

REVIEW ARTICLE**An exploration of Therapeutic and Nutritional Potential of
Artocarpus heterophyllus (Jackfruit): A review****Tripti Seyan and Shelly Garg***

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Email: gargshelly8795@gmail.com**ABSTRACT**

Jackfruit, (*Artocarpus heterophyllus*) of the family Moraceae, is the largest edible evergreen fruit tree. It is the national fruit of Bangladesh and was once considered as "poor man's food". Due to its texture, jackfruit is an excellent alternative to meat. The three main parts of jackfruit are (30-32%), seeds (18%), and rind (5-55%). A 100g serving of ripe fruit pulp contains 84 calories, 22g carbohydrates, 1.9g protein, 0.1g fat, 1.1g fiber, 77% moisture, 40mg sodium, 407mg potassium, 20mg calcium, 30mg phosphorus, 1.1mg iron, 540 IU vitamin A, 10mg vitamin C. The slimy coating of jackfruit seeds is rich in pectin, which exhibits anti-oxidant and phenolic properties. Bioactive components like (artocarpin and lectin) present in jackfruit exhibit immunological properties. The deep yellow & orange-red colored jackfruit flakes have lower glyceamic load & contain anti-diabetic substances namely n-hexadecanoic acid and 2-Heptadecanal. Jackfruit is rich in phytochemicals such as flavonoids, stilbenes, artocarpin, triterpenoids, carotenoids and alkaloids which possess numerous health benefits including anti-oxidant, anti-inflammatory, anti-bacterial, anti-cancerous, anti-fungal, anti-helminthic, and anti-neoplastic and wound healing properties. It further can help in the prevention of cancer, cardiovascular diseases and disorders associated with ageing, osteoarthritis, dementia etc. Jackfruit contains a wide variety of nutrients and bioactive components such as protein, dietary fiber, minerals, lectins, phenols, carotenoids and flavonoids that provide several health benefits beyond basic nutrition, it is still underutilized due to limited commercial production.

Keywords – Jackfruit, underutilized fruit, anti-oxidant, glyceamic load

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How to cite this article:Tripti Seyan and Shelly Garg. An exploration of Therapeutic and Nutritional Potential of *Artocarpus heterophyllus* (Jackfruit): A review. Adv. Biores., Vol 15(4) July 2024: 264-272.**INTRODUCTION**

Jackfruit, (*Artocarpus heterophyllus* Lam.) of the family Moraceae, is the largest edible evergreen fruit tree widely grown in tropical and subtropical areas of Asia, Africa, South America, Bangladesh, Nepal, and the Ghats of India [1, 2]. Fully ripened jackfruit has a sweet flavor and a soft texture. Bulb/flake is the edible part present around the seeds and resembling similar characteristics of fruits like melon, papaya, pineapple and banana [3]. Jackfruit is a highly versatile fruit crop that can be consumed raw either unripe or fully ripe and can be cooked as a vegetable [4]. Jackfruit is the national fruit of Bangladesh and was once considered as a "poor man's food" [5, 6]. Due to its texture jackfruit is considered as an alternative to meat. The three main parts of jackfruit are flakes (30-32%), seeds (18%), and rind (5-50%). The jackfruit can vary from red to orange color based on genetic variation. It is a good source of carbohydrates, protein, fiber, vitamins, minerals and several phytochemicals [7]. The copper- red jackfruit flakes cultivated in Karnataka are superior to the yellow and light creamy jackfruit flakes due to their sweetness and firm texture [8]. Jackfruit seeds are a good source of starch (approximately 80-85%) and are a substitute in industrial manufacturing of starch. It contains a higher percentage of resistant starch (approximately 70%) [9]. Minerals like magnesium, potassium, phosphorus, calcium, sodium, iron, copper, zinc and manganese that help in improving bone density, muscle, and nerve activity and also regulates the water concentration in the body [10, 11]. A 100g serving of ripe fruit pulp contains 77% moisture, 84 kcals, 1.9g protein, 0.1g fat, 1.1g fiber and 0.8g total mineral matter i.e., 20mg calcium, 30mg phosphorus, 500mg

