

Formulation, Standardisation, Nutrient Analysis, Shelf Life Evaluation and Popularization of GPAN Flour Incorporated Ready to Cook Recipes among Selected Mothers

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Abstract

The study was undertaken to know the nutritive value of processed germinated pulses and nuts flour and the acceptability of GPAN flour incorporated Ready to Cook mix recipes like Chappathi, Murukku, Adai, Puttu, Nutrient ball and Dosa. The nutrients analyzed in this study were moisture, protein, fat, ash, iron, phosphorus, fibre, calcium and vitamin E. The results reflected that there was slight increase in nutrient contents of the formulated Ready to Cook mix recipes with respect to standard. The storage quality of the processed GPAN flour also assessed. Popularization of GPAN flour was conducted among 30 primary school children's mothers.

Keywords: Almond, Bengal Gram, Food Mixture, Green Gram, Nutrient Analysis, Nutritional Composition, Popularization, Shelflife Evaluation, Walnut and Hazelnut

1. Introduction

Pulses are part of a healthy balanced diet and have an important role in preventing illness such as cancer, diabetes and heart disease. The World Health Organization estimates that up to 80% of heart disease, stroke disease, type-2 diabetes and cancer could be prevented by eliminating risk factors, such as unhealthy diets and promoting better eating habits of which pulses are an essential component².

Germination of Bengal gram increased protein digestibility. It degrades protein to simple peptides. It involves chemical changes such as the hydrolysis of starch, protein and fat by amylolytic, proteolytic and lipolytic enzymes respectively.

Green gram is a good source of vitamins, minerals, enzymes, complex carbohydrates and its protein quantity is better than others and are low in fat and have no

cholesterol⁴. Bengal gram is a good source of high quality protein, carbohydrates, fibre, vitamins like thiamine and niacin, folic acid and minerals such as calcium, phosphorous, iron, magnesium and potassium¹. Sprouted Bengal gram also serves as a great source of vitamins C and B-complex⁸.

Almonds are a rich source of vitamin E, B-vitamins, essential minerals, mono-unsaturated fats, phytosterols and dietary fibre which have cholesterol lowering properties³. Hazelnuts contain high levels of fiber, vitamins, moderate proteins and healthy fat and carbohydrates and a great source of those all-important omega-3 fatty acids which provide health benefits. Walnut are rich in protein, fibre, manganese, copper, ellagic acid and ω -3 fatty acids have been linked to reduced inflammation and decreased risk of heart disease. Walnut are heart healthy due to the polyunsaturated fatty acids. It also rich in antioxidants like melatonin⁷.

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2. Materials and Methods

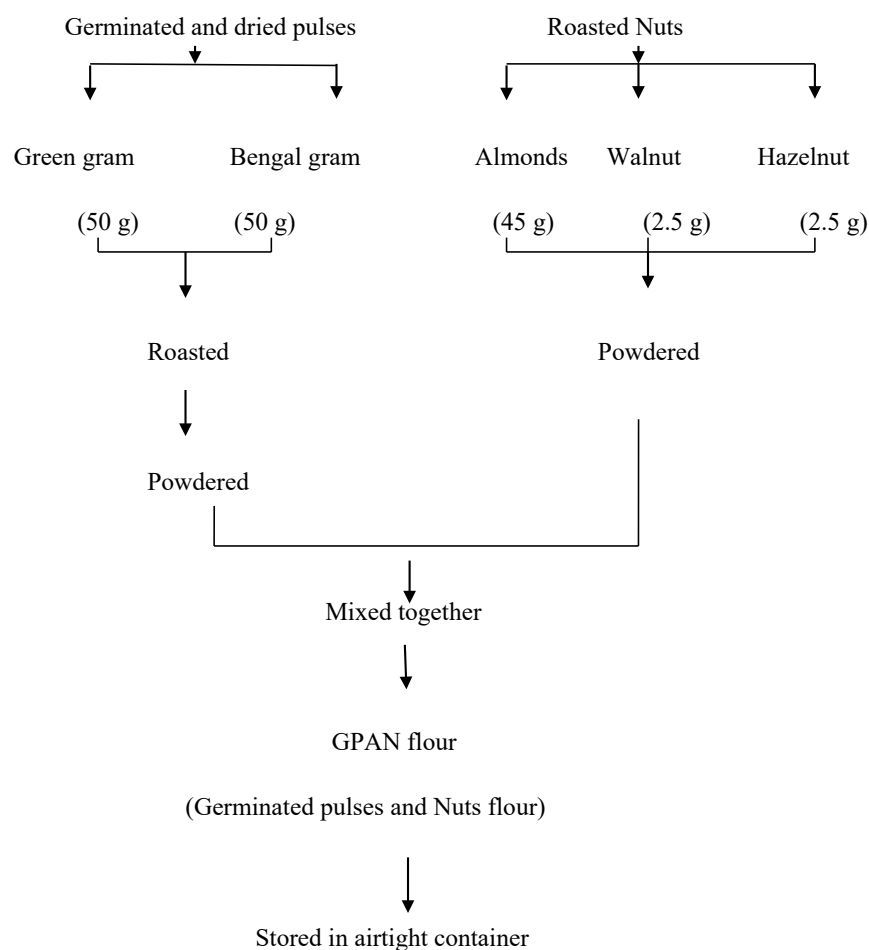
The pulses such as green gram dhal, bengal gram and unde-rutilized nuts such as almonds, hazelnuts and walnuts were selected for the study. The pulse and nuts were purchased from the local departmental stores.

