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Comparative Study of Photochemical and Proximate Analysis of Breadfruit Seeds, Leaves and Barks

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Abstract: *A study was conducted to determine the phytochemical and proximate analysis breadfruit leaves, seeds and barks*
Fresh leaves, seed and bark were collected and dried under room temperature for sixty days. The dried leaves, seed and the bark of the tree were grounded separately and put in different sterile bottle.
It was found that the leaves, seed and bark of breadfruit contain some phytochemicals like essential oil, saponin, phenolic compound, sugar, flavours alkaloids and tannin except Amino acid that was absent. The result of the proximate analysis showed that the seed had higher content in terms of percentages in all parameters than the leaves and barks.
Key words: *Phytochemical, proximate analysis, Artocarpusalitis*

I. Introduction

The breadfruit Artocarpusaltilis belong to the malbery family moraceana. The tree is handsome and fast growing reaching up to 85ft between 2 to 6ft in width. (Maton. 1987). Breadfruit is scientifically known as ArtocarpusAltilis

Breadfruit has been since the 12th Century A.D and believed to have been widely spread in the pacific area by migrating Polynesians and Hawaiians brought from the Samon Island of Upalu to Ohau. It was first seen by the Europeans in the marquesan in 1595. Then in Tahiti in 1606. It gained its fame in the 18th century with the English Explorers and during the period of famine in Jamaica between 1786 and 1788. It produces its fruit up to 2-3 times in a year and the number of fruit is rich in latex and can weight 1-4kg. (Richburg T.I.et al)

The leaves of breadfruit are evergreen or deciduous, depending on the climatic condition, on thick yellow petioles. They are ovate about 9.36 inches long and 8.20 inches wide entire at the base. They are bright green glossy on the upper surface with conspicuous yellow vein, dull yellowish and coated with minute stiff hair on the underside (Morton, 1987).

The seed are irregular oval, minded at end, pointed at the other about 2cm long, dull brown and darker stripes. In the green stage, the fruit is handsome and the interior is white starchy and somewhat fibrous.

When fully ripe, the fruit is somewhat soft the interior is cream coloured or yellow and pasty, with sweet fragrant (John, 2009)

Breadfruit is a fruit tree that is propagated with root cutting and the average age of bearing fruit is between 4-6 years. It produces its fruit up to 2-3 times a years, and number of fruit produced is very high.

The plant occurs in the wild in Iran and Micronesia, while its secondary centre of diversity is Polynesia. It is commonly cultural in several other tropical countries like west Indies, Ghana, Sierra Leone, Nigeria and Jamaica, Breadfruit has been described as an important staple food of high economic value. It is a source of carbohydrate and forms a portion of the diet in several countries particularly in the highland of the south pacific. (Morton, 187)

It was also used as food for slaves in British West Indies during the reign of King George III. The United State Department of Agriculture brought in breadfruit plants from the canal zone, Panama in 1906. (Morton, 1987(.

The breadfruit pulps are made into various dishes, it can be pounded, fried boiled or mashed to made porridge. It can also ground into flour and used in bread and biscuit making. Due to its high amount of carbohydrate, it can easily replace such carbohydrate-rich fruit like banana. Carbohydrates are thought to be higher. Breadfruit is also known to be rich in fat, ash, fibre and protein. (Amusa, 2002).

Despite the important of breadfruit, its production is faced with several problems. This includes short shelf life and poor yield due to diseases. Since the shelf lives of breadfruit are short, they are often utilized in Nigeria within 5 days of harvesting. However, it can take up to 10 days after harvesting to get to markets in some major cities, resulting in large loss due to bio-deterioration (Amusaetal. 2002)

This study is designed to investigate phytochemical and proximate analysis of breadfruit leave, seed and bark extracts due to the economic importance of the tree.Breadfruit is a large round seedless or seeded fruit with a texture like bread eaten boiled, baked or roasted. The tree yields other products of economic value such

as native cloth from the fibrous inner plant of young trees. The wood is used for canoes and articles of furniture and a kid of glue materials are obtained from the viscid milky juice, which extrude from incision mass in the stem.

In the Pacific Islands, the fruit is preserved for use by storing in pits where the fruit ferments and resolves them into a mass similar in consistency to new cheese, in which they emit an offensive odour. After baking under hot stones, they yield a pleasant and nutritious food.(Motina. M.R et.al)

One of the main pest of breadfruit as found in the west Indies are ant and mealy bugs. Diseases that affect breadfruit include soft rot in southern India, die back cause by Fusariumspp in the Pacific Island, root rot caused by Pythiumspp and other kinds of disease by Rosellinaspp, PhytophoraPalmivora attacks the fruit on the Island of truck while Phomopsis, Dothwrell and Phylosira cause stem rot (Morton 1987).

Breadfruit leaves is used to lower blood pressure and to relieve asthma.

Crushed leaves are applied on the tongue for treating thrush

The leaf juice is also employed as ear-drop and the ashes of burnt leaves is used on skin infections.

A powder of roasted leaves is employed as a remedy for enlarged spleen.

