



Original article

Common wild fruits from Akwa Ibom state, Nigeria and nutritional analyses of *landolphia membranacea* (Stapf) pichon

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ABSTRACT

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Fruits from *Maesobotrya barteri*, *Carpolobia lutea*, *Dialium guineense*, *Hemandradenia mannii*, *Uvaria chamae*, *Cola millenii*, *C. heterophylla*, *Melastomastrum capitatum*, *Landolphia membranacea* are reported as being commonly consumed in Akwa Ibom State of Nigeria even though they are harvested only in the wild. These all are available in the planting season when the staples are not really available. Phytochemical screening of the fruits of *L. membranacea* showed a strong presence of flavonoids, cardiac glycosides and tannins, trace quantities of saponins and complete absence of alkaloids, anthraquinones and cyanogenic glycosides. Proximate analyses revealed moisture content of 75.5%, 8.74% of protein, 5.33% of ash, 8.33% of crude fibre, 13.95% of crude fat and 65.55% of carbohydrate. The mineral content showed that potassium was 2448.00mg/kg⁻¹, sodium was 100.00mg/kg⁻¹, magnesium was 240.00mg/kg⁻¹, calcium was 240.00mg/kg⁻¹, phosphorous was 2500.00mg/kg⁻¹ and iron was 129.00mg/kg⁻¹. The anti-nutrient composition was phytic acid (43.36mg/100g), oxalic acid (580.80mg/100g) and tannins (2.93mg/100g). This fruit is recommended for consumption, conservation and possibly further development in size and yield.

1. Introduction

Fruits often form a vital part of human nutrition. Some are eaten as a refreshing delicacy, others make up a meal. In whatever way they are consumed they are valuable because of the minerals and vitamins they contribute to the diet. Edible wild fruits are those fruits that are collected in the wild even though they are commonly consumed. Some have excellent flavour, attractive fragrance and delicious taste according to (Pantastico, 1975). Campbell (1986) noted that women and children know many wild fruits which can be used for food and medicine. They know how to gather, prepare and use different kinds of wild fruits. Pennarrieta et al. (2009) investigated wild strawberries which showed higher values of Total Antioxidant Capacity (TAC) than the cultivated species. In addition to food value, edible wild fruits are marketable and provide the opportunity to supplement household income (Campbell, 1986; Wilson, 1990). Akwa Ibom State is located in the rainforest zone of Nigeria and the people get all their food from the farms and forest or what is left of it. Over time, they have identified edible fruits in the wild which have become part of a seasonal diet. Most of these wild fruits are harvested during visits to and from farmlands. With major developmental strides and clearing of forests for farmlands to accommodate growing populations, many of these wild fruits are in danger of being lost.

The purpose of this work was therefore to document indigenous knowledge on common edible fruits eaten by people in Akwa Ibom State and to assess the phytochemical, nutrient, anti-nutrient and mineral contents of one of the fruits, *Landolphia membranacea*.

2. Materials and methods

Information on the wild fruits was obtained by random interviews of people who were knowledgeable about the edible wild fruits. Collections were made of the plants, they were authenticated and vouchers were deposited in the University of Uyo herbarium.

The sample for phytochemical screening was obtained by cold extraction. 100g of the powdered sample was extracted using 50% ethanol. The mixture was allowed to stand for 72 hours under room temperature with a lid to prevent evaporation of the solvent. After 72 hours, the liquid extract was separated from the marc through filtration. The filtrate was concentrated to dryness in vacuo 45 °C. The dried extract was then used for the screening using the methods of (Sofowora, 1993) and (Harborne, 1964). Proximate analysis and determination of minerals and micronutrients were done using the (AOAC, 1980) and (AOAC, 1990) methods respectively. Anti-nutrient contents were determined by the method of (Udoessien, 1990).

3. Results

The plants that were found to produce fruits that are commonly consumed by people in Akwa Ibom State but are still collected in the wild are listed in Table 1. Results of the phytochemical screening, nutrient, anti-nutrient and mineral analyses are summarised in Tables 2-5.

Table 1 shows nine species in eight genera that produce edible fruits in the wild. In Table 2, the carbohydrate content (65.55%) was higher than all the other nutrients. However, the crude protein content (98.74%) was higher than the crude fiber value (8.33%). Crude fat value was 13.95% and the ash content was 5.33%. In Table 3, the potassium and phosphorous values were over 2,000mg/kg⁻¹, magnesium and calcium values were similar (240.00mg/kg⁻¹). The anti-nutrients analysed as seen in Table 4 were phytic acid, oxalic acid and tannins and oxalic acid had the highest value of 580.50mg/100g.

