



Phytochemical and Nutrient Evaluation of Dry and Fresh Jackfruit

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Abstract The jackfruit used in the study was collected from Kontagora town, Niger state, Nigeria and analyzed for the phytochemical composition, vitamins, mineral and proximate analysis. Phytochemical screening revealed the presence of some bioactive compounds; saponins, alkaloids, cardiac glycoside and showed absence of tannins. Results showed that the fruit contained some vitamins in mg/100g; thiamine (B₁): 0.98; riboflavin, 0.20; ascorbic acid, 13.29. Mineral analysis in mg/kg showed that Ca, 3762.40; Mg, 29.55; Na, 556.00; K, 820.10; Fe, 143.40 and Mn, 6.00mg/kg were recorded for the fruit. The values of moisture, ash, fat, crude fibre, protein and carbohydrate contents in percentage revealed that their were significant differences between the dry and fresh samples of the jackfruit. This study showed that the jackfruit can be manipulated in the medicinal treatment of and could serve as vital supplement for drugs formulation.

Keywords Jackfruit, Phytochemical screening, proximate analysis, vitamins, mineral analysis Performance

Introduction

Fruits are rich in mineral, antioxidants such as vitamin C and E which have shown some anti-inflammatory and anticarcinogenic properties [1]. The citations and supporting evidence of many publications on most tropical fruits are limited either due to collection of data and analysis or the decrease in farming system most especially in most African countries. Thus a fruit known as jackfruit commonly called “Bread of the Tropics” is very rich in starch, protein, calcium, phosphorus, zinc, fibre, vitamins C and E [2]. The wellbeing of people that make use of the parts of the plant has extensively been documented as sources of vitamin A, B, C and mineral nutrients which include potassium, iron, sodium, zinc and among others [3].

Jackfruit which belongs to the genus *artocarpus*, a family *moraceae* is a tropical fruit crop that is widely grown in India, Philippines, Thailand and Srilanka for food, ornamental and traditional health care purposes [4]. The leaves of the fruit are used for the treatment of diseases such as diarrhea, asthma, skin problems and fever [5]. In Nigeria, the fruit is utilized for its medicinal and furniture usage while in some parts of the country the fruit is often eaten fresh because it is said to be a source of dietary fibre, sometimes cooked as starchy vegetable. The seeds are boiled and eaten and often added to flour as baking ingredients to cook dishes [5].

The plant has proven some phytonutrients and phonological properties according to researchers but the understanding and knowledge of the nutritional composition of this fruit for human composition is yet to be published. Thus, this paper determined the phytochemical properties, vitamins, mineral for the dried fruit and the proximate compositions for both the dry and fresh jackfruits was also investigated.



Materials and Methods

Source of Plant Material

Jackfruit used was bought from modern market Kontagora, Niger State of Nigeria. The sample was washed with water to remove the debris and other impurities that might adhere to the fruits and finally re-washed with distilled water to improve cleaning.

Sample Preparation

The sampled jackfruit was sliced into pieces using sharp and cleaned knife and allowed to dry under sunlight. The dried sample was grinded into powdered and stored in an airtight leather prior for analysis.

Proximate Analysis

Proximate analysis of jackfruit such as moisture, crude protein, fat, fibre contents were determined using the method described by using AOAC [6]. The values of carbohydrate were determined by subtracting the sum of ash, protein, fat, fibre and moisture.

Mineral Analysis

The minerals (calcium, magnesium, sodium, potassium, iron and manganese) were determined with a bulk atomic absorption spectrophotometer (Bulk Scientific, Model 200A/200, Inc-East Norwalk, Connecticut, USA). This was done by digesting the ashed sample with 3 M of HCl and the filtrate was used for the mineral analysis using the atomic absorption spectrophotometer and flame photometer [7].

Vitamin Analysis

The compositions of the vitamins (thiamine and riboflavin) of the jackfruit were investigated using the method of Scalar [8] while ascorbic acid content was determined using the method as described by AOAC [6].

Statistical Analysis

The values expressed as means and standard deviation for proximate analysis were done in triplicates. The data were statistically analyzed using statistical package for social sciences (SPSS) for the determination of the significant differences.

Results and Discussion

Table 1 depicted the phytochemical analysis of jackfruit. The results show that the jackfruit contained saponins, cardiac glycosides, and alkaloids while tannin was absent. Saponins are classified as glycosidic compounds which is found in abundance in most plants that have bitter taste and foaming properties [9]. The presence of saponins which gives the fruit a little bitter taste and foaming ability indicated that it could have the potential of cytotoxic effects. It has been established in the study of Aregal and Pathak [10] that the phytochemical constituent plays significant role in central nervous activities. Alkaloids known to be heterocyclic indole compounds are efficient therapeutically significant plant substances that have shown some pharmacological properties such as hypertensive, anticonvulsant, activity, antimicrobial and antimalarial activities [11-12]. As such the presence of these chemical substances combined with cardiac glycoside will be effective for healing hypertensive patients and people suffering from severe acute malaria parasites. This could also act as phyto-protective agent against microorganism on human skin.

