



EMPLOYMENT AND MARKET POTENTIAL OF JACKFRUIT AS FOOD SUPPLEMENT

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ABSTRACT

Jackfruit is a fruit that is organic and nutrition-packed. It is known to be the largest edible fruit in the world, rich in carbohydrates, proteins, vitamins, minerals and phytochemicals. Despite the benefits, the fruit is underutilised in commercial scale processing due to lack of post-harvest technology and gaps in supply chain systems. The public has not appreciated its innumerable possibilities, commercially and nutritionally. As a result of this, more than 60% of this nutrition-packed fruit produced every year is wasted.

This paper provides an innovative business method to utilise the fruit as a medicinal value-added product (Jackfruit flour) for diabetes patients. By providing training, resources and disseminating technologies from research institutes, the Jackfruit flour can be produced by collectivising women Self Help Groups and jackfruit farmers. This will result in increased employment opportunities and market potential for jackfruit ensuring the effective utilisation of the crop.

KEYWORDS: *Jackfruit, wastage, Business method, Value-added product, flour, diabetes, employment.*

1. INTRODUCTION

1.1. Jackfruit (*Artocarpus heterophyllus Lam.*)

Artocarpus heterophyllus Lam., commonly known as Jackfruit, belongs to the mulberry family (Moraceae). It grows abundantly in India, Bangladesh, and many parts of Southeast Asia. It is one of the most significant evergreen trees in tropical areas with a medium size reaching 15- 20 metre in height. In India, jackfruit is cultivated in the tropical regions, distributed in the States of West Bengal, Assam, Uttar Pradesh, Maharashtra, Tamil Nadu, Kerala and Karnataka. The total area under jackfruit cultivation is approximately 1,02,552 hectares, of which, an estimated 1,00,000 trees are grown in backyards and as intercrop (Indian Institute of Food Processing Technology (IIFPT), 2020).

There are two types of jackfruit in Kerala, popularly called 'Varika' and 'Koozha'. The Varika variety has slightly hard fleshy bulbs and the Koozha variety has soft bulbs. Due to the textural and compositional characteristics of jackfruit, it cannot be stored for a long time. There is a lack of proper post-harvest knowledge during harvesting, transportation and storage, due to which a considerable amount of jackfruit is wasted. It is estimated that more than Rs 2000 crore worth of jackfruit is wasted annually in India (Ministry of food processing Industry, GoI, 2020).

1.2. Medicinal Properties of Jackfruit – Cure for Diabetes

Jackfruit is a very fibrous fruit rich in carbohydrates, vitamins, phytonutrients and minerals. It is extremely beneficial for diabetics as the fibre helps to slow down the rate of time at which the glucose is released into the blood. Assessment and evaluation of the nutritional and glycaemic value (Glycaemic Index, GI of Jackfruit is about 50-60 on a scale of 100) of green jackfruit is a proven alternative to rice for 'diabetes patients' (James et al., 2019). This fibre-rich fruit is an absolute substitute for carbohydrates, as the glucose level of unripe or green jackfruit is nearly half that of wheat or rice, which significantly helps in the reduction of blood glucose levels. One cup of jackfruit contains 155 calories and only 4 grams of fat and contains 11% of the required amount of fibre to improve the digestive system (Mission Jackfruit, Govt. of Meghalaya, 2020).

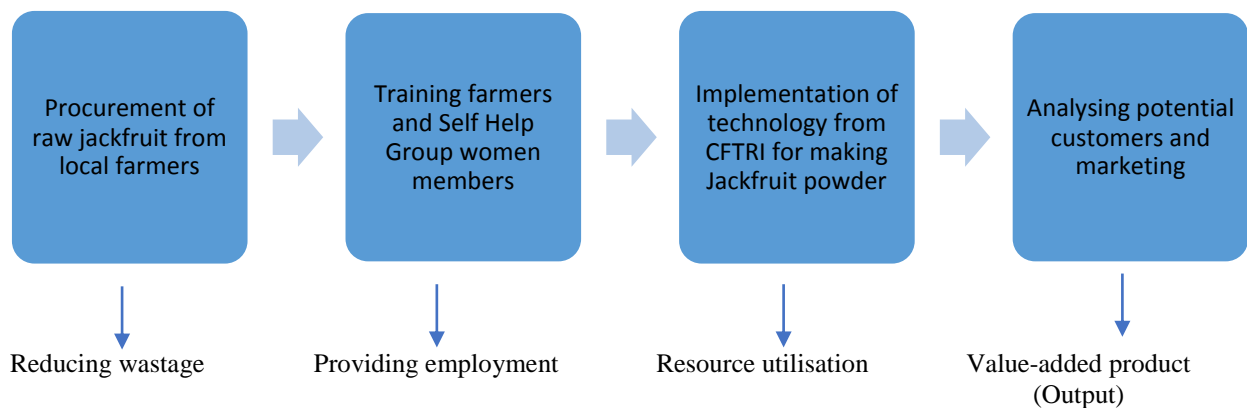


Fig1: Jackfruit (source: FoodTechBiz)