iron, 540IU vitamin A, 30mg thiamine. The beta-carotene amount found in jackfruit bulbs is an essential anti-oxidant for human health [12]. Jackfruit possesses large concentration of fatty acids, ellagic acid, free sugar (sucrose) and amino acids such as arginine, cysteine, histidine, leucine, lysine, methionine, threonine and tryptophan. Jackfruit exhibits numerous health benefits including anti-oxidant, anti-inflammatory, anti-bacterial, anti-cancerous, anti-fungal, anti-helminthic, anti-neoplastic and wound healing properties [13,14] can help in the treatment of cancer, cardiovascular diseases and disorders associated with ageing, osteoarthritis, dementia, and refractive errors [1, 15]. The high fiber content of jackfruit supports regular bowel movements and protects the colon mucosal membrane by eliminating carcinogens [12]. Due to its low glycemic index wheat and rice jackfruit is a good food option for diabetics [16, 17]. Two lectins (artocarpin & lectin) found in jackfruit seeds have immunological characteristics [18]. Even though jackfruit contain a wide variety of nutrient-dense components and bioactive compounds such as protein, dietary fiber, mineral, lectins, phenols and flavonoids that provide health benefits beyond basic nutrition still, it remains underutilized due to limited commercial production [19]. The slimy coating off jackfruit seeds is rich in pectin, which possesses significant anti-oxidant and phenolic properties [20].

MATERIAL AND METHODS

Jackfruit is a largest evergreen tree that weighs up to 30kg [21] with having tiny trunk and a heavy tree top reaching an estimated height of 10-20m. The jackfruit tree bark is of reddish brown color with a smooth texture. All the parts of the tree release sticky white latex when damaged. In the beginning, the color of the jackfruit rind is yellowish-green as it ripens or matures the color changes to yellowish-brown. It is held by a central fibrous core, the average length of the fruit is 30-100cm with a diameter of 15-50cm and weighs around 10-25kg. Leaves are dark green, are oval with a diameter of 1-1.5cm and length being 2-3cm with spiral arrangement and have a leathery texture [22]. Seeds are light brown and surrounded by a thin whitish layer. On average one jackfruit contains 100-500 seeds and is comprised of 27 % edible seed coat, 15% edible seed, 20% white pulp and 10% core [23].

Nutritive Value

Nutritive Value of Jackfruit Pulp

Jackfruit is a rich source of various nutrients and bioactive compounds providing several health benefits. The total calorie, carbohydrates, protein, fat and dietary fiber content of jackfruit pulp is (351.8 kcal/100g), (54.39%±0.47/100g), (18.35%±0.04/100g), (6.68%±0.07/100g) & (9.88%±0.0/100g) respectively. Jackfruit pulp is good source of minerals like potassium (848±10.34mg/100g) and sodium (69.53mg/100g). Jackfruit pulp also contains various phytochemicals such as polyphenols, flavonoids & carotenoid content (12.10 to 14.55 mg/g), (0.18±0.29 mg/g) & (107.98ug/100g) respectively. The pH of jackfruit pulp (5±0) is significantly lower than that of seeds (6±0) [24].

Nutritive Value of Jackfruit Seeds

The estimated calorie, carbohydrate, protein, fat & dietary fiber content of jackfruit seeds are calculated to be (332.23 kcal/100g), (49.01% ±0.43), (21.66% ±0.31), (5.47% ±0.07) & (14.22%) respectively. Jackfruit seeds are a rich source of minerals like calcium (132mg/100g ±9.42), magnesium (43.73mg/100g ±9.12), and phosphorus (101.51mg/100g ±4.02) [24]. The total phenolic & flavonoid content in jackfruit seeds is (17.37-18.69mg/g) & (0.5-0.89mg/g) respectively [25]. Despite being nutritionally abundant it is consumed in very less regions. It contains ample amounts of B- complex water-soluble vitamins such as vitamin B6 (pyridoxine, niacin, riboflavin and folic acid [26]. Amino acids that are present in jackfruit are arginine, cysteine, histidine, leucine, lysine, methionine, threonine, and tryptophan [13].

Health Benefits

Beyond basic nutrition, jackfruit provides various health benefits categorized as a functional food. It contains several bioactive compounds that contribute to its therapeutic properties and helps in reducing incidence of high blood pressure, heart diseases, strokes, bone disorders etc. it has an anti-diabetic, anti-inflammatory and anti-oxidative, anti-carcinogenic, anti-bacterial, anti-fungal, anti-hypertensive, hypoglycemic and immune-modulatory properties [27, 28].

