



# FUNCTIONAL PROPERTIES AND NUTRITIONAL COMPOSITION OF JACK FRUIT SEED FLOUR BLENDS

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## Abstract

Jackfruit (*Artocarpus heterophyllus* Lam.) belongs to the family 'Moraceae' and is a native of India. It bears the largest fruits among edible fruits. Even though it enjoyed the status of a heavenly fruit in Kerala during ancient periods, it has lost its status and is one of the most under exploited fruits in the state today. Jackfruit has been referred to as the poor man's crop. Amongst the enlightened population of Kerala, it is valued for its nutritional content and medicinal properties (Kumari, Veena, 2015). The ripe fruit contains well flavored yellow sweet bulbs and seeds (embedded in the bulb). Seeds make up around 10% to 15% of total fruit weight. Seeds are normally steamed and eaten as a snack or used in some local dishes. Jackfruit seeds are less popular as vegetable and are eaten after boiling and roasting. The composition of jackfruit seeds has been reported and found to contain similar compositions as that of grains. The seeds are also rich sources of nutritional supplement such as protein, and good sources of fiber and vitamins (Henry Nguyen, 2016). Hence, the study was undertaken to blend jackfruit seed flour and bajra flour with the following objectives: 1.To process and prepare jackfruit seed flour and Bajra flour; and 2. To blend jackfruit seed flour with Bajra flour in various proportions; and 3. To assess their Functional properties like: Bulk density, Water absorption capacity, Oil absorption capacity, swelling index and Nutritional composition like; Carbohydrate, Protein, Fat, Crude fibre, Calcium and Iron.

**Key words:** Jackfruit seed, Functional properties, Nutritional composition.

## Introduction

Food is the basic necessity of everyone life in this world. A recent survey stated that consumers are concerned about limiting the amount of calorie and cholesterol in daily diet as higher fat intake result into cardiovascular diseases which are highly pernicious. The jackfruit seed flour is rich in protein and carbohydrate while low in fat and calorific value and it is relevant to convert seed into flour and use it in different convenience food products (Shrivastava, 2015). Jackfruit (*Artocarpus heterophyllus Lam.*) a member of the family Moraceae is the largest tree-borne fruit in the world. India is the second biggest producer of the fruit in the world and is considered as the motherland of jackfruit. The jackfruit is native to parts of South and Southeast Asia and is believed to have originated in the rainforests of Western Ghats of India and is cultivated throughout the low lands in South and Southeast Asia. Major jackfruit producing countries are Bangladesh, India, Myanmar, Nepal, Thailand, Vietnam, China, the Philippines, Indonesia, Malaysia and Sri Lanka. There are 100-500 seeds in a single fruit. Jackfruit seed contains lignans, isoflavones, saponins, all phytonutrients and their health benefits are wide-ranging from anticancer to antihypertensive, antiaging, antioxidant and antiulcer (Vinod, 2015). Jackfruit seeds are a source of fiber, potassium, calcium and sodium and they are an under-utilized product in many tropical countries. Jack fruit is still under used due to seasonality, difficulty in logistics and conservation and low consummation due to a high sensory intensity of taste and aroma in addition to an association of jackfruit with poor communities (Fernanda, 2018). The jack fruits seed flour is not only a rich source of protein, starch and dietary fibers but can also be regarded as an abundant yet cheap source of the said nutrients. Bajra or Pearl Millet (*Pennisetum glaucum*) is one of the oldest millet used by our ancestors. It is used as a regular meal in places like Rajasthan, Gujarat (Shweta Malik, 2015). Hence, the study was undertaken to blend jackfruit seeds flour and bajra flour with the following objectives: 1. To process and prepare jackfruit seed flour and Bajra flour; and 2. To blend jackfruit seed flour with Bajra flour in various proportions; and 3. To assess their Functional properties like: Bulk density, Water absorption capacity, Oil absorption capacity, swelling index and Nutritional composition like; Carbohydrate, Protein, Fat, Crude fibre, Calcium and Iron.

## Materials and Method

The processing of flour from jackfruit seed and bajra and to prepare flour blends in various proportions and its analysis (both functional and nutritional composition) were done in the laboratories of Department of Home Science, The Gandhigram Rural Institute – Deemed to be University, Gandhigram.

