



## **DEVELOPMENT AND STANDARDIZATION OF JACKFRUIT SEED FLOUR INCORPORATED VALUE ADDED PRODUCTS**

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### **ABSTRACT**

The Jackfruit seed is rich in protein and carbohydrate while low in fat and calorific value. It is relevant to convert seed into flour and use it in different convenience food products. Hence, a Study on “Development and Standardization of Jackfruit seed flour incorporated Value Added Products” was conducted. For this study, value added products such as Cookies, Cake and Sweet diamond cuts Cake were prepared by standardized Jackfruit seed flour and the developed products were subjected to sensory evaluation. In the sensory evaluation, the selected value added products were subjected to nutrient and cost analysis. Microbial analysis was carried out to find out the shelf life of the product. In this study, it was found out that the Jackfruit seed flour could be a potential promising ingredient for functional food in order to prevent illness and improve overall health. This study could also open of new entrepreneurship business challenge in food processing field for small and medium enterprise.

**Key words:** Jackfruit seed, Jackfruit seed products, Jackfruit seed flour

### **INTRODUCTION**

*Artocarpus heterophyllus Lam.*, which is commonly known as Jackfruit is a tropical climacteric fruit, belonging to Moraceae Family, native to Western Ghats

of India and common cultivated plant in Asia, Africa and some regions in South America. It is known to be the largest edible fruit in the world. Jackfruit is rich in

nutrients including carbohydrates, proteins, vitamins, minerals and phytochemicals. Both the seeds and the flesh of Jackfruit are consumed as curries and boiled forms, while the flesh in fully ripen stage can be eaten directly as a fruit (Ranasinghe *et al.*, 2019). Jackfruit also has been reported to contain antioxidant phenyl flavones. Recently, antioxidant capacity of fruit pulp has been evaluated (Jagtap *et al.*, 2010).

Jackfruit seed can be converted into flour and to be used as a protein and carbohydrate supplement in diets or can also be used as a functional agent in a variety of formulated foods in bakery product (Otegbayo *et al.*, 2013). The flour has good ability to bind water and lipid (Swami *et al.*, 2012). As stored seeds are recalcitrant, they germinate immediately after maturity. Therefore, fresh seeds cannot be stored for long time. If seeds are dried to the safe storable moisture content, it can be preserved for longer duration. The seed flour can be alternative product to be used in some food stuffs such as white bread, cake, extruded product and it can also be used as thickening and stabilizing agent (Butool *et al.*, 2015). The Jackfruit seed flour may also be blended with wheat flour to explore the potential of low cost flour from Jackfruit seed as an

alternative raw material for bakery products (Chowdhury *et al.*, 2012).

Thus, usage of Jackfruit seed flour in the preparation of the traditional sweet is a boon as it contains numerable health benefits. It tries to help improving commercial flour in terms of spoilage and shelf life. As Jack fruit is highly seasonal, seeds have shorter shelf life and go waste during the seasonal glut, plan to use the Jack fruit seed flour as an alternative intermediary product, which can be stored and utilized, both for value addition and to blend with other grain flours without affecting the functional and sensory profile of the final product. Moreover, the incorporation of seed flour to deep fat-fried products has been found to reduce the fat absorption to a remarkable extent (Rajarajeswari *et al.*, 1999).

Hence the present study has been planned to analyse the nutrient content, phytochemicals, physical parameters, and shelf life of Jackfruit seed flour, to standardize the Jackfruit seed flour incorporated value added products such as Cookies, Cake and Sweet Diamond Cuts, Cake and its cost analysis.

## **METHODOLOGY**

The ingredients used for the experimental work is given in the table 1

## PREPARATION OF JACKFRUIT SEED FLOUR

The collected Jackfruit seeds were washed and boiled for 5 minutes. After boiled, the skin is removed then it is cut into small pieces. The pieces were dried into Cabinet Drier. After drying, the seeds were grinded well and sieved. The prepared Jackfruit seed flour was stored in air tight container for further uses.

## DEVELOPMENT OF VALUE ADDED COOKIES

In this study, sample A, sample B and sample C were prepared by using 2.5%, 5% and 7.5% of Jackfruit seed flour respectively (**Table 1**). Control was prepared as per the standard cookies recipe. The dry ingredients were sieved and mixed well with jaggery and butter then made dough. After that, sheeting, cutting and baking were done at 150°C for 15 minutes.

