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Comparative Studies on the Nutritional and Anti – Nutritional Properties of Indigenous Seeds Used As Soup Thickeners in South-East Nigeria

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Abstract: *The Proximate, minerals, vitamins and phytochemical compositions of six indigenous seeds used as soup thickeners in South East Nigeria were investigated using standard procedures. The soup thickeners which included* Mucuna flagelipes *(Ukpo),* Defarium microcarpum *(Ofor), Brachystegia eurycoma (Achi),* Citrullus colocynthis *(Melon), Afzelia africana (Akparata) and* Irvingia gabonensis *(Bush mango) was seen to contain various nutritional and anti-nutritional properties such as carbohydrate 43.32% to 59.64%, Ask 2.55- 4.77%, crude fiber 4.05% to 3.00%, Protein, 15.25-16.71%, Fat, 6.10-17.15, Fiber, 4.05- 3.00. The phytochemical included Tannins 67.24-82.1 mg/100g, Alkaloids, 48.71-66.05, Oxalate, 0.67-1.44. The mineral content were calcium 44.28 mg/100g to 65.26 mg/100g, iron 3.02 mg/100g to 4.61 mg/100g, Magnesium 55.34 mg/100g to 72.09 mg/100g, and Sodium 20.60 mg/100g to 28.88 mg/100g. The seed were also found to be rich in vitamins such as Thaimine, 0.44-2.65, Riboflavin, 0.10-0.15, Niacin, 0.22-0.39. The present study shows that most of these soup thickeners consumed in the south-eastern Nigeria are rich source of nutrient and medicinal importance for both Man and livestock augmenting or supplementing as an alternative source of nutrient.*
Keywords: *Minerals, proximate, phytochemical, soup thickeners, South East Nigeria*

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I. Introduction

Plants have long serve as useful ingredients for our nutritional purposes and in the treatment of diseases in both developing and developed countries. About 80 % of the World's populations rely mainly on plant and their products for there well being (WHO, 1993). Every food substance consumed by humans has either a therapeutic, nutritional or toxic effect on the body. Plants and their products have been in used for as old as the history of man for there therapeutic purposes. In the past decades, pharmacologists and organic chemists have synthesized a large number of interesting chemical substances from plants, which have been of great help in the practice of pharmacology and traditional medicine.

In south eastern part of Nigeria, most of the foods consumed as soup are prepared with different plant parts (such as the leaves, seeds, and fruits) which serve for different purposes as spices, condiments, thickeners etc. The different varieties of soup prepared in these parts of Nigeria are usually garnished with one thickening agent or the other which help to stimulate appetite and aid swallowing. According to Ikechuku and Emmanuel, (2010) Thickening agents, or thickeners, are substances which, when added to an aqueous mixture, increase its viscosity. They provide body, increase stability and improve suspension of added ingredients (the strength of the food materials). Thickening agents are often used as food additives and in cosmetics and personal hygiene products (Igwenyi, and Azoro, 2014). The food use and consumption of these soup thickeners calls for more research to provide information on their mineral, pharmacological, phytochemical compositions and properties of their constituents so as to ascertain their actual nutritional values, health and other medicinal importance. Examples of these soup thickeners as used in the present study; includes, *Mucuna flagelipes* (Ukpo), *Defarium microcarpum* (Ofor), *Brachystegia eurycoma* (Achi), *Citrullus colocynthis* (Melon), *Afzelia africana* (Akparata) and *Irvingia gabonensis* (Bush mango). These plants have generally being reported for their nutritional and medicinal importance.

Mucuna is a genus of around 100 accepted species of climbing vines and shrubs of the family fabacea found in the woodlands of tropical areas (Hutchison and Dalziel, 1973). The plants have been reported to possess useful phytochemical of high medicinal value of human and veterinary importance and also constitute as an important raw material in Ayurvedic and folk medicines (Sridhar and Bhat, 2007). The seeds constitute as a good source of several alkaloids, antioxidants, antitumor and antibacterial compounds (Adebowale and Lawal, 2003).