Toasted flowers are used to treat aching too by rubbing it on the gums. The latex is used to treat diarrhea. (Morton, 1987).

Most varieties of breadfruit are purgative if eaten raw. Some varieties are boiled twice and the water thrown away to avoid unpleasant effects, while there are a few named cultivers that can be safely eaten without cooking.

The cyclopropane sterol cycle-astenol, has been isolated from the flesh fruit.

It constitutes 12% of the non-saponifiable extract.

II. Materials And Methods

Fresh leaves, seeds and barks of the breadfruit (Artocarpusartilis) were dried, blended with mortar and pestle to powdered form and kept under room temperature for sixty days in sterile bottles for further analysis.

Qualitative phytochemical evaluation was carried out to test the presence of alkaloids, flavones, sugar, phenolic group, saponin, amino acid and essential oil in the extracts samples using modified method of Brindha et al. (1981)

Tannin: A test solution was made with distilled water to which 0.01g lead acetate was added. The development of a white turbidity in the precipitate represented the presence of tannin.

Alkaloids: A test solution was made with 2N HCI. The aqueous layer was decanted. To the lower layer 2 drops of Mayer's reagent was added. Development of a white turbidity in the precipitate represented the presence of alkaloids.

Flavones: The test solution was mixed with 100µ1of alcohol, 0.02g of paradimethy1 amine benzaldehyde and two drops of conc. HCl. Development of red or pink colour indicate the presence of flavones

Sugar: The test solution was made in a clean test tube, to which 0.01g of anthrone and 3drops of conc. H_2SO_4 were added. The solution was heated for 1 to 2 minutes. Change of green to purple colour was noted to detect the presence of sugar in the sample.

Phenoplic group: An alcoholic plant extract was prepared in a test tube. Two drops of 1M ferric chloride were added. Appearance of intense color indicated the presence of phenolic groups.

Saponin: A test solution with distilled water (2 drops) was prepared in a test tube. The development of a foamy lather indicated the presence of saponin.

Amino acid: A test solution made with two drops of 1% ninhydrine in alcohol was prepared in a test tube. Blue or violet colour development indicated the presence of amino acid.

Essential oil: A test solution made with two drops of 1M alcoholic $K_2Cr_2O_7$ and 3 drops of phenotheline was prepared in a clean test tube. Soap formation indicated the presence of essential oil.

Proximate Analysis

The proximate analysis of breadfruit seeds leaves and barks samples were determined using standard methods (3, 23, 24). The samples analysed for crude fibre, moisture, crude protein, ash, fat and carbohydrate.

III. Results

Proximate analysis of sample A (seed)

Parameter	I	II	III	IV	Mean Value
Crude fibre %	13.08	12.30	13.0	13.10	12.87
Fat %	6.0	5.8	3.5	4.5	4.95
Moisture %	55.10	35.20	55.10	55.0	55.20
Carbohydrate	80	82	80	80.5	80.62
Crude protein %	26.88	26.80	26.60	26.59	26.72
Ash %	6.8	6.75	6.90	6.85	6.83

Proximate analysis of sample B (Leave)

Parameter	I	II	III	IV	Mean Value
Crude fibre %	10.63	10.58	10.60	10.65	10.64
Fat %	3.60	3.66	3.59	3.60	3.61
Moisture %	25.70	25.40	25.60	25.60	25.50
Carbohydrate	50.15	50.10	50.15	50.10	50.0
Crude protein %	22.60	22.40	22.50	22.30	22.45
Ash %	10.50	10.60	10.65	10.59	10.59

Proximate analysis sample C (Bark)

Parameter	I	II	III	IV	Mean Value
Crude fibre %	10.50	10.56	10.48	11.0	10.64
Fat %	3.60	3.65	3.60	3.63	3.62
Moisture %	12.20	12.10	12.0	12.0	12.01
Carbohydrate	22.60	22.40	22.60	22.40	22.50
Crude protein %	12.85	12.80	12.81	12.83	12.82
Ash %	18.80	18.75	18.80	18.82	18.80

Phytochemical analysis

Parameter	A	B	C
Essential oil	III	II	II
Saponin	III	III	III
Phenolic	III	III	II
Amino acid	-	-	-
Tanrnin	III	II	II
Alkaloida	III	II	II
Flavones	II	II	II

IV. Discussion

The bread fruit seeds have higher value in terms of proximate analysis than the leaves and barks. The protein content is important and responsible for the elasticity of and dough formation during bread making. Crude fibre has been known to promote health as it aids the digestive system of human, eating breadfruit equally aids in digestion of foods. The fat contents plays vital role in the determination of shelf life of foods. Too high amount of fat is very undesirable and cause spoilage leading to off flavours and odorous development.

The ash contents helps in enhancing the mineral intake of people. It should be noted that ash content is indicative of the amount of mineral contained in food sample.

Moisture is very important factors in the keeping quality of food, high moisture content have an adverse effect on storage stability.

V. Conclusion

Intake of bread fruit or when mixed with other foods have a good medicinal effect on human.

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