

Original Research Article

Proximate and Antinutrient Compositions of *Parkia biglobosa* Fruits in Abakaliki, Ebonyi state, Nigeria

P.M.Aj a*, C.E.Offor and O.U.Orji

Department of Biochemistry, Faculty of Biological Sciences, Ebonyi State University,
P. M. B 053, Abakaliki, Nigeria

*Corresponding author

ABSTRACT

Keywords

Proximate composition, Antinutrient composition, *Parkia biglobosa* fruit, Abakaliki and Ebonyi State

Proximate and antinutrient compositions of *Parkia biglobosa* fruit in Abakaliki, Ebonyi State, Nigeria were investigated using standard analytical method of Association of Analytical Chemists (AOAC). The result of the proximate composition of *Parkia biglobosa* fruit revealed the contents of protein (0.62%), ash (3.75%), moisture (10.40%), crude fibre (2.55%), fat and oil (25.62%) and carbohydrate (57.06%) in the sample while the result of the anti-nutrients showed the contents of tannins (28.34%), alkaloids (9.70%), oxalate (4.00%), phytate (0.05%), cyanogenic glycosides (0.08%), trypsin inhibitor (0.41%) and haemagglutinin (0.12%), in the sample. This indicated that the fruits of *Parkia biglobosa* can contribute to human nutrient requirement and could be used as a good source of energy because of its high oil and carbohydrates contents.

Introduction

Food analysis is the resolution of the components of food into its proximate or ultimate parts (Onwuka, 2005). Proximate analysis involves the determination of the major components of food as moisture, fat, ash, protein, fiber, and carbohydrate. The sweet and fleshy product of a tree or other plant that contains seed and it can be eaten as food (Lewis, 2002). In common language usage, "fruit" normally means the fleshy seed-associated structures of a plant that are sweet or sour and edible in the raw state, such as apples, oranges, grapes, strawberries, banana and lemon. On the other hand, the botanical sense of "fruit" includes many structures that are not

commonly called "fruits", such as bean pods, corn kernels, wheat grains, and tomatoes (Lewis, 2002).

Parkia biglobosa also known as "dawa-dawa in Hausa, African Locust Beans in English, Igbolyere in Yoruba, Nere in Bambara have been known to be a native of Africa and is an important multipurpose tree of West African Savannah land and one of the most common species of the Parkland agro forestry system (Sacande and Clethro, 2007). More attention have been given to economically important species of tree

plants especially *Parkia biglobosa* in recent years to a sustainable use and integrated management due to an increasing recognition of its contribution to fulfill basic needs of people, household, food security and conservation of natural resources (Joshi and Joshi, 2009). The trees of the *Parkia* species are usually and carefully preserved by the inhabitant of the area where they grow because they are valuable sources of reliable food, wood production, supply of timbers, firewood, pulp and fibre through fodder, gum, drugs and dyes are well as restoration of fertility (Okafor, 1980). The Nigeria study submitted that leaves, fruits, nuts and oils obtained from *Parkia biglobosa* have provided food for humans, livestock and wildlife in many parts of the country. The roots, barks, leaves, stem, flowers, fruits and seed of *Parkia biglobosa* are all used medicinally to treat a range of ailments including diarrhea, ulcers, pneumonia, burns coughs and jaundice (Sacande and Clethro, 2007).

Hassan *et al.* (2007) reported that the *Parkia biglobosa* fruit has poor essential amino acid content with a score of 1/8. The pulp contains higher cellulose and less ascorbic acid than the cotyledons. The pulp also contains simple sugars accepts maltose (Alabi *et al.*, 2005). The seeds of *Parkia biglobosa* on fermentation are used in cooking stew and soup, the sweet yellow pulp contains 60% sugar when ripe and the seeds contain 30% protein as well as vitamins and minerals (Sacande and Clethro, 2007). The fruits pods are used to produce insecticides powders for treating crops. Literature reviews that the fruit is used in rural Africa during emergencies when grain store are empty, which is an indication of its edibility (Akoma *et al.*, 2011). However, people from Abakaliki, Ebonyi State, Nigeria eat the fruit of *Parkia biglobosa*, hence this study was carried out

to x- ray the proximate and anti-nutrient compositions of *Parkia biglobosa* fruit which is one of the major fruits in the area.

Materials and Methods

Materials

All chemicals and reagents used were of analytical standard. The *Parkia biglobosa* fruit were collected from Agara Oza Village in Abakaliki, Ebonyi State and was classified by a taxonomist in Applied Biology Department Ebonyi State University, Abakaliki, Nigeria.

Sample Preparation

The fruit of *Parkia biglobosa* were dried at room temperature and ground into fine powdered with electric grinding machine and stored in an air tight container in a refrigerator.

