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Jackfruit Flour: A New Weapon to Fight against Diabetes and Reduce Cancer Patients' Side Effects from Chemotherapy

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Abstract

The tree-borne fruit known as jackfruit (*Artocarpus heterophyllus* Lam) exists as the biggest fruit in the world because of its incredible size and weight. The native fruit supports numerous health advantages because of its high protein content along with fibers, vitamins A, vitamins C and antioxidants as well as mineral content. Nicotinic acid, riboflavin, folic acid, calcium, iron, magnesium and zinc constitute the essential components present in this fruit. A low GI (Glycemic Index) rating of jackfruit supports the management of blood sugar levels. The cancer-fighting capabilities of flavonoids along with phenolics, carotenoids and other substances found in it assist in antioxidant protection and lowering inflammation while providing anti-hypertensive benefits. These phytonutrients fight against oxidative stress, decrease inflammation and improve immunological function. Recent studies showed that jackfruit flour along with its seed flour applications bring important results in diabetes treatment while reducing chemotherapy negative impacts leading to better overall wellness.

Keywords: Antioxidants, Glycemic index, Jackfruit, Medicinal value

Introduction

Jackfruit (*Artocarpus heterophyllus*) belongs to the Moraceae family while it also carries the local names *Phanos* or *Fanos*. The Indian consumers consider jackfruit as an essential fruit because it emerged from the Western Ghats region. Jackfruit has earned praise for its natural sweetness so people call it "*The Poor Man's Fruit*," because it is abundant and suitable for various applications. The rain-dependent Indian climate features jackfruit as its main produce but this fruit grows in high-rain & coastal regions and also flourishes in Bangladesh, Nepal, Sri Lanka, Vietnam, Thailand, Malaysia, Indonesia, Philippines andZZZ several nations in Africa and South America, Brazil, Tanzania, Uganda and Cameroon, and some Caribbean countries such as Jamaica (Ranasinghe *et al.*, 2019).

Naturally occurring in farmlands and forests, jackfruit trees need minimal human involvement to thrive. Their growth involves no particular cultural procedures; their cultivation is mostly organic by nature. Apart from being relished as a tasty table fruit, jackfruit is also a mainstay in making many regional delicacies including pickles, chips, jack leather and papad. Jackfruit also has great potential to be turned into many value-added products such as halwa, sweets, jam and squash. While the unripe bulbs can be blanched, dehydrated and stored for year-round usage, the ripe bulbs of jackfruit can be preserved for up to a year in sugar syrup or as sweetened pulp. Furthermore, the seeds, which are a wonderful source of starch, are considered a seasonal treat (Ranasinghe *et al.*, 2019).

Being biologically rich with essential vitamins and minerals including vitamin B, vitamin C, potassium, calcium, iron and proteins, jackfruit is a wonderful source of complete nutrition. Among the most useful bioactive compounds in jackfruit is Jacalin, a protein that has demonstrated promise in avoiding significant ailments such as colon cancer and AIDS (Rao *et al.*, 2021; Ranasinghe *et al.*, 2019). Known for its high productivity, with each tree producing up to 200 fruits, jackfruit has become a common component in many

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global cuisines (Table 1); hence, confirming its relevance as an essential fruit in the tropics (Ranasinghe *et al.*, 2019).

Table 1: Health benefits of jackfruit

Health Benefit	Details
Strengthens immune system	Jackfruit is abundant in vitamin C, vitamin B_6 (pyridoxine), folic acid, riboflavin and niacin that help to strengthen the immune system.
Protects against cancer	Jackfruit contains phytonutrients including isoflavones,lignans and saponins, which has anti-cancer and anti-aging attributes.
Supports in proper digestion	Jackfruit contains high fiber that prevents constipation and it also possesses anti-ulcer qualities that aid in the treatment of ulcers and digestive diseases.
For better and healthy eye and skin	The presence of vitamins maintains a healthy eye and skin.
Energy-boosting property	Jackfruit is considered as an instant energy-generating fruit due to its content of simple carbohydrates such as fructose and sucrose.
Reduces high blood pressure	The presence of potassium in jackfruit helps lower blood pressure, hence diminishing the risk of heart attacks and strokes.
Regulates asthma	The extract of boiled jackfruit root is widely used to control asthma.
Strengthens the bone	The higher magnesium content in the Jackfruit promotes calcium absorption in the body, strengthening the bone and preventing bone-related diseases, including osteoporosis.
Prevents anaemia	Higher content of iron in the jackfruit prevents anaemia and also facilitates optimal blood circulation throughout the body.
Maintains a healthy thyroid	The presence of copper in the jackfruit is essential for thyroid metabolism, particularly in hormone synthesis and absorption.
Antidiabetic effect of jackfruit	Jackfruit contains phytochemical components that regulate blood sugar levels, including carotenoids, proanthocyanidin, flavonoids, volatile acids, sterols and tannins. Researchers observed that diabetics were able to better manage their blood sugar levels after taking jackfruit extract.
Antioxidant properties	Jackfruit contains antioxidants that inhibit or avert cellular damage in the body, hence maintaining overall fitness.