2.1 Processing of Ingredients

Whole grams like green gram and bengal gram were soaked overnight and drained water away. The seeds were tied in a loosely woven cloth and hang and allowed to germinate separately. After germination the pulses were dried under sunlight. The dried germinated pulses were roasted on medium flame ground using mixie. Moisture and warmth are essential for germination. The selected nuts Almonds, Walnut and Hazelnut were cleaned and roasted little bit it becomes golden brown in colour. Then it was grounded into fine flour. The above said processing methods were used to eliminate antinutritional factors and unpleasant beany flavor of pulses and also for easy digestibility.

2.1.1 Composition of Food Mixtures

• Preparation of GPAN flour



2.1.2 Nutrient Analysis of GPAN Flour

The nutrient content of the diet needs to be screened in order to improve the availability⁵. The germinated pulses and nuts flour was used for analysis of moisture content, fibre, iron, phosphorus, protein, fat, calcium, Vitamin E and vitamin C by using standard procedures.

2.1.3 Formulation and Standardization of Ready to Cook Mixes with the Incorporation of Germinated Pulses and Nuts Flour (GPAN Flour)

The processed GPAN flour was used in the formulation of Ready to Cook mixes. The Ready to Cook mixes were prepared using the different levels of incorporation of GPAN flour such as 10, 20 and 30 %. The following Ready to Cook mixes were prepared. List of ingredients in standard and germinated pulses and nuts flour incorporated Ready to Cook mixes were given in below.

2.2 Preparation of Chappathi

For the preparation of Chappathi, the ingredients such as wheat flour, oil and salt were used.

2.3 Preparation of Murukku

In Murukku, the ingredients such as rice flour, roasted Bengal gram flour, black gram flour, chilli powder, salt, Bishop's seed and oil were used.

2.4 Preparation of Adai

Adai was made using the ingredients such as rice flour, red gram flour, salt, oil, curry leaves, coriander leaves and chilli powder.

2.5 Preparation of Ragi Puttu

Ragi Puttu was prepared by using the ingredients such as ragi flour, sugar and elachi instead of ragi.

2.6 Preparation of Nutrient Ball

Nutrient ball was prepared by using ragi flour, rice flour, roasted bengal gram flour, corn flour, wheat flour, black gram flour, sugar, groundnut and elachi.

2.7 Preparation of Dosa

For Dosa, the ingredients such as rice flour, black gram flour, salt and water are used.

The GPAN flour was incorporated at 10, 20 and 30% by reducing standard flour for all the Ready to Cook recipes.

3. Organoleptic Evaluation of Formulated Recipes using Ready to Cook Mixes

Organoleptic evaluation is the composite characteristic, which determines the degree of acceptability of a specific product by the consumers. The quality attributes of the convenience food is broken into component characteristics like appearance, texture, flavour, taste etc. For organoleptic evaluation five point hedonic rating scale was used to measure the consumer acceptability of recipes with the help of 20 semi- trained panel members.

4. Microbial Analysis of Stored Gpan Flour

The initial microbial load was analyzed. The Germinated pulses and nuts flour were stored in plastic container and kept in room temperature for period of 15 days and one month by means of over all acceptances of panel members.

5. Organoleptic Evaluation of Formulated Recipes using Stored GPAN Flour

The prepared recipes stored GPAN flour were sensorily evaluated. For organoleptic evaluation five point hedonic rating scale was used to measure the consumer acceptability of recipes with the help of 20 semi- trained panel members.