Ascorbic acid (vitamin C) is an antioxidant, highly soluble in water which help the body make collagen. The study revealed that ascorbic acid content of jackfruit was 13.29 mg/100g indicating that the fruit is a good source of vitamin C. The functions of ascorbic acid include: prevention of the formation of carcinogens, healing of wounds, heart diseases, high blood pressure, common cold, osteoarthritis, asthma and for strong bone and teeth formation [13-15].



Tables of Results**Table 1:** Phytochemical constituents of the dried jackfruit

Constituents	Aqueous extract
Saponins	+
Tannins	-
Cardiac glycoside	+
Alkaloid	+

+ Represent presents, - No activity

Table 2: Mineral composition of the jackfruit on dried weight (mg/kg)

Mineral	Composition
Ca	3762.40
Mg	29.55
Na	556.00
K	820.10
Fe	143.40
Mn	6.00

Table 3: Vitamin compositions of the dried jackfruit (mg/100g)

Vitamin	Composition
Ascorbic Acid	13.29
Thiamine	0.98
Riboflavin	0.20

Table 4: Proximate composition of dried and fresh jackfruit (%)

Parameter	Dried	CV	Fresh	CV
Moisture	39.75±0.06	0.15	82.00±0.02	0.02
Ash	1.75±0.03	1.71	0.50±0.02	4.00
Fat	3.75±0.07	1.87	1.25±0.21	16.8
Crude fibre	1.25±0.01	0.08	0.50±0.05	10.00
Protein	7.74±0.04	0.52	2.03±0.15	7.39
Carbohydrate	45.76±0.02	0.04	13.72±0.04	0.29

$$\text{Coefficient variation (CV) \%} = \frac{\text{Standard deviation}}{\text{Mean}} \times 100$$

In Table 2, the results of the mineral composition showed that jackfruit is a rich source of mineral elements. These minerals are important because their significant in human systems such as muscles contraction, proper circulation of blood and functioning of the heart indicate the usefulness of the jackfruit. The presence of magnesium (29.55 mg/kg) and potassium (820.10 mg/kg) in the fruit support could help in supporting the rate of the assimilation of muscular weakness related to malaria that can slow down the vascular system. It has also been established that the intake of fruit that contains sufficient amount of these minerals will help to fight against micro-organisms causing stomach acidity in the digestive system [16].

The presence of iron in the fruit can be used to fight against anaemia and other syndromes in human [16]. Manganese is an important mineral element in human for functioning brain, pituitary and pineal gland which promotes hepato-renal function and growth [17]. Since this plant contains substantial amount of this element, it could be useful for the treatment of diabetes, cancer and fibroid [17].

The coefficient of variation (CV) % of the dried and fresh jackfruit samples ranged from 0.02 to 16.8 % showing significant variation in the obtained results.

Tables 4 showed moisture, protein, ash, crude fibre, carbohydrate contents of jackfruit. The level of moisture content of most food substances indicates their shelf-life [18]. High moisture content in jackfruit is an indication that the fruit has short shelf-life. The ash contents of both fresh and dried jackfruit were significantly okay. The high ash contents indicated the presence of sufficient mineral content in the fruit. The protein content of fresh jackfruit was less than that contain in dry type though both are higher than findings of Eke-Ejiofor and Owuno [19]. The high protein content indicated that jackfruit is highly nutritious and could serve as builder and



regulator of body organs in the body [20]. There is significantly more crude fibre in the dried jackfruit than the fresh one. High fibre in a sampled substance helps to keep the digestive system very healthy and prevent heart disease. The fat content of this jackfruit has made it distinctly potential for the oil industries where it is used for the production of vegetable oils [21]. Carbohydrate is the main source of energy. This energy source is vital in the growth of every organism. The carbohydrate content of jackfruit is moderate which an indication of low sugar content.

Conclusion

The studied jackfruit from modern market Kontagora, Niger State of Nigeria has shown the phytochemical, vitamins, mineral and proximate composition. The use of this fruit either by taking it directly or incorporating it as supplement in other foods could serve as a rich source of phytochemical, vitamins and minerals that will help to improve the health living of human. However, the presence of alkaloids in the plant explains the reason why jackfruit is a potential source of food to man and it uses as anti-malaria, anti-anaemia and other disease agents.

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