1.3. Jackfruit as Value Added Product

Jackfruit is one of the most underutilized fruits. It has immense potential for value addition and a wide variety of items can be prepared from jackfruit right from its raw immature stage to well-ripened stage. Transportation and packaging are huge impediments to the successful marketing of jackfruit, because of its heaviness and large size. Therefore, *value-added* products have more relevance for the commercial utility rather than the whole fruit. Jackfruit can be preserved by applying various techniques like drying, freezing, canning, or by converting it into various products.

2. BUSINESS METHOD



This research focuses on developing a value-added product from jackfruit for medicinal benefits. It can be done by training and catalysing women from rural and urban livelihood to become self-sufficient economically by establishing Small and Medium-sized Enterprises (SME). This can create a value chain for jackfruit products, reduce the substantial wastage of the fruit and also generate employment opportunities in rural areas. Jackfruit can be directly obtained from local farmers by eliminating the middlemen. This can help the farmers obtain greater profits from the food crop. The Self Help Group(SHG) members and jackfruit farmers can be trained to address food security standard protocol and nutrition by commercializing the jackfruit products and disseminating technologies for its production.

SWOT Analysis helps to identify and evaluate the position of the Food processing sector in the market. The letters S.W.O.T stand for strengths, weaknesses, opportunities, and threats. It can be applied to identify the current positioning and can form a strategy to move forward with the business method.

SWOT Analysis

Strength <ul style="list-style-type: none">• The enormous supply of jackfruits during the season.• Jackfruit is a climate-resilient crop.	Weakness <ul style="list-style-type: none">• Low shelf life• Perishability is low• Lack of marketing chains.
Opportunity <ul style="list-style-type: none">• High demand for healthy and vegan food/diet.• Participation and self-sufficiency of self-help groups and rural women, farmers.	Threat <ul style="list-style-type: none">• Failure to maintain proper hygienic standards.• Lack of customer base for the value-added products.

This research focus on the diabetes patients, which are one of the potential customers. The other ways through which the product can be marketed is via restaurant chains and inclusion of the jackfruit flour in bakery products which improves the nutritional benefits of local snacks and fast foods.

2.1. Value-added product – Jackfruit Powder

Value addition means the modification of a food commodity to enhance its value, especially by special manufacturing, marketing and processing. Using food processing technology or by changing the packaging of the product, value addition can be done by incorporating a new ingredient resulting in products that are far more appealing and usable for customers. The business management strategy associated with the value addition is plentiful. Jackfruit being one of the most underutilized fruits, it has immense potential for value addition. A proper commercial utility can be obtained by successful value addition to the product. Value addition requires clear business understanding, creative ideas, and market demographics. This research will focus on the innovative methods for the production of a value-added product – ‘**Jackfruit powder**’.

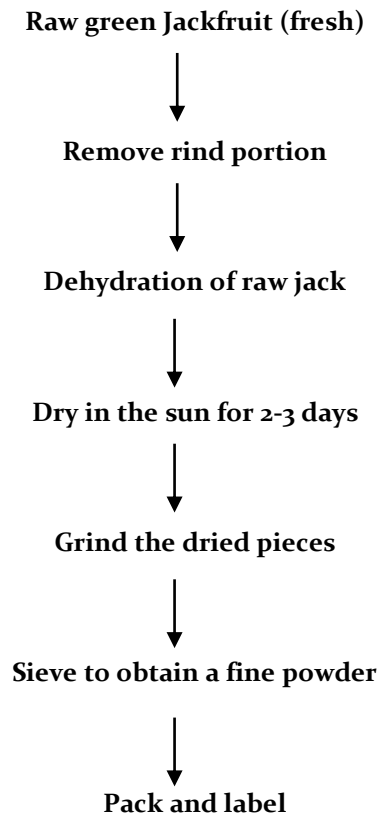
Processing of Jackfruit Powder:

Making **flour out of jackfruit bulbs** is a great solution for those people who are suffering from diabetes mellitus and want to have their daily carbohydrate by reducing their insulin intake. Jack flour (thrice a day, 2 teaspoons per meal) is a proven solution. The powder can be mixed with the usual flour used to make chapatis, dosa, etc. To make the powder, the main requirements are raw green jackfruit, dryer and grinder. The task of getting the product to the ultimate customers offers various opportunities to grow a business. Understanding the business, customers, and potential customers plays a vital role in the success of the business.