Anti-Diabetic Activity

Metabolite investigation of deep yellow and orange-red colored jackfruit flakes showed that they contain surplus amount of anti-diabetic compounds such as n-hexadecanoic acid, tridecane, 2-heptadecenal which has low glycemic load, thus helps in the management of hyperglycemic conditions. The deep yellow flakes of jackfruit are found to be a rich source of flavonoids, anti-oxidants and ascorbic acid it also possesses alpha-glucosidase inhibition activity. Orange red flakes on the other hand possesses the highest amount of beta-carotene, phenol and minerals like (iron & zinc) and have better inhibition activity of

alpha-amylase and beta-glucosidase enzymes [29]. Being a rich source of bioactive compounds, such as ascorbic acid, beta-carotene and lycopene jackfruit has the potential to inhibit the glycation of hemoglobin which is a spontaneous non-enzymatic reaction between free sugars and free amino acids. This anti-glycation activity of jackfruit helps in reducing glycated hemoglobin levels HbA1c [30].

Anti-Oxidant Activity

Jackfruit is rich in anti-oxidants which help in reducing oxidative stress and delay the development of degenerative diseases. Jackfruit is one of the best sources of highly bioavailable phytochemicals like phenolic compounds, flavonoids and carotenoids such as (beta-carotene, neoxanthine and zeaxanthin) making it a great source of vitamin A, thus helping in boosting eye sight and avert the retina degeneration reduces the risk of cataracts [31]. Jackfruit is a rich source of vitamin C which acts as a chain breaking anti-oxidant that boosts immunity and delay the ageing process. Due to the presence of phytochemicals such as flavonoids and polyphenols, carotenoids in jackfruit aid in the elimination of the toxic produced within the body as well as the free radicals that are deleterious to human health [27]. B-complex vitamins are necessary for metabolism and jackfruit is a rich source of B-complex vitamins mainly thiamine (B1), Riboflavin (B2) which also keeps our skin, eyes, hair healthy. Vitamin B2 also acts as an anti-oxidant [22].

Immune-Modulatory Activity

The bioactive compound jacalin, is the crucial and predominant protein present in jackfruit and possesses distinctive immune-modulatory effects which aid in reducing the symptoms of various immune related diseases [31]. Jackfruit seed contain several phytochemicals one of them is the carbohydrate binding protein known as jacalin, which has the potential for exhibit anti-cancerous activity against colon & breast cancer and can also be used for the treatment of other non-communicable diseases [32, 33]. Jacalin acts as a mitogen of peripheral blood mononuclear cells, the key cytokine secreting immune cells bioactive compounds are used to treat many non-communicable disease [1].

Cardiovascular Health Promoting Activity

Jackfruit is a good source of potassium to assists in the regulation of blood pressure as it excretes the excessive accumulation of sodium in the body which maintains fluid and electrolyte balance and it is also helpful in maintaining muscle functioning. The presence of vitamin B6 helps in reducing the amounts of homocysteine, thereby helping in preventing the risks of stroke and heart diseases [27]. Dietary fiber present in the jackfruit provide satiety that helps in weight loss and lowers the risk of developing heart diseases such as (high cholesterol, high blood pressure) [22].

Gut Health Promoting Activity

Jackfruit is a great source of soluble and insoluble dietary fiber that provides bulk to stool easing bowel movement and thus preventing constipation. It reduces the risk of gastric ulcer complications by maintaining the mucosal integrity. It also colon mucus membrane by excreting the toxin from the large intestine. Jackfruit seeds are a rich source of resistant starch which is helpful in maintaining blood sugar levels and keeps gut healthy [22].

Bone Health Promoting Activity

The presence of minerals like calcium helps in strengthening the bones and potassium plays a major role in reducing the loss of calcium from the kidneys. Jackfruit is rich in various nutrients including phytochemicals, minerals and vitamins that makes it a highly capable fruit to improve food insecurity, improve nutrient intake & provide diversification in the diet [34]. Jackfruit should be included in the diet to prevent disorders like osteoporosis and arthritis [27].

Anti-Microbial Activity

Jackfruit exhibits potential inhibitory action on pathogenic bacteria and can be a potential source for the development of a bio-bactericide for agricultural use. The rich content of phytochemicals in jackfruit possesses strong anti-bacterial activity against *Xanthomonas axonopodis manihotis* a pathogenic bacterium that is responsible for the bacterial blight disease in cassava [35].

