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# Nutritional Qualities of Three Medicinal Plant Parts (*Xylopia aethiopica, Blighia sapida* and *Parinari polyandra*) commonly used by Pregnant Women in the Western Part of Nigeria

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**Abstract:** The nutritional potentials of three medicinal plant parts used by pregnant women in the western part of Nigeria *Parinari polyandra*, *Blighia sapida* and *Xylopia aethiopica* were evaluated through their proximate compositions as well as percentage mineral elements composition. *Blighia sapida* was high in crude fibre (44.09±2.20%) compared with *Parinari polyandra* and *Xylopia aethiopica* that were 4.21±1.10% and 12.14±0.70% respectively. Moisture contents of *Xylopia aethiopica* and *Blighia sapida* were 16.04±1.25% and 10.17±2.60% respectively while that of *Parinari polyandra* was 30.65±5.02%. The total ash contents of *Parinari polyandra*, *Blighia sapida* and *Xylopia aethiopica* were 2.53±1.20%, 3.66±1.20% and 4.37±0.85% respectively. The total fat of *Xylopia aethiopica*, *Blighia sapida* and *Parinari polyandra* were 9.55±2.10%, 1.25±0.20% and 0.53±0.15% respectively while the total protein of *Blighia sapida*, *Xylopia aethiopica* and *Parinari polyandra* were 2.1±0.25%, 2.1±0.20% and 7.09±0.20% respectively. The total carbohydrate of *Xylopia aethiopica* was 55.80±4.26%, that of *Parinari polyandra* was 54.27±3.20% and that of *Blighia sapida* was 39.45±2.20%. *Xylopia aethiopica* can be a good source of magnesium (2.236±0.095), phosphorus (0.620±0.04) and potassium (0.510±0.04) as the amount of these mineral elements were higher than that of the other plant parts with the exception of *Parinari polyandra* having 0.690±0.11% phosphorus. *Blighia sapida* is also a good source of phosphorus (0.400±0.20), magnesium (0.430±0.20) and calcium (0.348±0.15). Other mineral elements detected in reasonable amounts were calcium, zinc and sodium. Further tests revealed that heavy metals such as lead, chromium and cadmium were not detected. The results of this research indicated that the three plants parts have nutritional qualities that could provide the users with additional nutrients.

**Key words:** *Blighia sapida*, *Xylopia aethiopica*, *Parinari polyandra*, proximate analysis, mineral elements

## Introduction

Medicinal plants are plants which contain substances that could be used for therapeutic purposes or which are precursors for the synthesis of useful drugs (Sofowora, 1982). Women are increasingly using fertility-enhancing plants to combat among other things, the negative effects of industrial pollutants on fertility (Lans, 2007).

*Parinari polyandra* belongs to the family, *Rosaceae* and found mostly in the tropical regions including: Nigeria, Ghana, Senegal, Ivory coast, Cameroon and Sudan among others. The common local names are *Gwanjan kusa* (*Hausa*), *Abaddima* (*Nupe*) and *Aboidefin* or Abere (*Yoruba*). In South-western Nigeria, the leaf extract of *Parinari polyandra* is used to enhance fertility. It is traditionally used to relief painful and inflammatory conditions (Vongtau *et al*., 2004; Bouquet and Debray, 1974). A decoction of the bark is used in Cotˆe d'Ivoire to wash fractured limbs, to relieve the pain followed by massaging with bark pulp mixed with powdered guinea (Daziel and Hutchchinson, 1956). In Senegal *Parinari polyandra* is called Basari a-noy in Ghana it is called Akan-Kwawu. In Ivory Coast *Parinari polyandra* is used as an analgesic for local pain (Bouquet and Debray, 1974). It is also believed in the Western part of Nigeria that *Parinari polyandra* has the potential of enhancing fertility.

*Xylopia aethiopica* is a tree of 20 meter high or more with a clear straight bole to 75cm girth (Burkill, 1985). It has an English name of African Pepper. In Nigeria: (Yoruba) it is called Eeru; in (Igbo) it is called Uda. A fruit extract or decoction of the bark as of the fruit is useful in the treatment of bronchitis and dysenteric conditions. In Congo, it is used for the attacks of asthma, stomach aches and rheumatism (Burkill, 1985). A decoction of leaves and roots is a general tonic in Nigeria for fever popularly called "Agbo". *Xylopia aethiopica* has been reported to be recommended to women who have newly given birth as a tonic in the Ivory Coast as a woman remedy, it is taken also to encourage fertility and for ease of childbirth (Burkill, 1985). Also, at one time in the Government Hospital in Ghana, *Xylopia aethiopica* is used in combination with New-boudia laevis (*Bignoniaceae*) for increasing menstrual flow and was accordingly deemed to have abortifacient properties (Burkill, 1985).

