

## Development of Formulated ready mix (Puttu) by incorporating jackfruit seed flour

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**Abstract:** Jackfruit (*Artocarpus heterophyllus*) is widely grown in India and it is one of the popular fruits in tropical region. Jackfruit seeds are generated as waste product in jackfruit processing industries. In order to reduce post-harvest losses and use its potential source of protein and carbohydrate in seeds are converted into flour and incorporated in South Indian traditional food (Puttu). To make it more conventional and easier for research project we made instant puttu mix. To increase the bioavailability and the nutritional value for the puttu mix the jackfruit seed flour is blended with rice flour and fat reduced coconut flour. Puttu mix was prepared with two different composition and standardized. In result we found that products with incorporated jackfruit seed flour possess better nutraceutical appeal, and more consumer acceptability. On performing proximate and sensory analysis sample B with 50% rice flour, 30% jackfruit seed flour and 20% fat reduced coconut flour was found to be optimum.

**Keywords:** Jackfruit seed flour, Postharvest losses, Puttu mix.

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### 1. Introduction

Jackfruit is one of the edible tree-borne tropical fruit. It derives from the Greek words 'artos' which means bread and 'karpos' which means fruit, so it is referred as 'breadfruit'. Bangladesh, India, Myanmar, Thailand, China, the Phillipines, Indonesia, Malaysia and Srilanka are the countries producing jackfruit. This fruit is native from India, but it is a national fruit of Bangladesh. Jackfruit production and cultivation area was reported at 1931 million Tonne and 189,000 Ha (Horticulture Statistics Division). Around 10-15 % of jackfruit weight is comprised of jackfruit seeds. The seeds are thrown out or left untreated as waste due to the bland taste and texture of the seeds. Jackfruit seed possess various health benefits such as antibacterial, antifungal, anticarcinogenic and anticancer to antihypertensive properties. It contains saponins, lignans, isoflavones, jacalin and artocarpin a class of glycoproteins. Jackfruit seed powder consists of rich source of dietary fibre, protein, carbohydrate, vitamins

A, B, C and minerals. Jackfruit seed flour is incorporated in food stuffs to prevent constipation, indigestion, controlling diabetes, reduces bad cholesterol level and obesity. Puttu is a breakfast dish in South India mainly in Kerala, Tamil Nadu, some part of Karnataka, and Sri Lanka. Puttu is a form of rice cake made in a special cylindrical vessel which consists of coarsely ground rice, grated coconut and Puttu, is wholesome food because the food is steamed and doesn't contain any oil in it so considered as healthy food. Due to its nutritional, functional and sensory assessments suggest that jackfruit seeds flour Jackfruit seed flour can be used with rice flour to develop a nutritious puttu mix and thereby it will reduce the post-harvest losses of jackfruit seeds.

## 2. Materials and Methods

### 2.1 Raw materials

In this study the main raw materials are jackfruit seed flour which is incorporated with commercially available rice flour.

#### 2.1.1 Other ingredients

Other ingredients which used in making a nutritious puttu mix is fat reduced coconut flour.

### 2.2 Preparation of jackfruit seed flour

The jackfruit of **Varika** collected from the Kanyakumari district a southernmost end of Tamil Nadu state., The jackfruit seeds were cleaned with water and white arils (seed coat) were manually peeled off. Seeds were boiled for 10-15 minutes to remove the thin brown spermoderm which covers the cotyledons. The spermoderm layer was removed by scrapping the seeds with knives and thoroughly washed under running water. The peeled off seeds were sliced into thin chips using knives and dried at 50° C for 48 hours. The chips were grounded into fine powder and packed in polyethylene pouches and stored ambient temperature.

### 2.3 Puttu Mix Preparation

For the preparation of coconut flour the fruits were purchased from a local market,

dehusked, cracked and grated. The grated coconut was allowed to boiling for 45 minutes thrice. After boiling the water was decanted and kernel and the kernel meat was collected. To eliminate milk from the kernel, it was passed through a cheese cloth and squeezed. The kernel was dried in an oven for 5 hours at 105°C. Blend it into a fine powder and stored in polyethylene pouches for further use. The Puttu mix was prepared by adding 50% of commercially available rice flour, 25% and 30% of jackfruit seed flour, 20% and 25% of fat reduced coconut flour and packed in polyethylene pouches.