Irvingia gabonensis is a species of African trees in the genus *Irvingia*, sometimes known by the common names wild mango, African mango, bush mango, dika or ogbono. They bear edible mango-like fruits,

and are especially valued for their fat- and protein-rich nuts. Irvingia seeds constitute an important part of the rural diet in Nigeria. Usually the sun dried seeds are ground in flour and usedas soup thickner (Ayuk *et al*, 1999).

Citrullus colocynthis L. (egusi) belongs to the species of the genus *Citrullus* of cucurbitaceae family, which usually consists of a large number of varieties that are generally known as melons. It is used both as condiment and thickener in Nigerian local soup and the industrial scale production of the oil yet to be utilized despite the huge potential. Various studies have reported predominantly high linoleic fatty acid content in egusi melon seed oils. Due to the unsaturated fatty acid composition of its oil, it was reported to resemble that of safflower, corn, cottonseed, sunflower, soybean and sesame oil.

Brachystegia eurycoma is one lesser known legumes popular in the eastern part of Nigeria, is a woody plant mostly found in the rain forest zone. In some states of Nigeria, *Bracysteria euyrocoma* is called achi in Igbo, akalado or eku in yoruba, akpakpa or apaupan by the Ijiaws and dewen in Benin. Brachystegia *eurycoma* seed is seasonal but its use in soup making is not seasonal (keay *et al*,. 1974)

Afzelia africana is one of the local food plants grown in the eastern part of Nigeria. It is a tree legume plant in the family of caesalpiniaceae. It is a deciduous tree and is known as counterwood tree "akparata" amongst the 1gbos.It has black fruits in woody pods of about 1Ocm long when matured (dry). The pod releases shiny black "mahogany bean" seeds when matured by mechanical explosion. The seed is glossy black with waxy orange aril around its haw. *Afzelia africana* cotyledons are traditionally used in the thickening of soups. Its leaves are wed in preparing pottage yam with vegetable after home fermentation. The consumption of both seeds and the leaves is common in Southeastern Nigeria.

Detarium microcapum is a locally common plant often left in farmland is cleared and left to fallow. It is plant genus of the family fabacea (Legume family). It is widely distributed in the semi arid sub Saharan African which include Benin, Burkina Faso, Nigeria etc. *D. microcarpum* fruits is edible and rich in vitamins C, the leaves and seeds are used for cooking, the root, stems bark are medicinal(Florence *et al*., 2014).

II. Materials And Methods

SAMPLE COLECTION

Fresh samples of the plant seeds were collected from Umungazi market in Aba, Abia state Nigeria. The samples were transported to department of chemistry/ biochemistry, Abia state polytechnic Aba. The samples were dried in an oven at 60^{O}C for 48 hours and then milled with an electric blender before used for the analysis.

PROXIMATE ANALYSIS: The seed samples were analyzed for their proximate compositions using the Official methods as described by AOAC, (1980).

DETERMINATION OF PHYTOCHEMISTRY: Alkaloids were determined by the method as described by Higuchi and Hassan (1973). Tannins were determined by the method of Price *et al*., (1978); Bainbridge *et al.* (1996), Saponins, flavonoids, glycosides and steroidal aglycon were variously determined by the method of Harbone (1973)

DETERMINATION OF MINERAL CONTENT: Calcium, sodium, potassium, magnesium and iron were determined according to the method of Shahidi *et al*. (1999). The sound seed samples were sieved with a 2mm rubber sieve and 2g each of samples were weighed and subjected to dry ashing in a well-cleaned porcelain crucible at 550^{o}C, in a muffle furnace. The resultant ash was dissolved in 5ml of HNO_3/HCL/H_2O (1:2:3) and heated gently on a hot plate until brown fumes disappeared. To the remaining materials in each crucible, 5ml of deionized water was added and heated until a colourless solution was obtained. The mineral solution in each crucible was transferred into 100ml volumetric flask by filtration through a Whatman No 42 filter paper and the volume made to the mark with deionized water. This solution was used for elemental analysis by atomic absorption spectrophotometer. A 10cm long cell was used and concentration of each element in the sample was calculated on percentage of dry matter**.**