Jackfruit Flour and Its Usage for Control of Diabetes

Though commonly thrown away, the jackfruit seeds make up roughly 12-23% of the whole weight of a fresh jackfruit. But they are a great source of resistant starch (RS-Type-2), which contains 60-65% starch, 2% crude fibre and a wealth of phytochemicals shown to have antibacterial and anticancer qualities. Especially in the shape of green jackfruit flour, which significantly reduces blood sugar levels and therefore helps to control diabetes, this nutrient-dense makeup makes jackfruit seeds a priceless treasure.

Research shown at the annual American Diabetes Association (ADA) conference in Chicago in 2019 underlined the extraordinary advantages of incorporating green jackfruit flour into the diet of Type 2 Diabetes (T2DM) patients. The presentation underlined that especially by lowering glycated haemoglobin (HbA1c) levels, regular eating of this flour greatly enhanced glycemic control. Moreover, the ADA has acknowledged Indian green jackfruit flour's promise and granted a patent for its use under the brand name "*Jackfruit 365*" because of its proven diabetes-management capabilities (Rao *et al.*, 2021).

A randomized controlled experiment, conducted by Rao *et al.* (2021) showed that substituting jackfruit flour for rice or wheat flour produced notable reductions in HbA1c, fasting plasma glucose (FPG) and postprandial glucose (PPG) levels in T2DM patients supports these findings. Especially in areas where jackfruit is plentiful, this makes jackfruit flour a great dietary intervention for diabetes management.

Emphasizing the need of Medical Nutrition Therapy (MNT), the American Diabetes Association (2019) underlined dietary modifications to improve blood sugar management. When added into normal diets, jackfruit flour is a decent replacement for traditional carbohydrate sources such wheat and rice. By lowering blood sugar levels and HbA1c, it thereby supports the ADA's recommendation on effective diabetes control.

Jackfruit Flour Recipe for Diabetes

First of all, the seeds are removed from the fruit and carefully cleaned to eliminate any dirt and then jackfruit flour is produced. The seeds are physically massaged and cleaned under flowing water to guarantee thorough washing. The seed coats are then removed and the seeds sliced into thin chips. Sieved through a 60 mm mesh sieve to ensure consistency, these chips are sun-dried until they are properly dehydrated. For storage, the final product is packed in polythene bags. Exhibiting low water and fat absorption ability, this flour made from jackfruit seeds is a good source of carbohydrates, protein and vitamins. Its

adaptability for diabetes control allows it to be utilized as an alternative ingredient in several recipes. Usually, jackfruit seed flour is combined with wheat flour in a 25:75 ratios, to make chapattis and roti (Figure 1). It is also a great choice for deep-fried foods and can replace as much as 50% of flour in conventional recipes like Vada, Pazhampori, Bajji and Puri, therefore improving their nutritional content.

Recent sensory evaluations of jackfruit flour-blended products have revealed ahigh consumer preference. Moreover, a Kerala-based business called '*Jackfruit 365*' is popularizing this flour by means of innovative recipes and promoting its usage as a binding and thickening factor in several food systems (Ranasinghe *et al.*, 2019; Rao *et al.*, 2021).

(a) Jackfruit seeds (b) Sundried Pealed Jackfruit seeds (c) Jackfruit flour

(d) Jackfruit flour dough (e) Jackfruit flour dough (f) Jackfruit flour paratha

Figure 1: Jackfruit seeds, its flour and prepared Capattis/ Roti

Health Benefits of Jackfruit Flour

1. Antioxidant and Anti-Inflammatory Properties

Oxidative stress gets reduced effectively because jackfruit flour contains high levels of bioactive chemicals, including flavonoids, stilbenoids and aryl benzofurans, which protects against chronic diseases such as diabetes and cancer. Especially during chemotherapy, it can cause oxidative damage and persistent inflammation; these strong antioxidants guard cell membranes and inhibit inflammatory pathways (Tripathi *et al.*, 2023).