## DEVELOPMENT OF VALUE ADDED CAKE

In the present study, sample A, sample B and sample C were prepared by using 2.5%, 5% and 7.5% of Jackfruit seed flour respectively (**Table 2**). Control was prepared as per the standard cake recipe. The flour was sieved with baking powder twice. Beat the egg yolk and butter together then add jaggery little by little and cream well. The egg white was added and

folded gently then was poured it on the greased mold and was baked at 200°C for 20 minutes.

**Table 1: Ingredients used for the Development of Value Added Cookies**

S. No	Ingredients	Control	Sample		
			A	B	C
1	Wheat flour	25	22.5	20	17.5
2	Jackfruit seed flour	-	2.5	5	7.5
3	Butter	15			
4	Jaggery	10			
5	Salt	To taste			
6	Baking powder	A pinch			

## DEVELOPMENT OF VALUE ADDED SWEET DIAMOND CUTS CAKE

In this experimental study, sample A, sample B and sample C were prepared by using 2.5%, 5% and 7.5% of jackfruit seed flour respectively (**Table 3**). Control was prepared as per the standard sweet Diamond Cuts Cake recipe. Dry ingredients were taken, sieved and enough quantity of water was poured to the flour for dough making. Dough was made and rolled in round shape and cut into small pieces then fried in oil.

**Table 2: Ingredients used for the Development of Value Added Cake**

S. No	Ingredients	Control	Sample		
			A	B	C
1	Wheat flour	25	22.5	20	17.5
2	Jackfruit seed flour	-	2.5	5	7.5
3	Butter	25			
4	Jaggery	25			
5	Egg	1			
6	Salt	To taste			
7	Baking powder	A pinch			
8	Milk	2tsp			
9	Essence	Few drops			

**Table 3:Ingredients used for the Development of Value Added Sweet Diamond Cuts Cake**

S. No	Ingredients	Control	Sample		
			A	B	C
1	Wheat flour	25	22.5	20	17.5
2	Jackfruit seed flour	-	2.5	5	7.5
3	Vanaspathi	2g			
4	Jaggery	20			
5	Salt	To taste			
6	Oil	3ml			
7	Water	As required			

## SENSORY EVALUATION OF VALUE ADDED FOOD PRODUCTS

The sensory characteristics of Value Added Products prepared by incorporated Jackfruit seed flour such as Cookies, Cake and sweet diamond cuts Cake were assessed with the help of 10 panel members using 5 point Hedonic Rating scales. The panelists were asked to give scores for colour, flavor, texture, taste and overall acceptability separately for the prepared products. The mean scores of all attributes helped to find the best out of the samples.

### STATISTICAL ANALYSIS

The mean value and standard deviation of value added products by incorporated Jackfruit seed flour were analyzed statistically.

### ANALYSIS OF PHYSICAL ATTRIBUTES

Physical qualities such as water and oil absorption attribute and swelling attribute of the seed flour were analyzed.

### PHYTOCHEMICAL SCREENING

Qualitative phytochemical screening of Jackfruit seed flour was carried out for the detection of various constituents such as phenol, saponin, tannin, flavanoids, terpenoids, glycoside, alkaloids and fixed oil.

## NUTRIENT ANALYSIS

The ash content was determined for the selected value added products by incorporated Jackfruit seed flour. Carbohydrate and protein of the sample was estimated by Benedict's and Lowry's Method respectively. Crude fiber was determined for selected Jackfruit seed flour incorporated food products.

## MICROBIAL LOAD ANALYSIS

The microbial load was carried out to find out the shelf life of the Jackfruit seed flour for about 30 days. The microbial load was determined at 3 intervals using standard Plate Count Method.

## COST ANALYSIS

Considering the raw materials, labour cost, fuel and packaging used for developed Jackfruit seed flour incorporated food products, the cost analysis was done. The cost was calculated for 100g of the prepared Jackfruit seed flour incorporated value added products.

## RESULTS AND DISCUSSION

The results on nutrient content and physical attributes are given in Figure 1 & 2. Regarding the estimation of physical properties of Jackfruit seed flour, the value of water absorption capacity was found to be 0.84, fat absorption capacity was 0.48 and swelling power absorption capacity was 5.06. The phytochemicals such as phenol, saponin, tannin, flavanoids,

terpenoids, and alkaloids were found to be present in the Jackfruit seed flour.

The sensory score was obtained from 10 panel members with three variations of Jackfruit seed flour in the developed cookies (Sample A 2.5g, Sample B 5g, and Sample C 7.5g). It was found that the Sample B had good score (4.9, 4.7, 4.7, 4.7, 4.7) in the sensory evaluation than other variations.