III. Result

Table 1: Proximate analysis of soup thickeners in %w/w

Thickeners	Moisture (%)	Crude Protein (%)	Crude Fat (%)	Crude Fiber (%)	Ash (%)	Carbohydrate (%)
Ukpo	$10.94^{ef} \pm 0.01$	$16.18^{b} \pm 0.01$	$6.53^{b} \pm 0.02$	$2.05^{a} \pm 0.01$	$1.60^{b} \pm 0.00$	$62.71^{c} \pm 0.01$
Ofor	$10.96^{e} \pm 0.01$	$16.02^{c} \pm 0.01$	$6.46^{c} \pm 0.04$	$2.01^{b} \pm 0.01$	$2.01^{b} \pm 0.01$	$62.98^{b} \pm 0.$
Achi	$11.27^{b} \pm 0.01$	$15.25^{d} \pm 0.02$	$6.12^{d} \pm 0.01$	$1.84^{d} \pm 0.01$	$1.48^{d} \pm 0.01$	$64.05^{a} \pm 0.03$
Melon	$10.35^{d} \pm 0.03$	$16.71^{a} \pm 0.01$	$7.15^{a} \pm 0.02$	$1.92^{c} \pm 0.01$	$1.64^{a} \pm 0.00$	$62.24^{d} \pm 0.01$
Bush mango	$11.03^{c} \pm 0.01$	$16.00^{b} \pm 0.00$	$6.46^{b} \pm 0.01$	$1.97^{a} \pm 0.00$	$1.52^{b} \pm 0.01$	$63.02^{c} \pm 0.01$
Akparata	$11.34^{a} \pm 0.02$	$15.20^{c} \pm 0.01$	$6.10^{c} \pm 0.00$	$1.81^{b} \pm 0.01$	$1.47^{c} \pm 0.00$	$64.09^{a} \pm 0.02$

Table 2: Mineral composition of soup thickeners (mg/100g)

Thickeners	Mg (Mg/100g	Ca (Mg/100g)	Na (Mg/100g)	K (Mg/100g)	Fe (Mg/100g)
Ukpo	72.09 [a] ± 0.03	62.26 [b] ±0.01	28.88[a] ± 0.02	66.82 [a] ± 0.02	4.61[a] ± 0.01
Ofor	62.14 [d] ± 0.03	45.23[d] ± 0.01	20.62[de] ± 0.02	56.82 [c] ± 0.02	3.52 [d] ± 0.00
Achi	55.34 [e] ± 0.03	65.26[a] ± 0.01	24.64[b] ± 0.02	52.82 [de] ± 0.02	3.61[c] ± 0.01
Melon	62.19 [c] ± 0.03	58.23[c]± 0.01	21.54[c] ± 0.02	53.82 [d] ± 0.02	3.02 [f] ± 0.00
Bush mango	52.02 [f] ± 0.03	44.28[e] ± 0.01	20.65[d] ± 0.02	51.82 [e] ± 0.02	3.12[e]± 0.00
Akparata	70.12 [b] ± 0.03	42.24 [f] ± 0.01	20.60[e] ± 0.02	58.82 [b] ± 0.02	3.72 [b] ± 0.00

Table 3: Vitamins composition of soup thickeners (Mg/100g)

THICKENERS	THIANINE (Mg/100g)	RIBOFLAVIN (Mg/100g)	NIACIN (Mg/100g)
Ukpo	1.08[a]±0.01	0.11[c]±0.02	0.39 [a] ± 0.01
Ofor	0.45[c]±0.10	0.11[c]±0.01	0.25[d] ± 0.01
Achi	0.45[c]±0.02	0.11[c]±0.02	0.22[e] ± 0.01
Melon	0.45[c]±0.02	0.13[b]±0.02	0.30[c] ± 0.01
Bush mango	0.45[c]±0.02	0.15[a]±0.02	0.23[cd] ± 0.01
Akparata	1.05[b]±0.01	0.1[d]±0.01	0.33[b] ± 0.01

Table 4: Phytochemical composition of soup thickeners (seeds) mg/100g.