Methods

Proximate and some nutrient analyses were carried out by the method of Association of Official Analytical Chemist (AOAC, 1997).

Result and Discussion

The results obtained from figure 1 showed that *Parkia biglobosa* fruits are high carbohydrate and oil containing fruits. Richard *et al.* (1996) has reported for high carbohydrates content in *C. esculenta* fruits. A high carbohydrate food is desirable while deficiency of carbohydrate causes depletion of body tissues (Barker, 1996). The major function of carbohydrate is to provide the body with energy. The observed low protein content revealed that *Parkia biglobosa* fruit is not a good source of protein (Fig. 1). The value obtained was relatively low when compared to 14.9% reported for *Cocooasia*

esculenta fruit (Richard *et al.*, 1996). The result obtained by Hassan *et al.*, (2007) was in correlation to the observed low protein content in *Parkia biglobosa* fruit. Protein is an essential component of diet which supplies adequate amounts of amino acid (Pugalenthi *et al.*, 2004). Proximate compositions of *Irvigna gabonesis* and *Citrullus colocynthis* also showed that they are rich in carbohydrate and oil, but low in protein (Igwenyi *et al.*, 2011).

The ash composition of *Parkia biglobosa* was observed to when compared to the result obtained from the fruit of *Cocooasia esculento* (9.4%) by Richard *et al.* (1996). The Ash content gives an idea of the inorganic content of the sample from where the mineral content could be obtained (Sotelo *et al.*, 2007). Moisture content of *Parkia biglobosa* fruit was observed to be low as shown in figure 1, which to an extent gives an idea on the perish ability nature of fruits materials due to association with the rise of microbial activities (Hassan *et al.*, 2007; Ruzoinah *et al.*, 2009). The crude fibre composition of *Parkia biglobosa* fruit was observed to be low (Fig. 1). The observed low crude fibre is correlation to the

work done by Hassan *et al.*, (2007) which revealed that crude fibre of *Parkia biglobosa* fruit to be 3.17 0.29%. Fibre plays a role in the prevention of number of diseases by reducing the level of cholesterol.

The results obtained from figure 2 revealed low levels of anti-nutrients in *Parkia biglobosa* fruits. The anti-nutrients such as tannin, phytate, oxalate, trypsin inhibitor, haemagglutinin and cyanogenic glycosides were observed to be very low in concentration in *Parkia biglobosa* fruit even below permissible toxicity levels (Brighth and Gullik, 2000). This indicates probable lack of interference with the availability of mineral elements.

This showed that the fruits of *Parkia biglobosa* could be used as a good source of energy because of its high oil and carbohydrates contents. The level of anti-nutrients which interfere with digestion and absorption are all below the toxic level of daily intake. It can therefore, be concluded that the fruits can contribute to human nutrient requirement and could be used as a source of nutrient supplement.

Fig.1 The percentage proximate compositions of *Parkia biglobosa* fruit

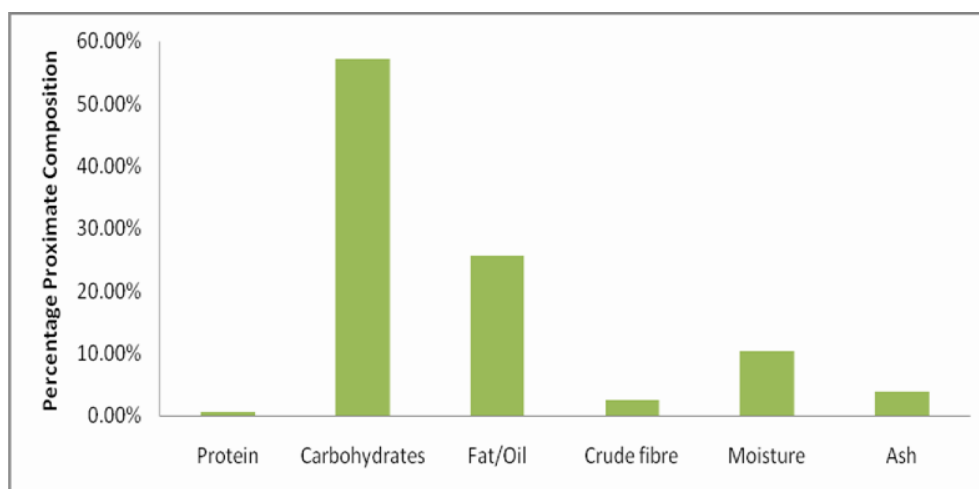
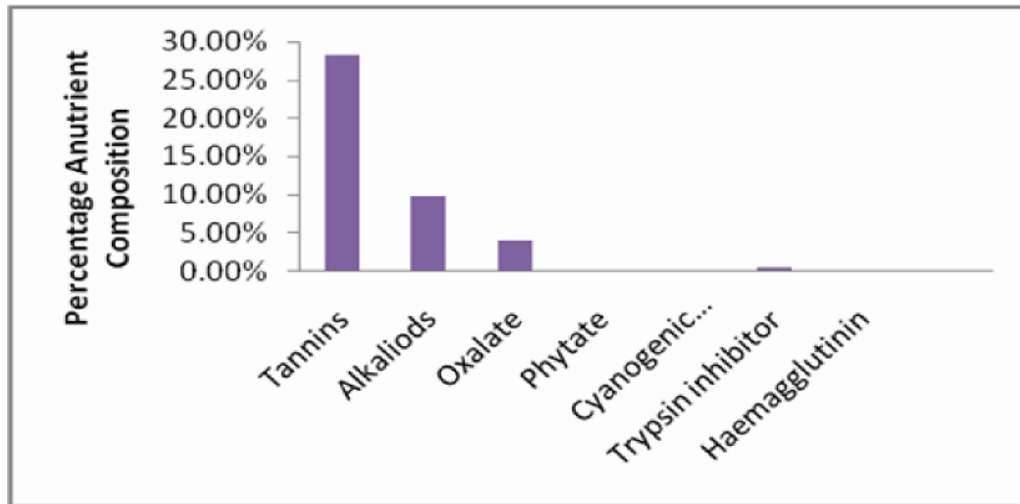


