

**NUTRITIONAL ASSESSMENT OF XYLOPIA PARVIFLORA SEED OBTAINED FROM PATI SHABAKOLO, LAVUN LOCAL GOVERNMENT, NIGER STATE, NIGERIA**

**E. Y. Shaba<sup>1\*</sup>, M. M. Ndamitso<sup>1</sup>, T. J. Mathew<sup>1</sup>, A. N. Tsado<sup>2</sup>, A. B. Salihu<sup>3</sup> and E. Ogbonna<sup>1</sup>**

<sup>1</sup>Department of Chemistry Federal University of Technology, Minna, P.M.B 65, Niger State, Nigeria. <sup>2</sup>Department of Basic and Applied Sciences, Niger State Polytechnic P.M.B 01, Zungeru Niger State, Nigeria.

<sup>3</sup>Science Laboratory Technology, Federal Polytechnic Bida Niger State, Nigeria

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**ABSTRACT:** *Determination of nutritive value of Xylopiya parviflora seed was carried out using standard analytical methods. The proximate parameters determined were moisture content ( $8.95 \pm 1.93$ ), ash content ( $6.25 \pm 0.35$ ), crude fibre ( $8.25 \pm 0.57$ ), crude protein ( $8.28 \pm 0.19$ ) %, fat ( $6.08 \pm 0.46$ %) carbohydrate ( $62.45 \pm 0.76$ ) % and calorific value ( $337.60 \pm 0.32$  KJ/100g) respectively. The result of this sample revealed that the seed of Xylopiya parviflora contains reasonable amount of mineral contents needed in diet with potassium concentration of  $53.21 \pm 0.31$ , phosphorus ( $50.22 \pm 0.43$ ), sodium ( $49.50 \pm 0.42$ ), magnesium ( $22.58 \pm 0.62$ ) and iron content ( $26.41 \pm 0.28$ ) as well as copper concentration  $12.42 \pm 0.14$  mg/100g. The highest and lowest essential and non-essential amino acid composition of this seed were glutamic acid (13.18) and triptophan (0.65) and leucine (5.79) and cystine (0.66) g/100g respectively. The anti-nutritional factors were also determined which revealed that the result were all below toxic level and therefore may not cause any effect on man and his animal when taken.*

**KEYWORDS:** Xylopiya Parviflora Seed, Nutritive, Mineral, Anti-nutritional and Amino Acid

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## **INTRODUCTION**

Plants are nature's gift to mankind. These wild plants are one of the main sources of vitamins, minerals and proteins. These constituents are essential for normal physiological wellbeing and help in maintaining healthy state through development of resistant against pathogens. Fruits and seeds from the wild is the major alternative to many people during shortage of food (Thiombiano *et al.*, 2012). Plant seeds are a good source of food for animals as well as humans, since they contain nutrients necessary for plant's growth, including many healthy fats, such as omega fats (Mathew *et al.* 2014) In different part of the world, products of natural tree are very important to human diets and are also good source of income (Ayessou *et al.*, 2009). These fruit and seed are good source of vitamins, essential minerals and carbohydrates in form of cellulose, starch and soluble sugar (Lamien *et al.*, 2009). Mainly crudely consumed, they improve the daily food ration as an energy source and through their content in micronutrients. Consumption of indigenous trees products is among strategies to supplement diets (Falconer, 1990). Several tree products which play pivotal role exist but undervalued and are seasonal (Ayessou *et al.*, 2009). It is now known that agricultural materials are used as animal feeds and they contain some nutritional values.

Fruits and seed are now occupying important position in our daily life as diet and feeding supplements and so adequate knowledge is required on wild fruits which contain these nutrients. However, most of these products have received little research attention, particularly their nutritional compositions. Their contribution to local diets is less understood and quantified. Therefore, the study was done to determine the proximate composition, minerals and amino acids content of these wild seed.

*Xylopia parviflora* is a shrub or small tree of about 17m high in fringing forest of the lowland rain-forest and savanna zones from Senegal to Nigeria. The wood is yellow, hard, fine-grained and elastic. Its flexibility and durability render it suitable for oars and masts. It is believed to resist termites, and is used for house-posts, scantlings and general carpentry. The bark is fibrous from which cordage can be made. In the Casamance, an aqueous decoction of equal parts of roots and leaves is taken by mouth as a bechic and expectorant (burkill, 1985).

### **Sample Collection and Preparations**

The seeds of *Xylopia parviflora* used were obtained from Patishabakolo, Lavun local Government, Niger State, Nigeria. The seeds were obtained and the shells were crack to separate the seeds from the shell. The seeds were collected and spread out on flat surface which was dried in the laboratory under room temperature for two weeks for proper drying after which the samples were grind into fine powder using a mortar and pestle.

