



# MULTIGRAIN APPAM PREMIX: A MODIFIED INNOVATIVE PRODUCT WITH THERAPUTIC ASPECTS

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**Abstract:** **INTRODUCTION:** Appam is a south Indian dish often savory as a snack and healthy breakfast. It is a filling dish, easy to make. This study focuses on modifying the regular Appam- which apparently contains- Semolina or rice and urad dal batter, to a Multigrain Mix that enhances the nutritive value of the product. **AIM & OBJECTIVES:** The aim of this study is to modify a regular Appam mix into a multigrain Appam with a goal of enhancing its nutritional value **METHODOLOGY :** The main cooking methods used in making multigrain appam premix are soaking, roasting and grinding. The key ingredients used in this premix that also add up for the therapeutic effects are ragi which in turn is rich in calcium and potassium and moong dal- rich in protein, potassium and fiber, all the ingredients were dehydrated and coarsely grinded. Both the ingredients aid in improving cardiac health, blood pressure. **CONCLUSION:** Since this product is a multigrain product, it automatically increases satiety. The calcium content in ragi is beneficial for people with hypertension, obesity and has a therapeutic effect on menstrual health too. The protein present in moong dal has a high biological value and is rich in dietary fibers. These nutritional benefits make this product a healthier version of a regular Appam.

**Keywords** – Food Product, Breakfast, Snack, Hypertension, Menstrual Health, Indian Snacks

## I. INTRODUCTION

Malnutrition is deficiency or excess in nutrient intake, imbalance of nutrients or impaired nutrient utilization. One in every third person is suffering from at least one form of malnutrition (WHO, 2016). Consumption of unhealthy, high calories low nutrient snacks are to be blamed. There is a well-established relationship between unhealthy diet and health problems. However, people have started being attentive towards their calorie intake, carbohydrate, fat and protein intake. Awareness about inclusion of micronutrients to avoid illness is also rising among the consumers. To meet up with this awareness, the food industry has started focusing on production of low calorie, low fat, high-fiber, micronutrient rich products. This project has been proposed to formulate a multigrain appam premix that is fiber rich and can be easily made.

Ready to make dehydrated appam premixes are food products that consist of rice flour, lentil, yeast, flavor enhancers and preservatives. Appam which is also known as palappam are pancakes usually made from ground fermented rice and coconut batter. It is a traditional food that is included in Kerala cuisine. It is made thin and crispy around the edges and bulky in the center and it can be eaten with coconut chutney or vegetable stew (also called sambhar). Incorporation of whole grains and millets increases the nutrient value of food products.

Ragi also called finger millet is a major ancient millet in India (2300 BC). In Maharashtra it is called “nachni”, in Bihar it is called “umi”. Ragi flour is also a popular weaning food. It is a rich source of carbohydrate and dietary fiber (Shingote et al., 2021). Finger millet is the richest source of calcium as compared to all other cereals and millets. It is also rich in potassium, phosphorus, and iron. Fermentation of finger millet decreased the phytate content by 60% and improved the bio accessibility of minerals (S. Shobhana et al., 2013)

Moong dal which is also known as golden gram or “pesalu” is a seed of vigna radiate found in countries like the Indian subcontinent, China, Thailand, Indonesia, Burma, Bangladesh. Moong dal has been seen to be popularly eaten in summer as it helps in preventing heatstroke, heat rash or prickly heat. (Singh et al., 2017) Moong dal, especially when sprouted, is rich in calcium, iron and potassium. Mung beans are rich in protein, resistant starch and fiber. It can help lower the risk of several chronic, age-related diseases like heart diseases, cancer, diabetes and obesity. (Yi-Shen, Shuai & Fitzgerald, 2018)

Cereals are nutritionally unbalanced in terms of amino acid composition as they have low levels of lysine. Due to high protein content and the digestibility of moong dal it can increase the quality of protein when taken with cereals and can increase protein intake in pure vegetarian diet. The total protein content in moong dal was seen to be 87.8% with essential amino acid content of 43.5% (Kudre et al., 2013) Irregular breakfast consumption has been inversely associated with excess weight and adverse health effects (Sharma et al, 2018).