Thickeners	Saponin (mg/100g)	Tanin (mg/100g)	Flavonoid (mg/100g)	Alkaloids (mg/100g)	Oxalate (mg/100g)	Phyate (mg/100g
Ukpo	1.46 [a] ± 0.01	4.19 [a] ±0.02	1.17 [a] ± 0.01	1.49[a] ±0.01	1.44[a] ± 0.01	0.94[b] ± 0.11
Ofor	0.94[b]± 0.02	3.24[f] ± 0.02	1.14 [b]± 0.01	1.41[b] ±0.11	0.68[d] ± 0.02	0.89[c] ± 0.2
Achi	0.55[c] ± 0.11	4.11[b] ± 0.01	1.12[d] ± 0.00	1.34[c] ±0.11	0.67[d] ± 0.21	0.88[d]± 0.02
Melon	0.48[d] ± 0.11	4.01[c] ± 0.11	1.12[d] ± 0.21	1.32[d] ±0.11	1.12[b] ± 0.01	0.9[c] ± 0.01
Bush mango	0.55[c] ± 0.02	3.45[e]± 0.11	1.1[e]± 0.20	1.32[d]±0.01	1.1[b] ± 0.01	0.99[a] ± 0.11
Akparata	0.46d[e] ± 0.02	355[d] ± 0.02	1.13[c] ± 0.01	1.33[c] ±0.02	0.97[c] ± 0.01	0.78[e]± 0.01

IV. Discussion

The proximate compositions of the soup thickeners (seeds) are shown in table 1.The result shows that *Citrullus colocynthis* (Egusi) had the highest protein content (16.71%) and *Brachystegia eurycoma* (15.25%) the lowest. There were significantly differences among the seeds. *Mucuna sloanei* had protein content of 16.18%, *Afzelia africana*15.20%, *Irvigna gabonesis* 16.00% and *Detarium microcarpum* 16.02%. The result was higher than that reports of Igwenyi and Akubugwo, (2010). These values give the seeds positive attributes as plant proteins are scarce and this protein contents can furnish the essential amino acids needed for healthy growth and repair of tissues (Igwenyi, 2008).

The crude fat content of the soup thickeners (seeds) were observed to be generally low except for *Citrullus colocynthis* (Egusi)17.15% which recorded the highest fat content and *Afzelia Africana* (Akparata) 6.10% the lowest. The crude fat content recorded 6.12% in *Brachystegia eurycoma* (Achi), 6.53% in *Mucuna sloanei, Irvigna gabonesis* (Ogbono) 6.46% and 6.46% in *Detarium microcarpum* (Ofor). The result here is

close to that reported by Odenigbo and Obizoba, (2004).

Lipids are the principal form of stored energy (fat and oils) in most organisms and major constituents of cellular membranes. Specialized lipids serve as pigments (retinal, carotene), cofactors (vitamin K), detergents (bile salts), transporters (dolichoils in bacteria cell wall synthesis), hormones (vitamin D derivatives, sex hormones), extracellular and intracellular messengers (eicosanoids), and anchors for membrane proteins (covalently attached fatty acids, phosphatidyl inositol, etc) (Voet and Voet, 2004; Nelson and Cox, 2005).