6. Popularisation of Germinated Pulses and Nuts Flour Incorporated Recipes among Selected Subjects with Pre School Children Mothers

6.1 Selection of the Area and Subjects

Based on convenience and nativity, Pallipalayam area, was selected for the data collection. Thirty mothers whose children were studying in primary school and who were willing to participate and cooperate were selected for the study. As the benefits of school children, to improve the nutritional status as well as the intake of antioxidant rich food, the children's mothers were selected for the study.

6.1.1 Analysis Of Data

The data obtained from the study was consolidated, tabulated, statistically, analyzed and results were discussed and concluded.

7. Results and Discussion

7.1 Nutrient Content of Raw and Processed GPAN Flour

The nutrient content of the raw and processed GPAN flour is given in Table 1.

From the Table 1, it was noted that the nutrients present in processed GPAN flour are 10.5 g of moisture, 10.4 g of protein, 8.56 g of fat, 4.72 mg of iron, 190.35 mg of calcium, 396.75 mg of phosphorus, 4.5 mg of Crude fibre, 9.5 mg of Vitamin C and 4.16 mg of Vitamin E.

Table 1. Nutrient content of raw pulses, nuts and processed GPAN flour Per (100 g)

Nutrients	Green gram	Bengal gram	Almonds	Walnut	Hazelnut	GPAN flour
Moisture (g)	10.4	9.8	5.2	4.5	5.3	10.5
Protein (g)	24.0	17.1	20.8	15.6	14.95	10.4
Fat (g)	1.0	5.30	58.90	64.50	60.75	8.56
Iron (mg)	4.4	4.6	5.09	2.64	4.7	4.723
Calcium (mg)	124	202	230	100	114	190.35
Phosphorus (mg)	326	312	490	380	290	396.75
Crude fibre (mg)	4.1	3.9	1.7	2.6	2.3	4.5
Vitamin C (mg)	4.8	1.3	-	1.3	6.3	9.5
Vitamin E (mg)	0.51	0.35	26.2	0.7	15.06	4.16

7.2 Organoleptic Evaluation of Recipes using Gpan Flour Incorporated Ready To Cook Mixes

Overall acceptability were found to be highly acceptable in Chappathi, Murukku and Adai for the standard and all the proportion of incorporation. And then mean scores for acceptability of Puttu, Dosa and Nutrient Ball were highest in Standard and 20% incorporation of GPAN Flour.

4.3 Comparison of Nutrient Composition between the Standard and Incorporated Ready to Cook Mix Recipes

The nutrient composition and percentage increase (or) decrease in nutrient content of germinated pulses and nuts flour incorporated Ready to Cook mix recipes are discussed below. The nutritive value of standard and formulated products were calculated. The nutrient content was calculated at 20% GPAN flour incorporated recipes like Chappathi, Murukku, Adai, Puttu, Nutrient ball and Dosai.

When compared to standards the nutrient content was increased in all the formulated Ready to Cook recipes. There was a gain in energy, protein, fat, iron, phosphorus, calcium and crude fibre contents and the CHO was reduced.

8. Microbial Quality of GPAN Flour

8.1 Microbial Count of GPAN Flour

The microbial count of Initial, 15th and 30th day of storage using in plastic containers are given in Table – 2.

The microbial count of GPAN flour stored in plastic container for the period of 15 and 30 days was noted and the results showed that microbial count was found to be at the safe level.

9. Shelf Life Evaluation and Formulation of Recipes using Ready To Cook Mixes in Different Period of Storage

The results showed that there was no difference in appearance, flavor, colour, texture and taste for standard and 20% GPAN flour incorporated Chappathi, Adai. Slight difference was noted for Murukku, Puttu, Nutrient ball and Dosa, hence GPAN flour can be stored effectively in plastic container.

10. Popularisation of Germinated Pulses and Nuts Flour Incorporated Recipes Among Selected Mothers

Thirty primary school children mothers were selected for popularization of GPAN flour, majority of the children (60%) belonged to the age group of 3-5 years and 40% belonged to the age group of 6-7 years.

Assessment of nutritional knowledge before education revealed that the average score was 4.83, out of a total score of 10. After education the average score increased to 8.53. Statistical analysis revealed that there was significant improvement in knowledge after nutritional education at 1% level.