Wound Healing Properties

Wound healing is the process of repair that follows injury to the skin and other tissues. During injury inflammatory response occur and the cell below the dermis starts to increase collagen production [36]. Mediators such as leukotrienes are released during inflammation which increase the capillary permeability and leukocyte adhesion. Leukotrienes are produced by the metabolism of arachidonic acid by lipoxygenase enzyme. Jackfruit leaf and bark contain flavonoid compounds like astragalol, quercitrin, luteolin, amentoflavone, lonicerin, rhoifolin and genistein that can inhibit lipoxygenase activity [37]. Jackfruit leaves also exhibit wound healing activity due to their phytochemicals (phenolic compounds & flavonoids) and triterpenoid constituents, especially ursolic acid which contracts the wound and increases the rate of epithelialization accompanied by the supportive anti-microbial activity.

Furthermore, elements such as zinc, copper, manganese, and iron help in wound healing as these minerals are required for cellular growth and replication [36].

Underutilization of Jackfruit

Jackfruit is a rich source of starch, fiber, phytonutrients, protein, minerals lectins as well as bioactive components like phenols and flavonoids. Remain underutilized due to limited commercial jackfruit production [19]. Jackfruit is a large fruit and peeling is rather difficult. Jackfruit flakes are highly perishable and often undergo flavor loss and tissue softening [38]. About 60% of the whole jackfruit consists of inedible parts such as the outer rind, perigones and the central core [39]. The jackfruit seeds contain around 55% moisture, due to which the shelf life of fresh jackfruit is short [40]. Usually, jackfruit seeds are consumed either boiled or roasted [41]. About 59.2% of the total weight of jackfruit is non-edible part including perianth, rind, and core, which can be utilized as cattle feed and biofuel. The non-edible portion of jackfruit contain ash (6-7.5%) carbohydrates (20-29 %) protein (8-10.6%), and fibers (12-17.30 %). Jackfruit peel can also be utilized for pectin extraction [42].

Role of Underutilized Foods in Improving Food Security

Jackfruit is a rich source of protein, starch and minerals and phytochemicals like lignans, isoflavones, and saponins due to which it has several medicinal properties like anti-oxidant, cardio protective and anti-inflammatory. It is also used for ayurvedic treatments such as a cooling tonic, jackfruit tree roots are used to treat fever and leaves are used to increase breast milk secretion in lactating women. Jackfruit and its products not only have a pleasant taste but are also a rich source of readily available source of instant energy [12]. Globally, food demands are enormously increasing mainly as a result of urbanization and population expansion, which is leading to an increase in the prevalence of food insecurity and malnutrition [42]. Diet diversification play a significant role in achieving zero hunger (sustainable development goal-2) [43]. Underutilized foods are nutrient-dense, locally available and easily adaptable which can be useful in the management and prevention of various forms of malnutrition such as protein energy malnutrition (PEM), anemia, osteoporosis, gut related issues etc. jackfruit has the potential to reduce food and nutrition insecurity [44] because it is rich in essential nutrients (vitamins and minerals) that are needed to maintain optimal health [45].

Effect of Processing on Jackfruit

Jackfruit is rich in various bioactive compounds that makes it a potential source of functional food. Processing techniques are used to reduce the anti-nutritional components that limit nutrient absorption in the body [46]. The physiochemical, anti-oxidant, and functional characteristics of jackfruit are majorly affected by drying. The effects of drying on jackfruit seed flour affects the change in moisture by (11.10-13.62%) protein (14.22-19.07%), fat (2.08-0.96%), carbohydrates (77.64-83.02%) and starch (56.59-74.14%) contents. Hot air cabinet dried (at 60 degree Celsius) reported that flours retained a higher amount of bioactive compounds i.e., total carotenoids (31.86-72.20mg/100g), ascorbic acid (42.41-65.05mg/kg), total phenolic (704.30-1009.13mg GAE/100g), and flavonoids (26.12-40.58mg CE/100g), and exhibits greater anti-oxidants activity [47]. Roasting increases protein bioavailability as well as the water absorption capacity with a reduction in oil absorption [48]. The protein content increases from 6.73 % to 7.32% and fiber from 1.6% to 3.38% in the roasted jackfruit seed flour. Roasting also positively affects the amylose content which leads to higher peak viscosity and short passing time. Higher water absorption capacity, good protein & fiber content and high peak viscosity properties are all crucial factors for application in baking and confectionary products [49]. The effect of soaking on proximate composition, gross energy, mineral composition and anti-nutritional factors of jackfruit were determined and reported that the protein content increases from 6.48% to 15.33% the fiber content increases from 3.65% to 11.27% in raw and soaked jackfruit seeds respectively. The energy content of the soaked seeds has also improved (4.10kacals/kg) [46].