The process of making jackfruit powder involves drying the raw jackfruit, after removing its rind portion. The flour prepared by grinding dried jackfruit bulbs extends the shelf life of the product. The flour from ripe bulbs has a yellowish-white colour. Jackfruit flour, as it is diabetic-friendly and gluten-free, can be used along with wheat flour, which has nutritious fibre content and can have several health benefits. This study focus on promoting healthy and nutritious food to society, sufficing the medical needs of diabetes patients.



Fig: Raw Jackfruit (picture source: kkaj.in)



Flowchart 1: Process flow for production of Jackfruit powder.

2.2. Training Self Help Groups (SHG's)

Self-Help Group is a voluntary association of people preferably from the same socio-economic backdrop. In this business method, the SHG has to be trained to produce Jackfruit powder by utilizing the machinery and equipment obtained from research institutes. By following the business mission and vision, and creating a strategic group for each of the tasks (from collecting the best quality jackfruit, packaging and transporting it to customers and retail shops), it has to be responsibly followed to obtain the best quality product. The SHG will be trained to follow the Food Safety and Standard Authority of India (FSSAI) regulations through every phase of the process.

2.3. Dissemination of Technology

More than 100 types of value-added products can be made from jackfruit. Govt. research centres like CSIR-Central Food Technological Research Institute (CFTRI) are trying to standardize the production protocol of value-added products from jackfruits as per the FSSAI standard. New products are responsible for employment, economic growth, technological progress, and high standards of living. CFTRI provides technologies to increase efficiency and reduce post-harvest losses. The technology transfer initiative integrates human resources in food industries. Therefore, the local farmers and SHG members can form a Small and Medium-scale Enterprise (SME) where they adopt the technology for the processing of jackfruit powder.

2.4. Estimated Cost and Financial Analysis for the production of Jackfruit powder

The major component of a small-scale fruit processing unit includes fixed assets, working capital, marketing and processing costs. The Micro, Small and Medium Enterprise (MSME) can be financed by any scheduled commercial banks, Regional Rural Banks and Cooperative Banks. There are numerous incentives from the state government for the promotion of the food industry. A brief overview of the initial project expense is provided in the following Table.

A. Fixed Capital

Sl. No.	Particulars	Quantity	Unit Cost	Total Cost (₹)
1.	Electric dryer	1	1,00,000	1,00,000
2.	Packing machine	1	30,000	30,000
3.	Sealer	1	3000	3000
4.	Jackfruit cutter	1	4,000	4,000
5.	Weighing balance (1kg, 50kg)	1	15,000	15,000
6.	Work tables with aluminium top	2	35,000	70,000
7.	Grinding machine/ powdering machine	1	3,00,000	3,00,000
8.	Tables	3	25,000	75,000
9.	Knives and other factory utensils	5	10,000	50,000
10.	Labelling machine	5	2000	10,000
11.	Installation cost, electrical, civil works	1	3,00,000	3,00,000
12.	Other office equipment and furniture	1	1,00,000	1,00,000
13.	Repair and maintenance charges	1	1,00,000	1,00,000
14.	Storage containers	10	10,000	1,00,000
15.	Fruit washing machine	1	2,00,000	2,00,000
	TOTAL			14,57,000

B. Working Capital

Sl. No.	Particulars	Quantity	Salary (per month)	Total (Lakh)
1.	Plant manager	1	15,000	1,80,000
2.	Technical manager	1	10,000	1,20,000
3.	Skilled labour charges	3	7,000	2,52,000
4.	Marketing officer	2	5,000	1,20,000
5.	Accountant	1	8,000	96,000
6.	Other contingent expenses			3,00,000
	TOTAL			10,68,000

2.5. Marketing

The most critical component of any enterprise is the marketing division which determines the outcome of the hard work and sacrifices and deserves the maximum attention. There is a wide variety of jackfruit products available and numerous enterprises that sell the same. Finding the right customers and the demand in the market makes the enterprise successful. Nowadays, the demand has been fuelled due to increasing awareness on the health and nutrition benefits of jackfruit. There has been a growing trend in the past few years among the middle-class and upper-class population on the rising demand for Jackfruit in the market. Due to lifestyle changes and work stress, people are always in awe of the healthier options of packaged and processed food available in the market. All of these channels focus on hygienic packaging, tested and certified products which makes the it a success in the market.