The percentage crude fiber in the seed samples were in the range of 4.05% to 3.00%. There were significant differences ($P<0.05$) in the fiber contents of the samples. *Afzelia Africana* recorded crude fiber content of 8.81%, *Brachystegia eurycoma* 7.84%, *Mucuna sloanei* 4.05%, *Citrullus colocynthis* 9.92, *Irvigna gabonesis* 5.97% and *Detarium microcarpum* 6.01%. These values are close to the values reported by Akpata and Miachi (2001) and Barminas *et al*., (2004) respectively. Fiber regulates bowel actions and may help to guard against colon and rectal cancer as well as in diabetes. Crude fiber is the inorganic residue left after the defatted food materials have been treated with boiling dilute hydrochloric acid, diluted sulphuric acid, boiling dilute sodium hydroxide, alcohol and ether. It is that portion of food that is not used up by the body. Fiber shortens the transit time of food through the gastrointestinal tracts, reduces low density lipoprotein and hence keeps the gut healthy. Fiber supplements or fiber-rich foods may function as normal dietary agents by modulating the digestive and absorptive process (Okaka *et al*., 2006). They are very important in promoting a range of physiological effects, including increased fecal bulk, water-holding capacity, absorption of organic molecules such as bile acids, cholesterol and toxic components (reduced bile acid and plasma-cholesterol levels), reduction of minerals and electrolytes (Igwenyi, 2008).

The ash contents were also investigated and it showed that the values were *Brachystegia eurycoma* (achi) 4.77%, *Afzelia africana* 3.51%,, *Mucuna sloanei* 2.66%, *Citrullus colocynthis* 2.55, *Irvigna gabonesis* 2.47 and *Detarium microcarpum* 3.79% . The ash contents were also comparable to values reported by Barminas *et al*., (2004) for *Xylopia ethiopica* also used as a thickener. Measure of ash content could be a measure of the food quality.

The percentage moisture contents were *Mucuna sloanei* 10.94%, *Brachystegia eurycoma* 11.27%, *Afzelia Africana* 11.34%, *Citrullus colocynthis* 11.35% *Irvigna gabonesis* 11.03% and *Detarium microcarpum* 10.96% respectively.

The carbohydrate composition of the (seed) soup thickeners as shown in table1 were in the range of 43.32% to 59.64% with *Mucuna sloanei* 59.64% the highest and *Citrullus colocynthis* (43.32%) the lowest. *Brachystegia eurycoma* (56.75%), *Afzelia africana* 45.55% *Irvigna gabonesis* 58.07%, *Detarium microcarpum* 57.76%, These results are comparable to the work of (Eddy and Udoh, 2005). Who recorded 60.17% in *Brachystegia eurycoma* (Achi) and 51.03% in *Detarium microcarpum* (Ukpo).The result is also in line with the work of Ejiofor, (1994).

The concentrations of saponins were generally low and were found in the range of 1.46mg/100g in *Mucuna sloanei*, 0.99 mg/100g in *Detarium microcapum* , 0.55 mg/100g in *Brachystegia eurycoma*, 0.48 mg/100g in *Citrullus colocynthis*, 0.55 in *Irvigna gabonesis* and *Afzelia Africana* 0.6mg/100g in *Afzelia Africana.*

The concentrations of tannins were relatively high. *Detarium microcarpum* contained 78.24mg/100g tannins, *Brachystegia eurycoma* 68.01mg/100g, *Mucuna sloanei* 60.83mg/100g , *Citrullus colocynthis* 82.1 mg/100g, *Irvigna gabonesis* 67.24 mg/100g and *Afzelia Africana* 67.27mg/100g. These values were higher than 0.38 –0.77mg/100g reported for Glycine max and *Vigna unguiculata* (Okwu and Orji, 2007). The values of the tannin contents were comparable to 57.10% in the ethnomedicinal and phytochemical profile of some savannah plant species in Nigeria (Bako *et al*., 2005).Tannins are astringent, bitter plant polyphenols that either bind and precipitate or shrink proteins. The astringency from the tannins is what causes the dry and puckery feeling in the mouth following the consumption of red wine or an unripened fruit. Their main function in nature seems to be one of protection; animals are deterred from eating plants high in tannins because of the bitter astringent. Tannins have traditionally been considered antinutritional but it is now known that their beneficial or antinutritional properties depend upon their chemical structure and dosage (Muller-Harvey and McAllan, 1992). Recent studies have demonstrated that products containing chestnut tannins included at low dosages (0.15-0.2%) in the diet can improve wellbeing (Schiavone *et al*., 2007).