Indian adolescents have been seen to have lower breakfast consumption due to various reasons with lack of time being a major reason (Rathi et al., 2018). Since this appam premix is easy and quick to make, it can help reduce the irregularities in consumption of breakfast and also provide a healthy and tasty breakfast option

## II. MATERIALS AND METHODS

2.1 Raw materials and ingredients:- The Ingredients that were used to make a appam premix from local market of Mumbai, Maharashtra, India. These includes (1) 25gm ragi, (2) 30gm moong dal, (3) 25gm rice flour, (4) 30gm semolina, (5) 50gm coriander leaves, (6) 15gm sesame seeds, (7) 30gm orange carrot, (8) 3 cloves garlic, (9) 3gm ginger, (10) 4 piece green chili medium size, (11) 2.5 gm Dry Ginger Powder

2.2 Preparation of soaked ragi flour:- The raw 25 gm of clean ragi millet was soaked in water for 5 hours. After 5 hours drained the water.

2.3 Preparation of soaked moong dal flour The 30gm of clean moong dal was soaked in water for 4 hours. After 4 Hours drained the water.

2.4 Preparation of multigrain flour approach In Pan, Roast soaked ragi, soaked moong Dal, semolina well, and then add rice flour and keep aside to cool In pan also roast sesame seeds and keep aside to cool

2.5 Dehydration of ingredients The carrot, ginger, garlic, green chili, and coriander leaves were washed carefully before use. Properly all ingredients were finely chopped. All chopped ingredients were dehydrated at temperature between 60-70 ° for 20 mins.

2.6 Preparation of optimized product Premix- Finely grind all the dehydrated products ginger, garlic, green chili, (except the carrot and coriander), all the flour, sesame seeds together to make a powder form. Add the dehydrated chopped carrot, coriander, dry ginger powder and salt in the rest of the ground premix to complete the Product.

2.7 For Appam making instructions Take the premix of the appam, mix baking soda in the premix and add water to it. Mix it in one direction either clockwise or anticlockwise to form a batter. Take a spoonful of the batter and pour it in the appam maker pan cavities and add 1 tsp. of oil in each cavity of the pan. Cook the appam in low flame on both sides.

2.8 For Microbial Analysis For the microbial analysis, the pour plate technique was used. In 5.6 nutrient agar. From the 5.6 nutrient agar, half of the amount- 2.8 agar was dissolved in 100 ml distilled water in a conical flask. In another flask, 100 ml water with 1 g of sodium chloride and 0.1 g of sodium arsenic was taken. It was then autoclaved with cotton plugs for 30 mins. After 30 mins the saline solution was taken out and mixed with 1 g of the product (the appam premix) Five test tubes were taken and another 100 ml of fresh saline solution (not the one mixed with the product) was poured in each one of the test tubes and labeled 1-5, 10 ml of the product saline was pipetted out and poured into the 1st test tube, then another 10 ml of the saline was pipetted out- now directly from the first test tube and poured into the test tube number 2. This process was repeated for another three test tubes by pipetting out 10 ml of saline from the preceding number of test tube, for example for test tube number 2 the saline is taken from test tube number 1, for test tube number 3 the saline is taken from test tube 2, and so on. After these 8 petri dishes were taken and the saline solution was poured from the 4 test tubes into the 4 petri dishes and label the dishes according to their test tubes respectively, these 4 petri dishes were covered with another 4 petri dishes. The nutrient agar solution was then mixed with the saline solution in the petri dishes with minimal possible air contact. All these dishes were incubated for 48 hours and the colony counting was done via a colony counter.

## III. PHYSIO-CHEMICAL ANALYSIS

3.1 Sensory Evaluation The freshly prepared powder was presented to 10 members to evaluate on the basis of sensory attributes. Each attribute was evaluated for color, flavor, aroma, texture and overall acceptability.

Table 1 and Figure 1 showed the sensory score that was given by 10 panelists based on 9-point Hedonic Scale were 1 indicates dislike extremely, 2-dislike very much, 3-dislike moderately, 4-dislike slightly, 5-neither like nor dislike, 6-like slightly, 7-like moderately, 8-like very much, 9-like extremely

3.2 Proximate analysis: Total amount of raw ingredients were 208gm and evaluated for Energy, Protein, Fat content using nutritive calculator (Refer to table 3)