There are lot of challenges faced by the jackfruit marketing sector like lack of a proper marketing chain, lack of post-harvest practices, insufficient value addition processing units, etc. Jackfruit still doesn't have the attention and focus that it deserves in the market and more awareness and outreach initiatives have to be done. Some of the successful methods for increasing awareness and bringing the humble jackfruit into the limelight are as follows-

2.5.1. Formation of a stable marketing chain

There isn't a stable marketing chain for jackfruit. The fruit is collected from villages by middlemen from within and outside the village and sold in external markets, mainly in fairs and roadside sheds that are common in India. It has been estimated over the past years that a very low percentage of the total production is consumed (about 30%) and more than 70% is wasted during pre-and post-harvest stages. So, making the maximum utilization of the fruit is essential when a huge section of the society is ready to invest in nutritious and fibrous food in their daily diet.



2.5.2. Awareness campaigns/ Melas

To expand the awareness of jackfruit and to reduce its wastage, proper awareness campaigns about the value addition can be addressed. With proper trainers from enterprises, training can be organized for farmers and women from rural areas on the importance of jackfruit and its nutritional values. Melas and campaigns can be conducted in districts to sensitize society and people at large, especially the govt. officials, policymakers, entrepreneurs, farmers, civil society, citizens, etc to spread awareness on the potentialities of the fruit. Melas are one of the platforms where the sellers/ entrepreneurs can showcase and sell the jackfruit produce by interacting with potential customers. Featuring the various varieties of jackfruit, organizing shows, exhibitions and competitions are some of the marketing strategies to draw customers.

2.5.3. Organizing Jackfruit festivals

Kerala has declared Jackfruit as the state festival in 2018. Being the most underutilized fruit in the state as well as the nation, it is necessary to organize timely festivals during the harvest season or post that because Jackfruit is known to be available for more than 8 months a year in Kerala. Jackfruit festivals are important showcases for entrepreneurs to interact with wider audiences, buyers, experts, explore markets, technology options and a platform to interact with other entrepreneurs and processors.

2.5.4. Social media platform

Social media platforms like Facebook and Instagram play a huge and vital role in the marketing of products and selling via online medium. In this era, it is more or less termed as more the followers, greater the customer support/ interaction for the product or page. So, it is necessary to be active, produce interactive content and collaborate with celebrities for wider reach among the common people.

2.5.5. Outreach at medical institutions

Reaching out to doctors, medical practitioners, diabetologists, nutritionists and research scientists at globally reputed universities on the health benefits of jackfruit and spreading awareness on the proper intake of the fruit in the daily diet is important. This is also an effective strategy in place to get a wide customer base focussing on diabetes patients.

2.5.6. Export potential

The awareness and knowledge of the nutrition value of jackfruit are reaching a wider audience, especially in busy metropolitan cities in India where people try to swift to a healthier lifestyle in the fast-paced world. Value-added products play an important role in the market. Jackfruit is in high demand in these cities and people are ready to buy highly nutritious food, despite the rate of the product in such cities due to the contagious fast-food lifestyle which is leading to many lifestyle diseases like diabetes, obesity, heart diseases, etc. Reaching these products in the fast-food supply chain is also a bonus because even in the fast-food chains people are ready to get the healthier ready-to-eat option.

Jackfruit is getting popular in many Asian countries, and globally. Many countries have been supporting jackfruit cultivation in recent years. Exporting the value-added products to these countries is also a great strategy to expand the market and reach an international customer base. An assessment of the market scenario shows that the demand is more in the northern, southern and western parts of India. There is also a substantial scope in the export market especially to UK, Middle East and the USA. Apart from large manufacturers, many small and medium business enterprises are focusing on the international market. There has been a growing demand for vegan meat across the globe, mainly concerning climate change and sustainability issues, and due to this India's Jackfruit market is thriving in many countries. When cooked, unripe Jackfruit has a texture similar to pulled pork or chicken, making it a popular vegan option in countries such as the UK, the US, and Germany. Many companies are bringing wide options for people on a timely basis due to the growing demand for Jackfruit. It is estimated to keep rising in the coming years.

3. CONCLUSION

Jackfruit industry faces innumerable challenges like lack of a proper marketing chain, lack of post-harvesting practices, difficulties due to the huge size of the fruit, insufficient processing units for value addition, etc. More than 60% of the fruit produced in the country is wasted during pre-and post-harvest stages. To utilise the fruit crop effectively, this research method presents the following solutions-

- a) Directly connecting with local farmers for the production of value-added products. This eliminates the middleman in the process resulting in greater profit for the farmers.
- b) Training and technology transfer for the farmers and Self-Help Group(SHG) members. This provides employment opportunities in rural households.



- c) Promoting new varieties of Jackfruits – Vietnam and latex-less varieties which is easier to pluck and process. This reduces the manpower involved in the processing.
- d) Publicising the value-added product 'jackfruit powder' by marketing it to potential customers.

4. REFERENCE

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