The concentration of alkaloids in table 2 was 66.05mg/100g for *Brachystegia eurycoma*, *Detarium microcarpum* 57.55mg/100g, *Afzelia africana* 53.95mg/100g, *Mucuna sloanei* 61.73mg/100g , *Citrullus colocynthis* 56.45 mg/100g and *Irvigna gabonesis* 48.71 mg/100g when compared with the rest. These values were higher than 1.28 –1.64mg/100g reported in the phytochemical composition and nutritional quality of *Glycine max* and *Vigna unguiculata* (L) Walp (Okwu and Orji, 2007) and 4.32% by Abukakar *et al*., (2008). Alkaloids are famous analgesics (Mothes, 1996) and have been utilized in a variety of ways in the treatment of diseases and during surgery due to their medicinal and pharmacological potency.

The concentrations of Oxalate were found in the range of 1.44mg/100g in *Mucuna sloanei*, 0.68 mg/100g in *Detarium microcapum*, 0.67 mg/100g in *Brachystegia eurycoma*, 1.12 mg/100g in *Citrullus colocynthis*, 1.10 mg/100g in *Irvigna gabonesis* and 0.97mg/100g in *Afzelia Africana*.

Flavonoids have been referred to as "nature's biological response modifiers" because of strong experimental evidence of their inherent ability to modify the body's reaction to allergens, viruses, and carcinogens. They show anti-allergic, anti-inflammatory (Yamamoto and Gaynor, 2006), anti-microbial (Cushine and Lamb, 2005) and anti-cancer activity. Flavonoids are antioxidants that play major roles in the protection of cells from lethal effects of free radicals and their derivatives Nyerhowo *et al*., (2015). A diet rich in antioxidant compounds (like phenols and flavonoids) therefore helps to strengthen the antioxidant-based defense system in the human body Nyerhowo *et al*., (2015). Flavonoid values recorded *Mucuna Sloane* (1.17 mg/100g) *Detarium microcarpum* (1.14 mg/100g), *Brachystegia nigerica* (1.12 mg/100g), *Citrullus colocynthis* (1.12 mg/100g), *Irvigna gabonesis* (1.00), *Afzelia africana* (1.13 mg/100g).

The mineral content of the soup thickeners are shown in table 3. The potassium contents was found in the range of 51.82mg/100g to 66.82 mg/100g with *Mucuna sloanei* (66.82 mg/100g) the highest and *Irvigna gabonesis(51.82* mg/100g the lowest, 56.82 mg/100g in *Detarium microcapum* ,52.82 mg/100g in *Brachystegia eurycoma*, 53.82 mg/100g in *Citrullus colocynthis*, 58.82 in *Afzelia Africana*.

Potassium is a systemic electrolyte and is essential for co-regulating ATP with sodium. Potassium is a major intracellular cation that maintains intracellular osmotic pressure (Vasudevan and Sreekumari 2007).

The Sodium contents was found in the range of 20.60 mg/100g to 28.88 mg/100g with *Mucuna sloanei* (28.88 mg/100g) the highest and *Afzelia Africana* 20.60 mg/100g the lowest *Irvigna gabonesis* 20.65 mg/100g., ,*Detarium microcapum 20.62* mg/100g, 24.64 mg/100g in *Brachystegia eurycoma*, 21.54 mg/100g in *Citrullus colocynthis*. Sodium is an electrolyte present in extracellular fluid and is essential for coregulating ATP with postassium (Linder,1991) sodium is also important in the regulation of acid base balance (Vasudevan and Sreekumari 2007).