## IV. RESULTS AND DISCUSSION

4.1 Proximate composition and total product content Proximate composition is raw ingredients were 208 gm and when this product was fully prepared after using different cooking methods it was 110gm i.e. half of the ingredients. Energy provided by premix was 520 kcal, Carbohydrate content was 80.59gm, Protein content was 25.06gm and fat content was 10.04gm. 4.2 Sensory Evaluation Sensory evaluation is very important as product acceptability in market is important aspect while we make any food product. Table 2 shows the mean value of the sensory attribute accepted by panelists. It was observed that there was no significant difference in sensory scores Figure 1 Proximate analysis of multigrain Appam premix Figure 2: Sensory analysis of Multigrain Appam premix 4.3 Microbial Analysis Using pour plate method, microbial testing results were Petri dish 1 - 10-12 CFU/ml, Petri dish 2 - 20-30 CFU/ml, Petri dish 3- 2 CFU/ml and Petri dish 4 - 40-50 CFU/ml 5. Conclusion It can be concluded from above study is using multigrain flours can enhance the nutritive value of product and can totally be replaced Rice flour that is used in appam mix as base ingredient and other flours gives addition of nutrition to our body. This premix have low protein content of about 25.06 gm from 208gm. The study demonstrated that Multigrain appam premix is highly acceptable as it is easy to make, instant and give numerous nutrients to body.

## V. FIGURES AND TABLES

Attributes → Panel No ↓	Color	Flavour	Aroma	Texture	Overall acceptability
1	6	8	6	7	7.5
2	8	8.5	7	7	9
3	5	8	6.5	8	7.5
4	7	8	8	6	8
5	8	9	8	5.5	8.5
6	8	7.5	9	9	9
7	5	8.5	8	9	9
8	9	9	8	8.5	8.5
9	7	7	7.5	8	9
10	9	7	8.5	9	9

Table 1

Attributes →	Color	Flavour	Aroma	Texture	Overall acceptability
Mean →	14.4	8.05	7.65	7.7	8.5

Table 2

Ingredients	Amount (gm)	Energy (kcal)	CHO (gm)	Protein (gm)	Fats (gm)
Soaked Ragi	25	80.19	16.7	1.79	0.48
Soaked moong dal	30	89.34	14.37	6.86	0.18
Rice flour	25	145.6	24.4	7.6	2.4
Semolina	30	100	20.5	3.41	-
Coriander leaves	50	15.54	0.97	1.76	0.35
Sesame seeds	15	77.94	1.62	3.26	6.46
Carrot	30	10	1.67	0.29	0.14
Ginger	-	-	-	-	-
Dry ginger powder	2.5	2.2	0.36	0.09	0.03
<b>TOTAL</b>	<b>208</b>	<b>520.81</b>	<b>80.59</b>	<b>25.06</b>	<b>10.04</b>

Table 3

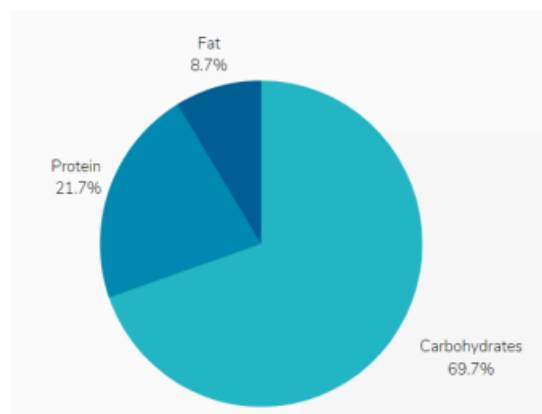


Figure 1 Proximate analysis of multigrain Appam premix

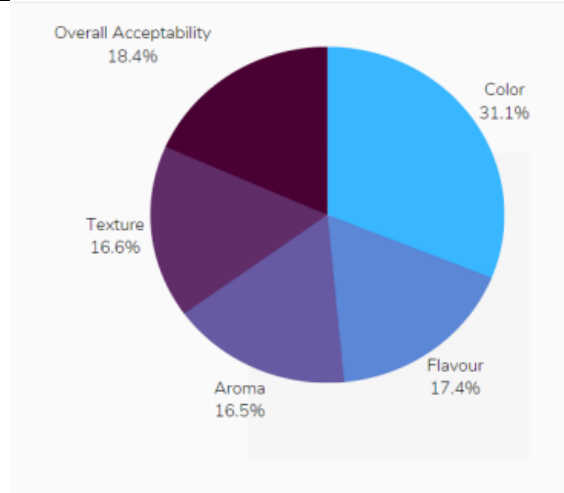


Figure 2: Sensory analysis of Multigrain Appam premix

## VI. ACKNOWLEDGMENT

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