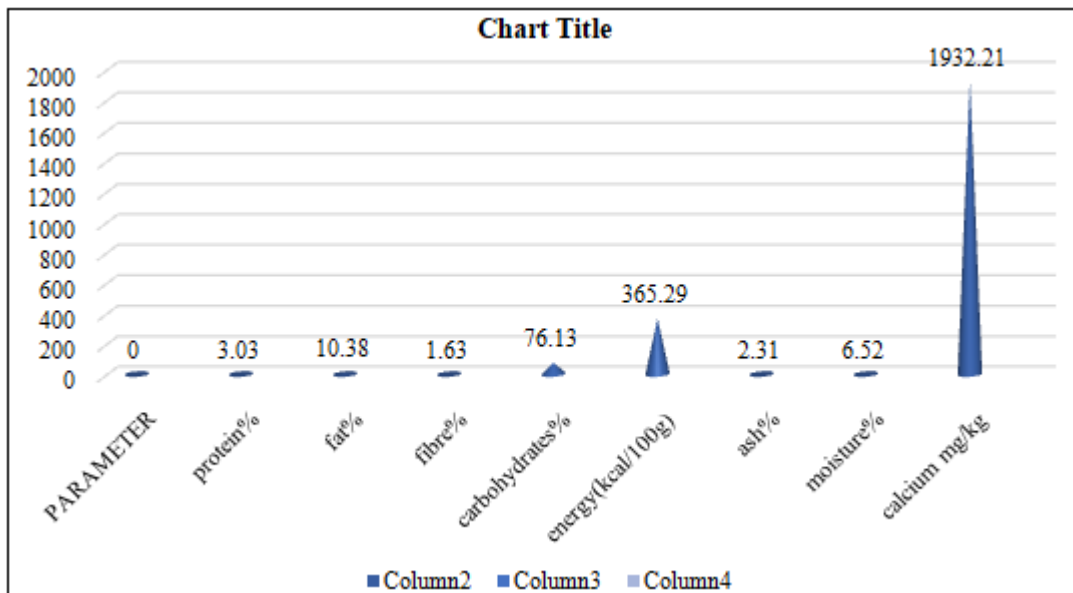


Figure 4: Nutritive Value of Standardized Millet Ladoo Mix per 100g

**Shelf Life Study of Millet Ladoo Mix****Table 4:** Shelf Life Study of Millet Ladoo Mix Under Refrigeration Temperature

Physical examination	At refrigerator temperature		
	5 days	10 days	15 days
Appearance	No change	No change	No change
Texture	Soft	Hard	Hard
Odour	No off odour	Slightly undesirable	Off odour
Presence of rancid smell	Absent	Present	Present

**Table 5:** Shelf Life Study of Millet Ladoo Mix under Room Temperature

Physical examination	At room temperature (36°C)		
	5 days	10 days	15 days
Appearance	No change	No change	No change
Texture	Soft	Soft	Soft
Odour	No off odour	Slightly undesirable	Off odour
Presence of rancid smell	Absent	Present	Present

**4. Conclusion**

The standardized millet ladoo mix in this study was high in calcium and energy, which plays an important role and is the most abundant mineral in the human body, the best known for its important role in maintaining a good bone health and protection from osteoporosis and in imparting strength to bones and teeth. The innovative standardized millet ladoo mix with many health benefits is the emerging need for the people who want to incorporate millets in their normal diet and also the individuals to lead a healthy life; to restore the calcium level post pregnancy, lactation and menopause and calcium deficient population. The millet ladoo mix can also be used as fillings in modak and made into ladoos with ghee or eat as such and is a healthy snack idea for all age group.

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