The calcium contents was found in the range of 44.28 mg/100g to 65.26 mg/100g with *Brachystegia eurycoma*, 65.26 mg/100g *Mucuna sloanei* (62.26 mg/100g) the highest *Irvigna gabonesis* 44.28 mg/100g the lowest, *Afzelia Africana* 42.24 mg/100g, *Detarium microcapum* 45.23 mg/100g 58.23mg/100g in *Citrullus colocynthis*. Calcium is a very important mineral. It is a structural component of bones and teeth. Ti contributes to physical strength of bones and teeth. Calcium is required in muscle concentration, blood coagulation, nerve impulse transmission etc.

The iron contents was found in the range of 3.02 mg/100g to 4.61 mg/100g with *Mucuna sloanei* (4.61 mg/100g the highest *Citrullus colocynthis* the lowest, *Brachystegia eurycoma*, 3.52 mg/100g) *Irvigna gabonesis* 3.12 mg/100g , *Afzelia Africana* 3.37 mg/100g , *Detarium microcapum 3.52* mg/100g . Iron is a component of many proteins and enzymes, notably hemoglobin and cytochrome P450. Deficiency of iron could to iron deficiency anaemia which is more common in menstruating females and pregnant women (Dvlin, 200) the RDA of iron in adults in between 15,20-30mg for children and 40mg for pregnant women (Vasudevan and Sreekumari, 2007).

The magnesium contents was found in the range of 55.34 mg/100g to 72.09 mg/100g with *Mucuna sloanei* (72.09 mg/100g) the highest and *Irvigna gabonesis* 52.02 mg/100g the lowest, *Afzelia Africana* 70.12 mg/100g,*Detarium microcapum 62.14* mg/100g, 55.34mg/100g in *Brachystegia eurycoma*, 62.19 mg/100g in *Citrullus colocynthis*.

The levels of thiamine concentration were within the range of 0.44 mg/100g to 2.65 mg/100g *Mucuna Sloane, Detarium microcarpum, Brachystegia eurycoma Citrullus colocynthis, Irvigna gabonesis Afzelia africana* were 1.08 mg/100g, 2.64 mg/100g, 0.48 mg/100g ,0.44 mg/100g,0.45 mg/100g and 1.05mg/100g respectively.

Riboflavin levels were analyzsed an it was found be 0.11 mg/100g in *Mucuna sloanei* , *Brachystegia eurycoma* and in *Detarium microcarpum* ,0.13 in *Citrullus colocynthis* ,0.15 mg/100g in *Irvigna gabonesis* and 0.10 mg/100g in *Afzelia africana* .

Niacin values recorded values for *Mucuna Sloane* (0.39 mg/100g) *Detarium microcarpum* (0.25 mg/100g), *Brachystegia eurycoma* (0.22 mg/100g), *Citrullus colocynthis* (0.30 mg/100g), *Irvigna gabonesis* (0.23 mg/100g), *Afzelia africana* (0.33 mg/100g). Vitamins are organic compounds, which are found in natural food and are essential for the normal growth and nutrition of human body (Chopra and Panser, 2010).

V. Conclusion

The seeds used as soup thickeners have high percentage yield of carbohydrate that serve both as thickener and fuel source for the generation of the energy currency of the cell. The protein contents showed that they can provide the amino acids needed to support the metabolic activities of the body. Despite the various levels of these plants secondary metabolites, there are not associated with any disease state or condition in the area as such diseases associated with malnutrition and malabsorption. This could be attributed to the presence of

antioxidants. However, many traditional methods of food preparation such as fermentation, cooking, and malting increase the nutritive quality of plant foods through reducing certain anti-nutrients and such processing methods are widely used in societies where cereals and legumes form a major part of the diet.

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