



e-ISSN: 2319-8753 | p-ISSN: 2347-6710

# IJRSET

International Journal of Innovative Research in  
**SCIENCE | ENGINEERING | TECHNOLOGY**



# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 12, Issue 6, June 2023

**ISSN** INTERNATIONAL  
STANDARD  
SERIAL  
NUMBER  
INDIA

Impact Factor: 8.423

 9940 572 462

 6381 907 438

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# A Comprehensive Review on Utilization of Jackfruit Seed in Food Industry

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**ABSTRACT:** The processing of jackfruit (*Artocarpus heterophyllus Lam.*) produces a large number of peels, seeds, and latex waste, which contributes to environmental pollution. These wastes can be used as an appealing source for many sustainable goods. In the bread sector, jackfruit seed flour has the potential to replace wheat flour (25–30%). It may also be utilised as a raw material for the creation of red pigments, which can be used as dyes in the textile industry and to make Fast Dissolving Tablets (FDT).

**KEYWORDS:** Jackfruit seed, Biscuit, bakery industry, food industry

## I. INTRODUCTION

The vast amount of peel, seed, and latex waste produced by the Jackfruit processing industry. If these wastes are not properly disposed of, it has been shown to lead to major environmental issues such water contamination, offensive odours, suffocation, and greenhouse gas emissions. The most crucial thing is to use the bioactive compounds in these wastes for their potential uses as antioxidants, antimicrobials, flavouring, colourants, and texturizing agents [1].

The processing industries and pollution monitoring organisations have a problem with these fruit wastes. It is necessary to transform these wastes into various byproducts, such as the peel, which can be used to prepare pectin, activated carbon, adsorbant, and the production of bio-hydrogen, the seed, which can be used to make food colour, ethanol, cattle feed, and fast-dissolving tablets, and the latex, which can be used to promote dental health, among others. This can help with the issue of waste reduction and improve the financial situation of the jackfruit processing facility.

The seeds in jackfruit, which make up around 10-15% of the fruit, are high in digestible starch, protein, minerals, and vitamins as well as phytonutrients including saponins, lignans, and isoflavones, which are known to have positive effects on human health. The annual seed production of a single jackfruit tree is 390 kg [2]. The seed powder of jackfruit having anti-microbial potential [3].

The goal of the current review is to examine the use of jackfruit seed as food, feed, medicine, and energy while lowering the danger of environmental damage. The community should benefit from the promising efforts made by the numerous researchers for the lawful use of these wastes into valuable by-products.

## II. NUTRIENT COMPOSITION AND HEALTH BENEFITS OF JACKFRUIT SEED

Consuming jackfruit seeds is very healthy for people since they aid in digestion, have anti-carcinogenic qualities, and reduce the appearance of wrinkles on the skin. Natural food enhancers and ingredients may be obtained from it as well [4]. Additionally, the vitamins A, B, C, and pectin components included in jackfruit seeds aid in blood purification and pancreatic health maintenance [5]. Jack fruit seeds are rich in protein, fibre, vitamins, minerals, and low levels of fat.



The individual on a crash diet for weight loss might choose this low-fat diet. According to Felli et al. (2018) [6], it has a large amount of dietary fiber—seven times more than whole wheat flour.

**Table 2.1 Nutrient composition of Jackfruit seed**

S. No.	Constituent	Quantity
1.	Moisture (wb)	61.80 g
2.	Protein	11.85 g
3.	Fibre	3.19 g
4.	carbohydrate	26.20 g
5.	Fat	1.06 g
6.	Ash	2.96 g
7.	Calcium	308.7 mg
8.	Iron	13.07 mg
9.	Potassium	246 mg
10.	Vitamin C	11.0 mg
11.	Calorific Value	382.79 kcal

[Sources: 7, 8, 9]

### III. UTILIZATION OF JACKFRUIT SEED IN FOOD INDUSTRY

Sometimes the raw jackfruit seed is simply cooked and eaten. Jackfruit seeds have the potential to be utilised in the culinary business as a low-cost component in biscuits, bread, cakes, gum sweets, and fillings as well as in the cosmetics sector, this is because they are a rich source of starch [10, 11].

The seed flour might be handy when making pasta and other extruded goods. Because of its high solubility and suitability for soups, sauces, hot drinks, and quick-cooking items, jackfruit seed flour can replace more expensive gums that are now used in many applications. It can also be used for food coatings. It is feasible to utilise roasted jackfruit seed as an alternate source of chocolate scent in various food items since the roasted jackfruit seed flour has chocolate aroma intensity that is comparable to cocoa powder.

The cereal bar made from jackfruit seeds with a 30%–40% mix has a higher fibre content than commercially available bars on the market, which is where the scent of chocolate comes from in various food products [12].

The chapatti produced with a mix of wholemeal wheat flour, bengal gramme flour, and 10% jackfruit seed flour received the most favourable reviews. Jackfruit seeds have potential as a substitute raw material for ethanol manufacturing and as a natural food preservative [13].

Since natural food colours are healthy, there is now rising demand for them. Due of their teratogenic and carcinogenic effects, synthetic colouring compounds are prohibited. It has long been known that the *Monascus genus* of bacteria produces red pigments that may be used to colour food. The jackfruit seed was used to create the red natural pigment. The extraction of red pigments from jackfruit seeds is also an easy and affordable method. As a natural food colourant, jackfruit seed powder made from dried, ground-up, and fermented seeds might be utilised [14].

Linoleic acid and alpha-linolenic acid, two important fatty acids, are abundant in jackfruit seed oil. About 1.35 g/100 g of free fatty acids are present [15]. The necessary fatty acids and extraordinary antioxidant qualities of jackfruit seed oils make them particularly effective for treating a variety of chronic ailments [16].

The starch from jackfruit seeds can be used in microencapsulates as a shell material in the food and pharmaceutical industries because they have properties like non-toxicity, gelling and thickening ability, stability to thermal and mechanical stress, binding capacity, strong water and oil absorption, low viscosity, and acid resistance. Jackfruit seeds also contain 13.50% protein, 79.34% carbohydrates, and 3.19% fibre. The vanilla oil, which is most frequently used as a flavouring in confectionery, food products, beverages, ice cream, perfume, cigarettes, and pharmaceutical products, was enclosed in a shell made from jackfruit seed starch. The yield and encapsulation efficiency of the shell were 84.82% and 79.33%, respectively. The encapsulated Jackfruit seed starch material also shown excellent storage stability and potential for gradual release, allowing the vanilla oil to be securely kept for 250 days [17].



Plastic, which is harmful to the environment and non-biodegradable but is affordable and meets all the requirements for idle packaging film, is the primary material used for packaging in the food sector [18].

#### IV. CONCLUSION

The main byproduct of the jackfruit processing industry, jackfruit seed is a rich source of pectin and an efficient way to remove hazardous colours like methylene blue and Cd (II) from aqueous solutions. In the bread industry, jackfruit seed flour is an excellent substitute for wheat flour. It may also be used in lieu of chemical coagulants like alum and ferric chloride coagulant to remove anionic surfactants from laundry effluent. Without altering the qualities of chocolate, it may also be used in place of cocoa powder. Jackfruit seed can be used in dentistry as a less expensive and less expensive substitute for a number of pricy treatments and supplies. In this context, jackfruit seed commercial conversion into high-value items has received special attention.

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SJIF Scientific Journal Impact Factor

Impact Factor: 8.423



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