## Procurement of Jackfruit and Bajra

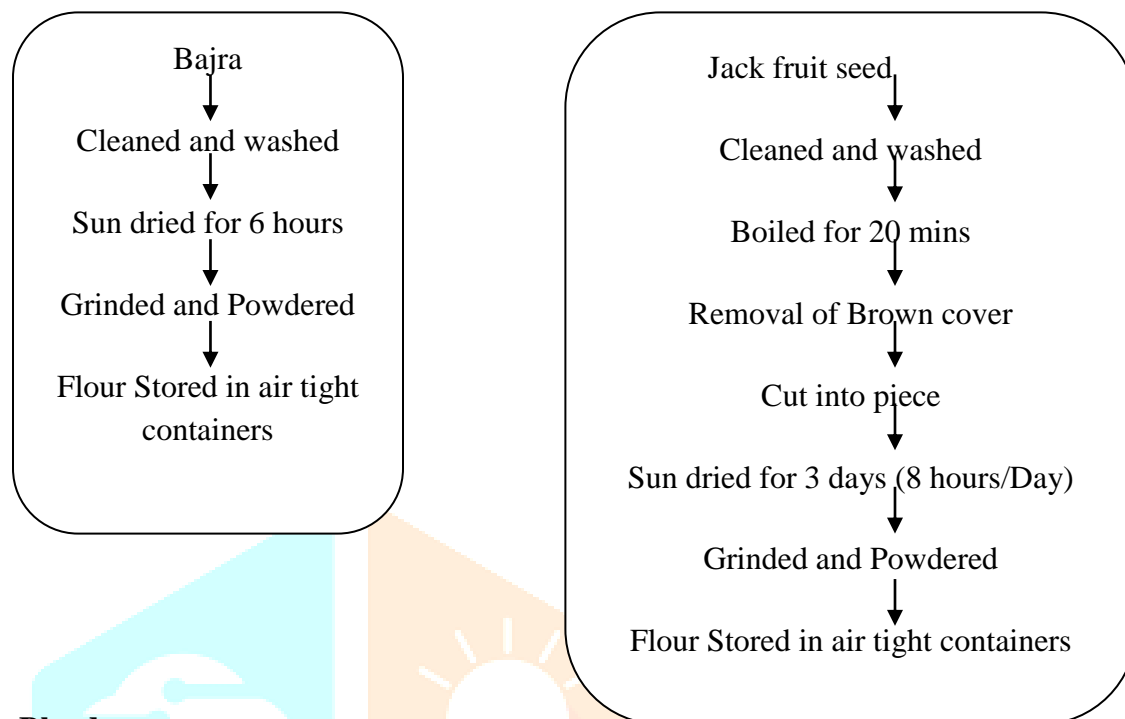
The Jackfruit from sirumalai hills, Dindigul was purchased and the seeds were removed for further processing and bajra was purchased from local market from Dindigul.

## Processing of Jackfruit Seeds and Bajra

Jackfruit seed (3 kgs) were removed from fruits, cleaned, and the white seed coat was removed and the seed was boiled for 20 minutes, then the brown cover was manually peeled off. Any wreckage in bajra were handpicked to remove any spoiled broken / empty seeds and washed in running water and drained. Both the boiled jackfruit seeds and bajra were sundried, powdered and stored in airtight containers separately. The processing technique is given in flow chart 1.

### Flow Chart 1

#### Processing of Jackfruit Seed and Bajra



#### Flour Blends

To prepare flour blends the jackfruit seed flour was mixed with bajra flour in various proportions and is given in Table 1.

**Table 1**  
**Variation of Flour Blends**

Variation	Ingredients	
	Bajra Flour (in g)	Jackfruit seed Flour ( in g)
BJ1	80	20
BJ2	60	40
BJ3	40	60

#### Functional Properties

The functional properties like bulk density, water absorption capacity, oil absorption capacity and swelling index were analysed in the flour blends.

#### Proximate Analysis of Flour

The crude fibre, calcium, iron, ash and moisture contents were determined according to standard methods of AOAC. The protein, carbohydrate and fat were determined by lowry's method, anthrone method, solvent extraction with petroleum ether respectively. Analyses were carried out in triplicates.

## Result and Discussion

### Functional Properties:

The functional properties are important in the food systems for the creation of new products. The bulk density, water and oil absorption capacity and swelling index was found to be 0.55g/ml, 2.9ml/g, 1.7mg/dl and 1.46g/g respectively in the all three blends.

### Proximate Composition:

The proximate analyses of the flour blends are shown in the Table 2.

**Table 2**  
**Proximate Composition of Flour Blends**

Nutrients Analysis	Variation of flour		
	BJ1	BJ2	BJ3
Moisture (g)	8.9	9.0	9.0
Ash (g)	5.4	5.1	5.3
Carbohydrate (g)	59	62	69
Protein (g)	6.71	6.82	7.0
Fat (g)	1.43	1.56	1.85
Crude fibre (g)	3.6	2.9	4.2
Calcium (mg)	68	64	70
Iron (mg)	4.2	4.0	4.3

Table 2 shows the proximate composition of flour blends. The carbohydrate content of flour blends were 59g, 62g and 69g respectively. The protein content of flour blends was 6.71g, 6.82g and 7.0g respectively. The fat content of flour blends was 1.43g, 1.56g and 1.85g respectively. The crude fibre content of flour blends was 3.6g, 2.9g and 4.2g respectively. The calcium content of flour blends was 68mg, 64mg, 70mg respectively. The iron content of flour blends was 4.2mg, 4.0mg and 4.3mg respectively.

The proximate analysis of flour blends shows that the blends of jackfruit seed powder and Bajra flour at 60:40 ratio (BJ3) shows increased level of protein, carbohydrate, fat, calcium, crude fibre and iron than the other two flour blends (BJ1 and BJ2).

### Conclusion

It can be concluded that 20%, 40% and 60% jackfruit seed flour can be successfully incorporated in various ready mix which also has a great potential in new food formulation by its nutritional contents like fibre, calcium and iron.

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