Table 1: Proximate Analysis of *Xylopia aethiopica*, *Blighia sapida* and *Parinari polyandra*

| Parameters (%) | *Xylopia aethiopica* (Fruit) | *Parinari polyandra* (Fruit) | *Blighia sapida* (Root) |
|---|---|---|---|
| Moisture | 16.04±1.25 | 30.65±5.02 | 10.17±2.60 |
| Total ash | 4.37±0.85 | 2.53±1.20 | 3.66±1.20 |
| Crude fibre | 12.14±0.70 | 4.21±1.10 | 44.09±2.20 |
| Total fat | 9.55±2.10 | 1.25±0.20 | 0.53±0.20 |
| Crude protein | 2.10±0.25 | 7.09±0.35 | 2.10±0.20 |
| Total Carbohydrate | 55.80±4.26 | 54.27±3.20 | 39.45±2.20 |

Mean±S.D, n = 3

Table 2: Mineral Elements in Percentage (%) Compositions

| Parametres | *Xylopia aethiopica* (*Fruit*) | *Parinari polyandra* (*Fruit*) | *Blighia sapida* (Root) |
|---|---|---|---|
| Ash | 4.37 | 2.53 | 3.66 |
| Manganese | 0.003±0.002 | 0.004±0.001 | 0.002±0.004 |
| Potasium | 0.510±0.04 | 0.400±0.01 | 0.200±0.01 |
| Sodium | 0.053±0.01 | 0.006±0.02 | 0.032±0.02 |
| Iron | 0.018±0.02 | 0.007±0.01 | 0.050±0.03 |
| Calcium | 0.193±0.021 | 0.145±0.20 | 0.348±0.15 |
| Magnesium | 2.236±0.095 | 0.117±0.14 | 0.430±0.20 |
| Phosphorus | 0.620±0.04 | 0.690±0.11 | 0.400±0.20 |
| Zinc | 0.020±0.01 | 0.021±0.04 | 0.014±0.02 |
| Cadmium | N.D | N.D | N.D |
| Lead | N.D | N.D | N.D |
| Chromium | N.D | N.D | N.D |

N.D = Not detected, Mean±S.D., n = 3

*Blighia sapida* belongs to the family *Sapindaceae*. In Nigeria (Yoruba) it is called Isin. It is an ever green tree with a dense crown. It is cultivated in India, West Indies and tropica America (Gledhill, 1972). *Blighia sapida* is useful in African traditional medicine. The bark pulp is used as a liniment for oedema intercostals pains in Ivory Coast. The pulp and leafy types are used as eye drops in ophthalmic and conjunctivitis (Irvin, 1965). The ashes of the dried husks and the seeds are used in the preparation of a kind of soap (Irvin, 1961). The information about the use of the root is scanty in the literature. In the western part of Nigeria, the root of *Blighia sapida* is used in combination with *Xylopia aethiopica* to terminate unwanted pregnancy.

The phytochemical screening of *Blighia sapida* revealed the presence of steroidal alkaloids. The fruits contain saponins which are hemolytic (Dukes, 1992). The proximate compositions and percentage compositions of some mineral elements of these three plant parts were determined in order to use the information to assess the nutritional potentials of these plants. Moreover, the percentage compositions of some mineral elements were also determined in each of the plant parts. This present work is aimed at using the proximate analysis as well as the percentage compositions of some mineral elements to assess the nutritional potentials of the plant parts in relation to the different purposes they are meant for.

## Materials and Methods

**Plants sampling:** Collection of plant materials for this research was taken from representative portions of the different plants. They were obtained from 'Mushin' Market, Lagos State, Nigeria in 2003. The plant samples are: *Parinari polyandra (the fruit), Blighia sapida (the root)* and *Xylopia aethiopica (the fruit)* as authenticated by Professor Olowo-kudejo of the Department of Botany of the University of Lagos, Nigeria. The choice of these plants for the work and the plant parts used were based on the frequent usages of these plant parts by some pregnant women in the Western part of Nigeria notably, Lagos, Ogun, Oyo and Osun States for different purposes. All samples were dried and ground.

### Chemical analysis

**Proximate analysis:** Chemical composition of the plants parts were determined using the AOAC methods (1990). Moisture (method 14:004), total ash (method 14:006), crude fibre (method 14.020), total fat (method7.056) and protein (method 2.057) were assayed and carbohydrate was obtained by difference.