## **METHODOLOGY**

### **Proximate Analysis**

The standard analytical procedures for food analysis were adopted for the determination of moisture content, crude protein, crude fibre, percentage lipids, carbohydrate, ash, and energy value as outline by AOAC (2006).

### **Mineral Analysis**

Sodium and potassium were determined using gallenkamp Flame analyzer, while calcium, magnesium, iron, manganese, zinc and copper were determined using buch Model 205 Atomic absorption spectrophotometer. Phosphorus level was determined using the phosphovanadomolybdate colorimetric techniques on JENWAY 6100 Spectrophotometer Pearson (1976).

### **Determination of Amino Acid Profile**

An amino acid profile of the sample was carried out by utilizing the routines depicted. The sample was dried and constantly weights, defatted, hydrolyzed, vanished into a revolving evaporator and stacked into the Technicon sequential Multi-Sample Amino Acid Analyzer (TSM).

### **Anti-nutritional Factors**

The Anti-nutritional Factors were analyzed based on the methods described by (Krishnaiah *et al.*, 2009).

**RESULTS AND DISCUSSIONS****Table 1: Results of the proximate composition of *Xylopia parviflora* in % except the calorific value in KJ/100g**

Parameters	Value
Moisture content	8.95 ±1.13
Ash content	6.25±0.35
Crude fibre	8.25 ±0.57
Crude protein	8.28 ± 0.19
Fat (lipid)	6.08 ± 0.46
Carbohydrate	62.45± 0.76
Calorific value	337.60 ± 0.32

KEY: The values are means of duplicate determinations ±standard deviations (SD).

**Table 2: The results of Mineral contents of *Xylopia parviflora* (mg/100g)**

Parameters	Values
Sodium	49.50±0.42
Potassium	53.21±0.31
Magnesium	22.58±0.62
Iron	26.41±0.28
Zinc	13.03±0.10
Manganese	16.20±0.22
Copper	12.42±0.14
Phosphorous	50.22±0.43

The values are means of duplicate determinations ±standard deviations

**Table 3: The results of anti-nutritional composition of *Xylopia parviflora* (mg/100g)**

Parameters	Values
Oxalate	0.24±0.01
Tannins	0.91±0.02
Saponnin	2.61±0.05
Alkaloids	3.03±0.11
Cyanides	2.09±0.01
Flavonoids	1.10±0.03

The values are means of duplicate determinations ±standard deviations

**Table 4: The result of the amino acid profile of *Xylopiya parviflora* in g/100g protein**

Parameters	Concentration
Lysine	5.00
Histidine	2.21
Arginine	8.72
Aspartic acid	11.10
Threonine	2.24
Serine	3.09
Glutamic acid	13.18
Proline	2.54
Glycine	3.24
Alaline	3.57
Cystine	0.66
Valine	4.29
Methioline	2.08
Isoleucine	3.23
Leucine	5.79
Tyrosine	2.22
Phynylalaline	4.22
Tryptophan	0.65

## DISCUSSION OF RESULTS

The result of the proximate composition is shown in table 1 which revealed that the seed contains relatively small amount of fat content of  $6.08 \pm 0.46\%$ . The value obtained in this work was high when compared with the values of 0.43% in the seed of *Parkia filicoidea* reported by Oderinde *et al.*, (2004). Crude fibre of  $8.28 \pm 0.19\%$  was obtained in this work. The value was observed to be high when compared to the seeds of *Alternanthera sessilis* (5.32%) reported by Anhange *et al.*, (2006). The value of the moisture content was  $8.95 \pm 1.13\%$  which are high when compared to 6.05 % observed from *Moringa oleifera* as reported by (Onwuka, 2005). The seed which contain low level of moisture content based on the safe storage limit of moisture (15%) for seeds suggest that it can be stored for a very long period of time without spoilage (Onwuka, 2005).

The ash content was  $6.25 \pm 0.35\%$ , this result is high compared to  $2.00 \pm 0.00\%$  for cherry seed reported by Mathew *et al.* (2014), though the value of ash content is low when compared to that of *Talinum triangulare* seed (19.5%) which is locally consumed in Nigeria as reported by Adebeye *et al.*, 2004. The high ash content values of the samples indicates that the high quantity of inorganic minerals were present. Crude fibre was  $8.25 \pm 0.57\%$ , this value was lower than orange seeds (11.0%) and red roselle (28.50 %) reported by Anwar *et al.*, (2008). The value of crude fibre falls within the range of value reported most seeds (Anhwang *et al.*, 2006). The value of crude protein of the seed sample was  $8.28 \pm 0.19\%$ . This value is high when compared to that of *Commelina nudifera* 1.42 % (Zock and Katan, 1992). This result therefore suggests that the seed may contribute significantly to the dietary intake of man and his animals. This sample also revealed that the carbohydrate content is moderately high  $62.45 \pm 0.76\%$  which may be a good source of energy to the body. This value was high when compared to 17.56%

of *Corchorus olitorius* seed, 7.27% of *Senna siamea* and 3.75% of *Commelina nudiflora* reported by Smith, 2009.