Fig.2 The percentage antinutrient compositions of *Parkia biglobosa* fruit



References

- A.O.A.C., 1997. Official methods for analysis of the Association of Analytical Chemists. 11th edn, Longman, Washington D.C., 5-10.
- Akoma, U., Compbell Platt, G., Hagos, T.H. 2011. African locust fermented products, Dadawa. *Ecol. Food Nutr.*, 8(9): 123 132.
- Alabi, D.A., Ayelaagbe, O.O., Ajalyeoba, E.O. 2005. Studies on the fruit of *Parkia biglobosa*. *J. Plant Foods Hum. Nutr.*, 4(49): 229 233.
- Barker, L. 1996. Medical plants used in intestinal Disorder / disease in Mba Mago Region. *Fitoterapia*, Pp. 246 254.
- Brighth, L., Gullik, P. 2000. Antinutrient analysis of *Parkia biglobosa* fruit. *Afr. J. Biotechnol.*, 10(30): 5805 5800.
- Hassan, O., El-Mahmood, A.M., Amech, D.M. 2007. *In vitro* Antibacterial activity of *Parkia biglobosa* root, Bark extract against some microorganism. *Afr. J. Biotechnol.*, 5(12): 1371 1257.
- Igwenyi, I.O., Eze, C.A., Azoro, B.N., Offor, C.E., Nwuke, C.P. 2011. Proximate, mineral and amino acid compositions of *Irvigna gabonesis* and *Citrullus colocynthis* used as soup thickeners in South Eastern Nigeria. *Int. J. Biotechnol. Biochem.*, 7(4): 493 499.
- Joshi, A.R., Joshi, K. 2009. Plant diversity and ethano-botanical notes on trees species of syabal village Longtan National, *Parkia biglobosa*. *Ethno Bot. Leaflets*, 13: 651 64.
- Lewis, R.A. 2002. CRC Dictionary of Agricultural Sciences, CRC Press, 4 Pp.
- Okafor P.G. 1980. Phenolic compounds in medicinal plant in health and disease. Dekker, New York.
- Onwuka, G.I. 2005. Food analysis and instrumentation, proximate composition of food minerals 1st Edition. Naplithali print, a Division of H.G. support Nigerian Ltd, Nigeria, 64 81, 114 Pp.
- Pugalenthi, M., Vadivel, V., Gurumoorthi, P., Janardhannan, K. 2004. Comparative nutritional evaluation of little known legumes, *Tamarindus indica*, *Erythrina indica* and *Sesbania bispinosa*. *Tro. Subtro. Agroecosyst.*, 4: 107-123.
- Richard, B., Tamanoto, Y.G., Tanner, G. 1996. Therapeutic potentials of

inhibition of the NF-KB pathway in the treatment of inflammation and cancer. *J. Clin. Invest.*, 107(20): 135-425.

Ruzoinah, U., Dacie, D.V., Lewis, S.M. 2009. Practical Haematology, 4th edition, Longman Group Ltd, Hong Kong, Pp. 17-22.

Sacande, A.I., Clethro, O. 2007. Nutritive and industrial utility values of African bean *Parkia biglobosa*. *Proc. Sci. Assess. Nigeria*, 2(25): 105-110

Sotelo, R., Sofowora, A., Index, E.E.I.J. 2007. Medicinal Plant and traditional medicine in African: Spectrum Book Ltd, Nigeria, 25 Pp.