**Mineral elements compositions determination:** The mineral composition were determined on aliquots of the solutions of the ash by established atomic absorption/emission spectrophotometer model 200-A produced by Buck Scientific. Phosphorus was determined by calorimetric means using the Vanadomolybdate (yellow) Method (AOAC, 1990).

## Results

The result from the proximate analysis showed that *Blighia sapida* was high in crude fibre content 44.09±2.220% compared with *Parinari polyandra* and *Xylopia aethiopica* (Table 1) *Xylopia aethiopica* has the highest percentage composition of total fat, 9.55±2.1% compared with *Parinari polyandra* and *Blighia sapida* with less than 1.50% total fat (Table 1).

*Parinari polyandra* is rich in the amount of total protein with composition of 7.09±0.35% compared with *Blighia sapida* and *Xylopia aethiopica* having less than 2.5%.

*Xylopia aethiopica* can be a good source of magnesium, phosphorus and potassium (Table 2) as the amount of these mineral elements were higher than that of the other plant parts with the exception of *Parinari polyandra* having 0.690±0.11% phosphorus.

*Blighia sapida* is also a good source of phosphorus (0.400±0.20), magnesium (0.430±0.20) and calcium (0.348±0.15) (Table 2). Other mineral elements detected in reasonable amounts were calcium, zinc and sodium. Further tests revealed the absence of heavy metals such as lead, chromium and cadmium.

## Discussion

Comparing the results of the proximate analysis of *Xylopia aethiopica*, *Parinari polyandra* and *Blighia*

Table 3: Summary of Proximate Analysis of Plants Parts for Comparative Studies with Proximate Analysis of Some Edible Vegetable Seeds

| Parameters | Afang* *Gnetum* Africanum | Flutedpumpkin* (*Telferia* Occidentalis) | B. Horse Eye;* Beans (*M. UREANS*) |
|---|---|---|---|
| Moisture % | 31.60 | 54.80 | 31.79 |
| Total ash % | 1.20 | 6.90 | 6.00 |
| Crude fibre % | 0.80 | 4.60 | 4.00 |
| Total fat % | 3.15 | 50.90 | 4.30 |
| Crude protein % | 17.50 | 7.00 | 24.33 |
| Total Carbohydrate % | 87.62 | 31.25 | 61.37 |
| Parameters (%) | *Xylopia aethiopica* (Fruit) | *Parinari polyandra* (Fruit) | *Blighia sapida* (Root) |
| Moisture | 16.04±1.25 | 30.65±5.02 | 10.17±2.60 |
| Total ash | 4.37±0.85 | 2.53±1.20 | 3.66±1.20 |
| Crude fibre | 12.14±0.70 | 4.21±1.10 | 44.09±2..20 |
| Total fat | 9.55±2.10 | 1.25±0.20 | 0.53±0.20 |
| Crude protein | 2.10±0.25 | 7.09±0.35 | 2.10±0.20 |
| Total Carbohydrate | 55.80±4.26 | 54.27±3.20 | 39.45±2.20 |

*Ekop (2007)

*sapida* with that obtained in the literature for three edible vegetable seeds (Table 3) show that *Xylopia aethiopica* and *Parinari polyandra* are high in the amount of total carbohydrate compared with *Blighia sapida*. This is beneficial since carbohydrate constitutes a major class of naturally occurring organic compounds that are essential for the maintenance of plant and animal life and also provide raw materials for many industries (Ebun-Oluwa and Alade, 2007).

*Xylopia aethiopica* is also high in percentage compositions of total fat, total ash and crude fibre. Because of the high contents of total carbohydrate, total fat, total ash and crude fibre contents of *Xylopia aethiopica*, it is particularly recommended to women who have newly given birth as a tonic in Ivory Coast (Burkill, 1985). The total fat in *Xylopia aethiopica* if further analyzed may contain essential fatty acids as well as vitamins.

The result from the proximate analysis also showed that *Blighia sapida* was high in crude fibre content compared with *Parinari polyandra* and *Xylopia aethiopica* (Table 1 and Table 3). Nutritionally, this is of beneficial effect since it had been reported that food fibre aids absorption of trace elements in the gut (Kelsay, 1981) and reduce absorption of cholesterol (Le Veille and Sanberlich, 1966). However due to the bowel movement increasing effect of fibre, it may tend to promote abortion. This could be one of the reasons *Blighia sapida* is used in combination with *Xylopia aethiopica* for abortifacient purpose in the western part of Nigeria. It is important that pregnant women should avoid using *Blighia sapida*.