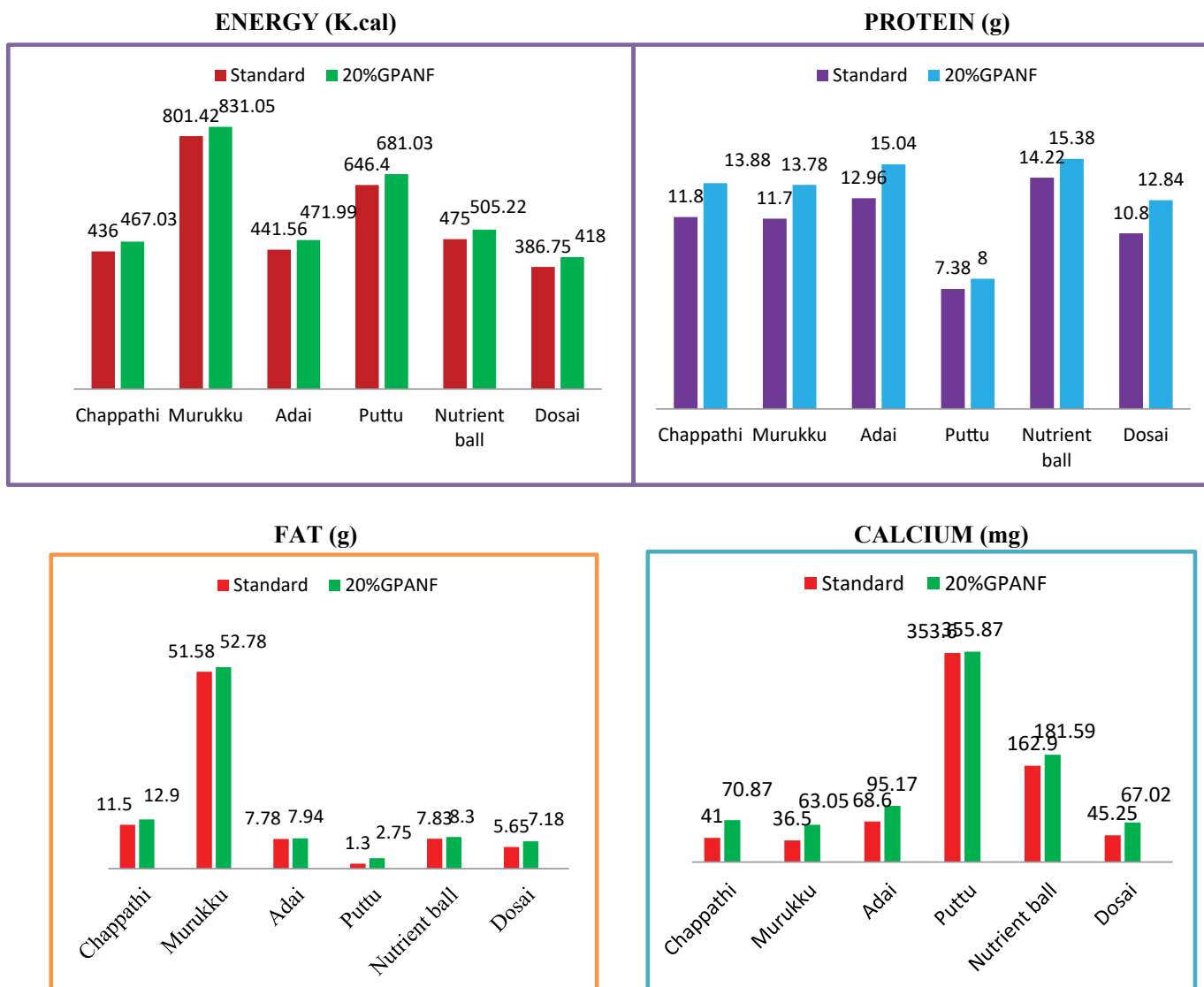


Figure 1. Percentage increase or decrease in the nutrient content if standard and formulated recipes.

Table 2. Microbial count of GPAN flour stored in plastic container

Storage	Initial	After 15 days	After 30 days
Plastic container	22× streptococci	30× streptococci	53× streptococci

GPANF- Germinated Pulses and Nuts Flour

11. Conclusion

Hence, it may be concluded from the above findings that incorporation of GPAN flour in Ready to Cook mixes and preparation of recipes could enhance the nutrients like protein, iron, fibre, phosphorus and calcium content and antioxidant like Vitamin E. According to panel members, all recipes made with 20% GPAN flour incorporation was found to be best and highly acceptable. The nutrition education and popularization of recipes using GPAN flour through cooking demonstration proved effective in

improving the nutritional knowledge about germinated pulses and underutilized nuts among the mothers.

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