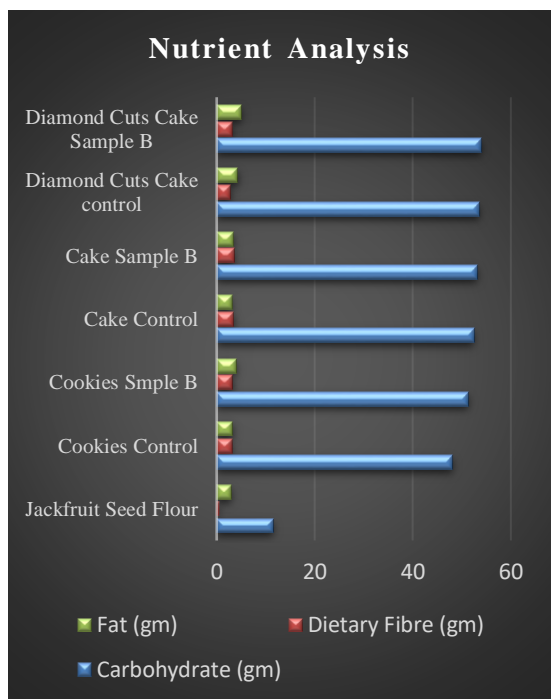
The sample B was selected for further studies. From the mean score of colour, flavour, texture, taste and overall acceptability of the Jackfruit seed flour incorporated cake, it was found that Overall Acceptability of Sample B was 4.8. But the other two samples A and C got 3.9 and 3.9 mean score respectively. Therefore 5% Jackfruit seed flour incorporated cake scored the excellent sensory attributes.

The Jackfruit seed flour incorporated sweet diamond cuts cake Sample C gained a higher score than the other two samples. Out of the three samples, sample C scored as the best with the overall mean score of  $4.7 \pm 0.12$ . Sample A and C scored the overall mean acceptability score of  $3.6 \pm 0.18$  and  $3.4 \pm 0.18$  respectively. Hence Sample C was chosen for further studies.

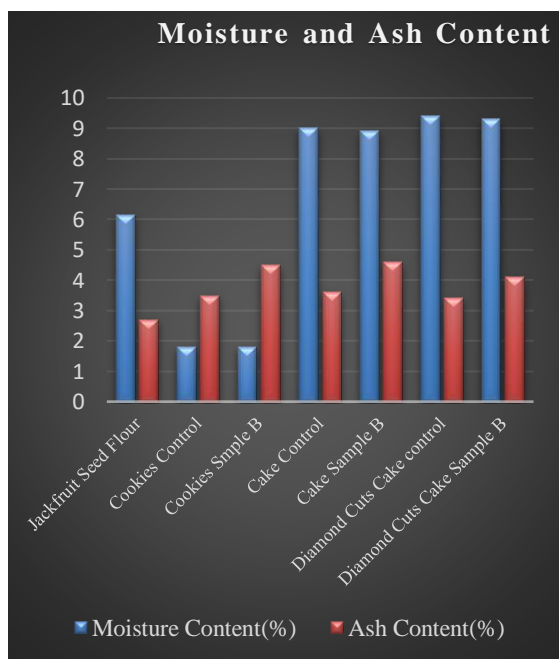
The result of the microbial load it was found that the products had too few to

count microorganisms at room temperature and refrigeration temperature.

**Figure 1: Nutrient content of various Value Added Products prepared from Jackfruit flour**



**Figure 2: Moisture and Ash Content of various Value Added Products prepared from Jackfruit flour**



**COST ANALYSIS OF JACKFRUIT SEED FLOUR INCORPORATED VALUE ADDED PRODUCTS**

A cost-benefit analysis is used to evaluate the risks and rewards of project and consideration. It can be used to project the potential benefits of investing in marketing ideas, product development, infrastructure enhancements and operational changes. In this study, cost analysis for value added products was determined and the cost of Cookies, Cake and Diamond Cuts Cake were found as Rs.45, Rs.65 and Rs.30 respectively.

In this study, it was found out that Jackfruit seed flour could potentially be used as ingredients in the production of some functional foods for human consumption through enhancing the nutritional value of several food products. The results show that Jackfruit seeds are excellent sources of dietary fibre and may therefore serve as important constituent of functional foods. It has the potential to replace wheat flour in Cookies, Cake and sweet Diamond Cuts Cake. These new value added products prepared from Jackfruit seed flour may replace the current sweet Diamond Cuts Cake due to its delicious and nutritive content. This idea could also open up new entrepreneurship business challenge in

food processing field for small and medium enterprise.

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