*Parinari polyandra* is rich in the amount of total protein with composition of 7.09±0.35% compared with *Blighia sapida* and *Xylopia aethiopica* having less than 2.5% (Table 1). Nutritionally, *Parinari polyandra* is beneficial as proteins contain amino acids utilized by the cells of the body to synthesize all the numerous proteins required for the function of the cell and also to furnish energy (Robinson, 1978).

*Xylopia aethiopica* can be a good source of magnesium, phosphorus and potassium (Table 2) as the amount of these mineral elements were higher than that of the other plant parts with the exception of *Parinari polyandra* having 0.690±0.11% phosphorus. The high contents of phosphorus, magnesium and potassium in *Xylopia aethiopica* further explains its usage in Ivory Coast for medicinal purposes (Bouquet and Debray, 1974). *Blighia sapida* is also a good source of phosphorus, magnesium and calcium. Other mineral elements detected in reasonable amounts were calcium, zinc and sodium. The high concentration of these minerals is advantageous since certain inorganic mineral elements (potassium, zinc, calcium, traces of chromium, etc.) play important roles in the maintenance of normal glucose-tolerance and in the release of insulin from beta cells of islets of Langerhans (Choudhary and Bandyopadhyay, 1999).

Lead, cadmium and chromium were not detected, this indicate that these minerals are not present in a detectable amount in the plant parts. This is beneficial to consumers, since it has been reported that some of these minerals like lead, cobalt and cadmium are highly toxic even at low concentrations (Asaolu *et al*., 1997).

All the plant parts have nutritional qualities which when used in the right proportions could be of tremendous benefit to the body. Further studies will concentrate more on the use of the extracts of these plants in laboratory animals in order to determine their metabolic effects.

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## References

A.O.A.C., 1990. Official Methods of Analysis (15 Ed.) the Association of Official Analytical Chemists, Washington DC, USA.

Asaolu, S.S., K.O. Ipinmoroti, C.E. Adeyinwo and O. Olaofe, 1997. Seasonal variation in heavy metals distribution in sediments of Ondo State coastal region. Ghana J. Chem., 3: 11-16.

Bouquet, A. and M. Debray, 1974. *Plantes Medicinales*, pp: 146-7.

Burkill, H.M., 1985. The useful plants of West Africa, Vol.1, Royal Botanical Gardens, pp: 11-20.

Choudhary, K.A. and N.G. Bandyopadhyay, 1999. Preliminary studies on the inorganic constituents of some indigenous hyperglycaemic herbs on oral glucose tolerance test. J. Ethnopharmacol., 64: 179-184.

Daziel, J.M. and J. Hutchchinson, 1956. The useful plants of West Tropical Africa. 2nd Edn. London, Crown Agent for overseas government and Administration, pp: 112-132.

Dukes, J.O., 1992. Handbook of medicinal herbs, CRC Press, N.Y., pp: 11-30, 102.

Ebun-Oluwa, P.O. and A.S. Alade, 2007. Nutritional potential of Berlandier Nettle spurge (*Jatropha cathatica*) seed. Pak. J. Nutr., 6: 345-348.

Ekop, A.S., 2007. Determination of chemical composition of *Gnetum africanum* (AFANG) seeds. Pak. J. Nutr., 6: 40-43.

Gledhill, D., 1972. West African trees-West African Nature Handbook, Longman Group Ltd. ISBN-0582604273, pp: 1-20.

Irvin, F.R., 1961. Woody plants of Ghana. Oxford University Press, London, pp: 878.

Irvin, F.R., 1965. Botany and medicine in West Africa. Ibadan University Press. Ibadan, pp: 102-130.

Kelsay, J.L., 1981. Effects of diet fibre on bowel function and trace mineral balances of human subjects. Cereal Chem., pp: 2-5.

Lans, C., 2007. Ethnomedicines used in Trinidad and Tobago for Reproductive Problems. J. Ethnobio. Ethnomed., 3: 13.

Le Veille, G. and H.E. Sanberlich, 1966. Mechanism of the cholesterol-dressing effect of pectin in the cholesterol fed rat. J. Nutr., pp: 209-214.

Robinson, H., 1978. Fundalmentals of normal nutrition. 3rd Edition. Macmillan Publishing Co., Inc. ISBN 0-02-979590, pp: 41-125, 272-284.

Sofowora, A., 1982. Medicinal plants and traditional medicine in Africa. John Wiley & Sons Ltd., pp: 1-10.

Vongtau, H.O., J. Abbah, I.E. Ngazal, O.F. Kunle, B.A. Chindo, P.B. Otsapa and K.S. Gamaniel, 2004. Anti-nociceptive and anti-inflammatory activities of the methanolic extract of Parinari polyandra stem bark in rats and mice. J. Ethnopharmacol., 90: 115-121.