Moreover, jackfruit flour's proanthocyanidins and carotenoids strengthen its antioxidant and anti-inflammatory armament, providing a natural way to control diabetic problems and to reduce the side effects of cancer treatments. These bioactive components not only help to prevent disease progression by reducing oxidative stress but also lower treatment-related toxicity, therefore supporting general health and improving the body's resilience under rigorous therapeutic schedules (Ranasinghe *et al*., 2019; Patil *et al*., 2025).

2. Anticancer Properties of Jackfruit

Jackfruit has bioactive chemicals such as saponins, lignans and flavonoids that seem to be anticancer ones. Jackfruit seed extract, for example, has been demonstrated to stop cancer cell growth by interacting with the cell membranes, therefore stopping the spread of malignant cells (Tripathi *et al.*, 2023; Patil *et al.*, 2025). Adding this information could support the assertion of the paper on jackfruit flour's possible function in lowering chemotherapy side effects.

3. Therapeutic Effects in Diabetes Management

Jackfruit flour has shown to be quite successful in controlling hyperglycemia and type-2 diabetes (T2DM). One of its main ingredients, resistant starch (RS), is essential for reducing

glucose absorption and hence helps diabetes people control their blood sugar more effectively. This function is particularly useful for people with diabetes and cancer since it helps to maintain more consistent blood glucose levels throughout therapy (Tripathi *et al.*, 2023). Apart from RS, jackfruit flour has SGLT-2 inhibitors, which help to control blood sugar by preventing kidney glucose reabsorption. This increases its capacity to manage hyperglycemia even more and offers a natural adjunct to conventional diabetic treatments (Patil *et al.*, 2025).

The American Diabetes Association (2019) claimed that good diabetes control calls for a customized approach to diet matching individual demands and health objectives. With its low glycemic index and high fiber content, jackfruit flour not only improves glycemic control but also provides vital vitamins and minerals that help overall health and well-being, hence fitting perfectly into these individualized dietary plans.

4. Improved Glycemic Control

Further exploration of the SGLT-2 inhibitors found in jackfruit flour could potentially be useful. Studies underlined how jackfruit flour polyphenols can be interesting SGLT-2 inhibitors helping to control hyperglycemia by means of renal glucose reabsorption prevention (Patil *et al.*, 2025).

5. Supporting Immunity and Reducing Chemotherapy Side Effects

Jackfruit flour significantly improves immunological response as it has jacalin, a strong protein well known for its immunomodulatory qualities. Jackfruit flour could help to offset the immunosuppressive results of therapy, hence qualifying it as a recommended dietary choice for cancer patients undergoing treatment. Jacalin increases the natural defences of the body by strengthening the immunological response, therefore enhancing the general quality of life for people with weakened immune systems (Tripathi *et al.*, 2023).

Moreover, the American Diabetes Association (2019) underlined the need of immunological support in chronic illness management, especially for those suffering with both diabetes and cancer. Jackfruit flour's immunomodulatory qualities, particularly *via* jacalin, provide a sensible approach to maintain immune function under the control of multiple health issues, hence supporting this holistic perspective (Ranasinghe *et al.*, 2019; Patil *et al.*, 2025).

6. Phytochemical Composition and Nutritional Benefits

Jackfruit demonstrates high phytochemical quality due to its vital health elements including vitamins along with minerals and carotinoids (notably lutein and beta-carotene) to enhance its anti-inflammatory and anticancer effects thereby becoming the preferred option for cancer patients (Tripathi *et al.*, 2023).

Conclusion

Jackfruit functions as a tropical diet with unique health advantages particularly for diabetes management and reducing chemotherapy side effects. Type-2 diabetes treatment benefits from jackfruit flour as an exceptional dietary approach that contains nutrients like protein and carbohydrates along with fiber to support diabetes management. The low glycemic index together with bioactive compounds like flavonoids and phenolics and carotenoids leads to antioxidant and anti-inflammatory properties, which lower oxidative stress and inflammation that occurs in cancer treatment as well as diabetes. The incorporation of jackfruit flour into daily meals assists in blood glucose management and strengthens the immune system of cancer patients receiving chemotherapy. The exceptional combination of vitamins and minerals in jackfruit along with its possible anti-HbA1c effect qualifies this fruit as an auspicious natural treatment. Studies continue to demonstrate the therapeutic properties of jackfruit flour which strengthens the evidence that this ordinary fruit functions as a powerful tool to enhance life quality for cancer patients and those with diabetes and those dealing with chronic diseases.

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