The phytochemical screening of the fruit of *L. membranacea* as seen in Table 5 showed that it had a very strong presence of Tannins, phlobatannins and cardiac glycosides. Flavonoids were present while saponins were found in trace amounts. Anthraquinones, alkaloids and cyanogenic glycosides were absent.

Table1

A list of common edible wild fruits from akwa ibom state.

Fruit plant	Family	Local name
Maesobotrya barteri	euphorbiaceae	nyanyated
Carpolobia lutea	polygalaceae	ikpafum
Dialium guineense	caesalpinaceae	okukuk
Hemandradenia mannii	connaraceae	adiadodom
Uvaria chamae	annonaceae	nkarika ikot
Cola millenii	sterculiaceae	ekpamfet okpoebot
C. Heterophylla	''	
Melastomastrum capitatum	melastomataceae	eyop inuen
Landolphia membranacea	apocynaceae	mba

Table 2

Nutrient composition in landolphia membranacea.

Nutrient	Proximate composition (%)
Crude protein	8.74±0.43
Crude fat	13.95±0.58
Crude fiber	8.33±0.57
Carbohydrate content	65.55±0.50
Ash content	5.33±0.57
Moisture content	75.50±0.50

Mean of 3 ± SD

Table 3

Anti-nutrient composition of l. membranacea.

Anti-nutrients	composition (mg/100g)
Phytic acid	43.53±0.24
Oxalic acid	580.50±0.50
Tannins	2.92±0.01

Mean of 3±SD

Table 4

Mineral composition of l. membranacea.

Mineral	Composition mg/kg-1
Potassium	2448.00±0.00
Sodium	100.00±5.77
Magnesium	240.00±2.40
Calcium	240.00±4.00
Phosphorous	2,500.00±0.00
Iron	129.00±0.00

Mean of 3 ± sd

3. Discussion

Many plant resources used by indigenous people over time have been abandoned in favour of improved varieties of a few of these resources. In this case, some fruits have been chosen over others and brought into cultivation around homes and in home gardens. However, many others are still collected in the wild and since

forests are continually destroyed for agricultural and developmental purposes, many of these resources have been lost and are being lost. Many people have relocated to cities and knowledge of these natural resources which were often not documented is being lost. Rajagopalan (2008) said that local people have a vast and unique knowledge of plants and that indigenous knowledge of biodiversity is increasingly recognised as being very important.

Table 5The result of phytochemical screening of *L. membranacea*.

Test	Observation	Inference
Saponin(frothing test)	persistent frothing for a short time	+
Tannins (ferric chloride test)	blue-green precipitate	+++
Anthraquinones	no colour change	-
Flavonoids (shinoda's test)	light orange effervescence	++
Cardiac glycosides		
Lieberma's test	pink colouration(terpenes)	+++
Salkowski's test	reddish-brown colour observed at interphase	+++
Keller-killiani test	reddish-brown ring at interphase	+++
Alkaloid(dragendorff's test)	no red precipitate	-
Cyanogenetic glycoside	no pink colouration	-
Phlobatannins	red precipitate	-

+++ = strongly present
 ++ = present
 + = trace
 - = Absent

The proximate analysis of the fruit of *L. membranacea* compares favourably in protein content with commonly consumed and popular fruits like the avocado pear (Okeke and Elekwa 2006). They also reported a lower value (10.81%) of crude fat for avocado than what was obtained for *L. membranacea* (13.95%). This may hold potential in the development of vegetable fat. The occurrence of high values of potassium may have an advantage in depressing blood pressure. Yoshimura and Nukanishi (1991) observed that a potassium /sodium ratio in diet is an important factor in prevention of hypertension and arteriosclerosis. Phosphorous values were also high (2,500.00mg/kg⁻¹) more than that of avocado as reported by Okeke and Elekwa (2006) and Dosunmu (2005), reported that calcium and phosphorous are associated with each other for growth and maintenance of bones, teeth and muscles. Iron is beneficial in diet since it is suitable for adults to maintain the daily balance of intake and excretion (Bothwell et al., 1989). Indigenous people recommend its' consumption by lactating mothers with the belief that it helps to regenerate blood lost during delivery. The presence of anti-nutrients implies these fruits may have anti-microbial (Margineanu et al., 1976) and haemolytic effects (Abe et al., 1981).

5. Conclusion

In conclusion, the indigenous knowledge on wild fruits has been documented for posterity, and this provides a basis for further investigations into their nutritional or even medicinal values. The investigation of *L. membranacea* has shown how comparable it is with a fruit like avocado which has both nutritious and medicinal value. The only set back is the fruit size which is usually up to 5cm long and about 3cm in diameter. However, other fruits like *Chrysophyllum albidum* are also small but very popular.

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