### 2.4 Preparation of puttu by using a developed puttu mix

Puttu was prepared by above mentioned ingredients with addition of water to flour then tempering it. While addition of water into the flour made sure that consistency of flour free from clumps. The composite mixture was filled into a puttu mould and steam it.

Ingredients	Control	Sample A	Sample B
Rice flour (g)	100	50	50
Jackfruit seed flour (g)	0	25	30
Fat reduced coconut flour (g)	0	25	20



**Fig 1.1 Prepared puttu by using developed puttu mix**

## 2.5 Proximate Analysis

The developed product mix was analysed for proximate (moisture, crude protein, crude fat, crude fiber and total mineral matter are expressed in percentage) by AOAC 1990.

## 2.6 Sensory Analysis

Sensory acceptability of prepared puttu by incorporating developed puttu mix was performed with 30 panelists of students and staffs of the College of Fish Nutrition and Food Technology, Chennai. Sensory characteristics like colour, flavor, taste, texture and overall acceptability were evaluated using 9-point hedonic scale

## 3 Results and Discussions

### 3.1 Seed flour yield

160 seeds were collected and it weighs 1100g. After removal of white arils and thin brown spermoderm seeds weight is reduced to 970g. After drying the seeds were grounded into fine flour and the weight of the flour was found as 520g.

### 3.2 Physico-chemical analysis of developed puttu mix

Nutrient contents in terms of moisture, protein, fat, fibre, ash and carbohydrate of developed puttu mix and rice flour is shown in Table 2.

Among the two samples, control sample with raw rice flour shows lower moisture content (7.08%) whereas, the higher moisture content (7.35%) was recorded in sample B. Moisture content of developed puttu mix increased by incorporating jackfruit seed flour which was observed by Siti Faridah and Noor Aziah (2012) during his studies.

Carbohydrate content of control sample mix with raw rice flour and the developed puttu mix was found similar values. This indicates that there is no loss of energy intake.

Fat content of developed puttu mix (0.12%) shows decreased value whereas control sample mix with raw rice flour (0.14%) shows slightly increased value. This results shows that it lower the intake of fat content.

Protein content of developed puttu mix shows higher value (8.5%) than that of control sample which was found to be 6.52%. Thus the product mix contains more amount of

protein and it is useful to overcome protein malnutrition.

Fibre content was observed higher in developed puttu mix (1.16%) whereas, the

Mineral matter of developed puttu mix (0.96%) results higher value than that of control sample (0.48%).

control sample mix shows lower fibre value (0.24%).

**Table 2. Proximate analysis**

Sample	Moisture (%)	Protein (%)	Fibre (%)	Fat (%)	Ash (%)	Carbohydrates (%)
Control sample (100% RF)	7.08%	6.52%	0.24%	0.14%	0.48%	8%
Sample B (50 RF: 30JSF: 20 FCF)	7.35%	8.5%	1.16%	0.12%	0.96%	8%

RF- Rice flour; JSF-Jackfruit seed flour; FCF-Fat reduced coconut flour.

Quality Parameters	Control sample	Sample A	Sample B
Appearance (%)	7.23	7.73	7.8
Colour (%)	7.35	7.78	8.15
Flavour (%)	7.15	7.36	7.8
Texture (%)	7.15	7.45	7.8
Taste (%)	7.25	7.33	8.13
Overall acceptability (%)	7.25	7.46	8.17

### 3.3 Sensory Evaluation

Results of sensory evaluation of puttu samples prepared by using developed product mix in two proportions as compared to control sample are listed in Table 3.

Sensory characteristics like appearance, colour, flavor, texture, taste and overall acceptability are evaluated using 9-point hedonic scale. The score for colour indicated that the sample B was preferred by most of the panelists. There were significant differences in taste between the control sample and sample A & B. Among these samples, sample B (30%

### 4. Conclusion

This study reveals that jackfruit seed flour supplementation with rice flour in developing puttu mix increased protein and fibre value with more delectability in sensory qualities. The addition of 25% JSF incorporated puttu results with good overall acceptability.

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