Fruit Texture & Taste

The presence of a combination of different sugar such as glucose, fructose, sucrose and organic acids mainly malic acid and citric acid are responsible for the fruit flavor. The total amount of these organic acids decreases from early unripe stage to the complete ripened stage [50]. The percentage of sugars and acids in fruits at different stages of ripening is used to measure the maturity index of fruit. During the ripening of jackfruit there is a sudden increase in sucrose content as compared to fructose and glucose content at the beginning of ripening [51, 52].

Fruit texture – there is a decrease in fruit firmness as the fruit ripens due to the hydrolysis of insoluble pectin to soluble form. Starch and pectin are the major components of cell wall and pulp tissue where they undergo hydrolysis into reducing sugar like glucose and fructose during ripening [7].

Post-Harvest Handling and Storage of Jackfruit

Effective measure need to be followed to reduce postharvest losses during food shortage [53]. During processing, the jackfruit undergoes enzymatic browning. This reaction affects the sensory quality of the fruit i.e., color, texture and flavor which leads to reduce the shelf life of fruit [54]. Freshly chopped jackfruit stored at 8 and 12 degree Celsius showed improved superoxide dismutase activity which leads to reduce cell membrane permeability. It has been seen that storage at very low temperature from 0-4 degree Celsius affects the texture by increasing the hardness of jackfruit flakes but does not affects the taste and nutritional value, on the other hand storage at higher temperature from 16-20 degree Celsius caused deterioration of fruit quality [53, 55]. While, vacuum packaging results in extending storage life, maintaining quality and preventing microbial damage in jackfruit. The vacuum-packed jackfruit bulbs stored at freezing temperatures showed better color retention and less microbial damage when compared to cold storage at 8-10degree Celsius [53].

Value Edition

Jackfruit is nature's gift for optimal health and a highly versatile fruit crop because it can be consumed in various forms raw, cooked, ripe and unripe and rich in various nutrients and bioactive compounds. Jackfruit can be used after dehydrating and grinding it into a fine powder and storing it in a hermetically sealed container [56, 57]. Various bakery products can be made using jackfruit flour such as cake, breads, biscuits and pastas which helps to increase the nutritional content of the developed product [58, 59]. Several other products can also be prepared using jackfruit in both forms unripe and ripe. Usually, ripe jackfruit flakes are used for preparing candy, pickles, leather, chutney, jam, jelly, slab, chips, papad and juice [60]. Jackfruit pulp is used for making beverages and ice creams [46]. Moreover, jackfruit seeds are consumed after roasting, boiling, drying and used for preparation of flour [61]. Jackfruit seed flour can be mixed with wheat flour to make chapatti out of it that makes it more nutritious [62]. Based on current analysis it has been reported that poor consumption of fruits and vegetables reduces the lifespan of a person instead of following a sedentary lifestyle or not being physically active at all. The phytonutrients present in jackfruit have anti-inflammatory, anti-oxidative, anti-cancerous, anti-ulcer, anti-hypertensive, anti-ageing and immunity boosting properties. It is the only fruit that can be consumed as a meal by replacing regular grains i.e., wheat and rice. Jackfruit can be supplemented to our traditional Indian foods without observing any alteration in the texture. One-third of the rice amount can be reduced from upma, idli, dosa, and dhoklas, etc. in the same way some amount of wheat flour can be reduced from chapattis. After these small changes, positive results can be seen in the health [63]. Ripe jackfruit is used to extract pectin, a gelatinous polysaccharide substance that acts as a thickening agent for developing various recipe or food products [64].

Pickle

One of the oldest methods of preservation is pickling. It is used to increase the shelf life of food products such as fruits, vegetables, fish and meat. This method of preservation leads to unique and desirable changes in sensory attributes of the food i.e., color, flavor, texture. Microorganism mainly lactic acid bacteria Micrococcaceae, bacilli, yeasts and filamentous fungi are responsible for fermentation. Ripe green jackfruit is usually selected for preparing pickles [65]. The thin jackfruit flakes are blanched and a mixture of spices and oil is added after which it is pasteurized at 85 degrees Celsius then it is allowed to cool at room temperature and packed in an airtight container and stored at a dry place. It has been reported that jackfruit pickles contain high amounts of vitamin C and carotenoids (34.43mg/100g) and (22.78mg/100g) respectively [53]. There are many health benefits of consuming fermented food products some of them are that it prevents gut dybiosis, improves immunity, increase the bioavailability of nutrients, and reduces the symptoms of lactose intolerance [66].