The result of the mineral composition of the seed of *Xlopia parviflora* is shown in table 2. The sample contains  $49.50 \pm 0.42$  mg/100g of sodium concentrations. This value was high when compared to 1.96 mg/100g obtained in cocoa bean reported by Anhwang *et al.* (2006). The high obtained from the sample is an indication that the seed can serve as dietary supplement for sodium. Potassium content was found to be  $53.21 \pm 0.31$  mg/100g. This value was higher than the  $13.93 \pm 0.10$  mg/100g reported for cherry seed by Mathew *et al.* (2014). Adequate intake of this mineral from the diets may be found to lower blood pressure by antagonizing the biological effects of sodium (Einhorn and Landsberg, 1988). Magnesium concentration of this sample was  $22.58 \pm 0.62$  mg/100g. The value was high when compared to 7.76 and 6.65 mg/100 g for *Parkia biglobosa* and *Boerhavia diffusa* by Adeboye, (2007). Iron content of  $26.41 \pm 0.28$  mg/100g was recorded in this work, though the value was high compared to 0.13 mg/100 g in *B. diffusa*, 0.016 mg/100g in *C. nudiflora* reported by (Onwuka, 2004). The zinc content of  $13.03 \pm 0.10$  mg/100g, this value was high compared to those reported in *Blighia sapida* 3.30mg/100g and *C. nudiflora* 4.2 mg/100g (Richard *et al.*, 2007). Copper concentration obtained from this sample was  $12.42 \pm 0.14$  mg/100g. The value was high when compared to 2.41 mg/100g for *C. olitorius* and 0.2mg/100g for *L. africana* seed (Adeboye, 2007). Phosphorus content was  $50.22 \pm 0.43$  mg/100g. The value was very low when compared to 4000mg/100g obtained for Beni seeds (Dashak and Fali, 2009). Therefore, the seed can serve as a good source of mineral for several biological activities.

The result of anti-nutrient of *Xylophia parviflora* seed was shown in table 3. Saponin content of  $2.61 \pm 0.05$  mg/100g was recorded in this work. Saponins are known for reducing the uptake of certain mineral element including glucose (Onwuka 2005). Tannin concentration analyzed in this sample was  $0.91 \pm 0.02$  mg/100g. Tannin has the ability of precipitating certain protein and thereby making them indigestible (Onwuka, 2005). Alkaloid content of this sample was  $3.03 \pm 0.11$  mg/100g. Alkaloids are often toxic to men and may have dramatic physiological activities hence they are widely used in medicine (Olaefe, 2007). Oxalate content was  $0.24 \pm 0.01$  mg/100g. The presence of oxalate in the food causes irritation in the mouth and interferes with absorption of divalent minerals particularly calcium by forming insoluble salts (Ola and Oboh 2000). Flavonoid concentration obtained from this sample was  $1.10 \pm 0.03$  mg/100g. Flavonoids which are phenolic compounds that serve as flavoring ingredient of spices and vegetable (Olaefe, 2007). These anti-nutritional factors can be minimized to tolerable limit by proper processing methods such as cooking, frying and soaking (Olaefe *et al.*, 1988).

Table 4 shows the values of amino acid concentration of the analyzed seed of *Xlopia parviflora*. The seed which are rich in essential amino acids such as lysine, histidine, threonine, valine, methionine, isoleucine, leucine, phenylalanine, tryptophan and the non-essential amino acids such as arginine, serine, proline, glycine, alanine, cysteine, tyrosine. glutamic acid is recorded to have the highest value 13.18g/100g protein and tryptophan 0.65g/100g protein had the least amino acid concentration present in the seed. The value of the essential amino acid such as glutamic acid (13.18g/100g) and aspartic acid (11.10g/100g) are comparable to that of FAO/WHO (2007).

## CONCLUSION

The information provided in this study showed that the seed of *Xylopia parviflora* increases our knowledge on the use of this wild seed as diet and can function as a food supplement. The seeds of *Xylopia parviflora* which are characterized by high carbohydrate content and also high mineral content as observed for K, P and Mg and also relatively reasonable amount of Na, Ca, Fe, Zn, Cu and Mn were found present. The seeds are also rich in some essential and non-essential amino acids such as glutamic acid, aspartic acid, arginine, leucine and lysine. Thus this wild seed could be highly nutritive and can serve as a good source of nutrient to man and his animal.

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