Biscuits

Jackfruit seeds are highly perishable it can be converted into flour to increase its shelf life that makes it potential to be used in bakery industry. Biscuits can be prepared using jackfruit seeds flour by substituting up to 40% of wheat flour in plain biscuits. Researches have revealed that these biscuits contain good amount of dietary fiber and minerals content. The proximate analysis of 100g of biscuits with a level of substitution of wheat flour by jackfruit seeds flour up to 40 % contains 5.6% moisture, 50.83% carbohydrates, 7.6% protein, 30.5% fat [64].

Honey

Jackfruit honey is a kind of syrup having jackfruit flavor. Fully ripened green jackfruit, sugar and citric acid are the ingredients used for the preparation of jackfruit honey. In order to make jackfruit honey the ripe jackfruit bulbs are separated and washed properly. After drying jackfruit bulbs, they are placed into a glass container and sugar is added in the container then citric acid is sprinkled over it. Cover the

container and allow it to rest for 9 days. After 9 days, strain it to separate the pieces. Boil the collected juice in a kettle until it reaches honey like consistency then cool it and store it in a dry place [67].

Muffins & Cake

Muffins are bakery product. These muffins are developed using jackfruit pulp, wheat flour, sugar, egg, milk, butter, baking powder. It is prepared by substituting all-purpose flour up to 40% by jackfruit seeds flour. The method of preparation is similar to cake. Firstly, combine all the ingredients and make a smooth batter out of it. Then after the proper beating transfer this batter to the moulds. Finally bake them in an oven 180 degree Celsius for 15-20 minutes [67]. 100g of cake made from the jackfruit pulp contains 358.63 kcal, 50.05g carbohydrates, 6.85g of protein, and 14.56g of fat [68].

Candy

Jackfruit contains different sugars such as glucose, fructose, sucrose and organic acids mainly malic acid and citric acid that gives the fruit flavor. Slight ripe jackfruit bulbs are used to prepare jackfruit candy it is manufactured based on principle of osmotic pressure. Dehydration by osmotic pressure is a method, which is a combination of the effect of preservation by high sugar content and high temperature drying technique. Jackfruit bulbs are cleaned and poured in a sugar solution having 65 to 700 brix followed by drying in a mechanical dryer at 60-620 degree Celsius until it is completely dried [67].

Noodles & Pasta

Noodles and pastas are one of the easily processed foods usually made from refined wheat flour, which makes it deficient in protein and dietary fiber. Nowadays, consumers all around the world are more at the risk of developing many non-communicable diseases obesity, cardiovascular diseases, arthritis etc. it can be prevented by regular consumption of functional food ingredients [69]. Jackfruit noodles or pasta can be prepared by replacing refined wheat flour with jackfruit seed flour and adding up to 20% of rice flour. Jackfruit seed flour is highly nutritious and gluten-free. It has the potential to replace refined wheat flour present in noodles & pastas that can be consumed by those people suffering from celiac disease [70].

Results & Conclusion

Jackfruit is a highly versatile fruit crop and one of the best sources of bioactive compounds such as phenolic compounds, precursors of vitamin A (beta-carotene, neoxanthine, zeaxanthin) and flavonoids, which reduces the oxidative stress by utilizing the free radicals species by donating an electron. Jackfruit is rich in minerals like potassium, magnesium and calcium and contains very little amount of sodium this assisting in the regulation of blood pressure as it excretes the excessive sodium an also helps in maintain muscle functioning and promotes bone mineralization. It is also a great source of B-complex vitamins such as thiamine (B1), riboflavin (B2) and pyridoxine (B6) that helps in reducing the amounts of homocysteine levels, thereby helping in preventing the risks of heart diseases. Jacalin is one of the crucial and predominant protein present in jackfruit. A carbohydrate binding protein exhibits anti-cancer activity and acts as a mitogen of peripheral blood mononuclear cells the key cytokine-secreting immune cells. It is mainly rich in micronutrients and phytochemicals, which makes it highly capable fruit to improve food insecurity, improve nutrient intake and provide diversification in the diet. Jackfruit can be included in the diet maintain optimal health and to preventing lifestyle disorders.

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