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Review Article

Chemical Composition and Phytochemical of Oha (Pterocarpus Soyauxii) Leaves

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Abstract: This study was conducted to determine the chemical composition and photochemical of Oha leaves (P. soyauxii). Fresh leaves of P. soyauxii were destalked, washed and oven dried at 100oc. The dried P. soyauxii leaves were ground into fine powder using pestle and mortar and evaluated for chemical, mineral and photochemical using standard methods. The chemical composition showed P. soyauxii contain, moisture 79.63%, Ash 8.87% fat 6.69%, protein 2.37% , fiber. 66% and carbohydrate 8.47% the mineral showed that P. soyauxii contain 86.00/100g, potassium 8.60mg/100, magnesium 1.30mg/100g, iron 7.60mg/100, zinc 3.40mg/100g, sodium 2.60mg/100g, copper 3.30mg/100. The presence of pytochemical in P. soyauxii such as saponins 0.89%, oxapate 2.74mg/100g and flavouoid 12:69%. This study revealed that P. soyauxii if consumed insufficient amount, would contrinte greatly to the nutritional status of human health and to the food security of Nigerian population.

Keywords: Oha (P. soyauxii), phytochemical, oxalate, flavonoid, phytate, saponins.

INTRODUCTION

The culinary importance of most edible vegetables and plant consists basically of the vital nutrients which are required for healthy living of both animal being which they posses. The vital nutrients which could be phytochemicals and useful mineral elements are necessary for curing certain ailments due to their medicinal properties (cokonwu, *et al.*, 2018). In Africa, studies have shown that a vast number of indegerious plants play a significant role in the diet of the populace (muhammed, 2011) Nigeria is blessed with many medicinal plants whose roots, barks, seeds and leaves are used for the treatment of different diseases and one of such is the *pterocarpus soyauxii.*

Pterocarpus soyauxii, also called "Oha" in Ibo land in Nigeria, belong to the genus, *pterocarpus*, which is tropically and sub-tropically distributed and belong to the family of *hegumiuosae* (Osuagwu, 2008).

There are about 60 species of the *genus pterocarpus*, of which 20 of these are found in African countries such of Nigeria, Cameroon, sierra Leone, and Equatorial guinea.

The leaves are popularly used in preparing Oha soup in south eastern Nigerian. Okonwu, et. al; (2018) reported that the leaves contain vitamin A and C.

The plant has been reported to have much pharmacological properties (Oqukwe *et al.*, 2004). Some tribes in the Eastern and southern Nigerian use the leaf extracts in the treatment of headaches, pains, fever, convulsions and respiratory disorders and as antimicrobial agents, similarly reported by Oqukwe, *et al.*, 2004.

This study seeks to evaluate the chemical and phytochemical proportions of Pterocarus soyauxii. The results that will be obtained can provide information on the nutritional use of *pterocarpus soyauxii* foods in contributing to narrowing the gap on food security and hidden hunger in Nigeria.

MATERIAL AND METHODS

Sample collection and preparation

The fresh leaves of p. soyauxii were purchased from Mile 3 market, Port Harcourt, Rivers State, Nigeria.

The leaves were destalked washed and oven dried at 100^{o}c. Thereafter, the dried p.soyauxii leaves were ground into fine power using pestle and mortar, and stored inan air-tight glass jar at 4^{o}c prior to use.

Determination of the Chemical Composition

The chemical composition, ie. Moisture, crude protein, crude fiber fat and ash content was determined according to the method of AOAC (2012), while carbonhydradrate content was calculated by difference.

Determination of Mineral Content

The mineral content was determined from the dried leaves sample using the method described below: one hundred grams of sample was accurately weighed into a 250 and beaker, 30ml of concentrated nitric acid was added to it and evaporated on a steam water bath and thereafter dissolved in 40ml of hydrochloric acid at a ratio of 1:1 and digested for two hours on a hot plate with magnetic stirrer. One ml of dilute HCL was further added to sample and boiled for about 1 hour, and thereafter made up to 100ml using distilled water. The minerals (k, ca, ma, cu, *pre*, and *na*) were determined using an atomic absorption spectrophotometer (AAS model Philip 1900), with ahollow cathode camp and a fuel rich flame (air-acetylene). The sample aspirated and the signal responses recorded for each of the elements at its respective wavelength. The concentration of each element was calculated as follow"

Conc. (mg/100g) = standard concentration x sample absorbance x 100 standard absorbance x weight of sample

Determination of Phytochemicals

The flavonoid and soponin content of the leaves were determined by the method of harbone (1998), phytate was determined using the Biphyrimidine colorimeter method described by Onwuka (2005), while hydrogen cyanide content was determined by alkaline picrate colorimetric method by Balagopalan *et al.*, (1988) and oxalate content was determined titration method described by Dayanl underwood (1986).

Statistical Analysis

The data obtained was subjected to analysis of variance (ANOVA) to analysis of variance (ANOVA) of a randomized complete design using SPSS procedure version 15.

Table 1 shows the results chemical composition of Oha (pterocarpus soyauxii) leaves, the results show that the leaves had moisture content of 79.63%, Oha 8.87%, fat 6.69% crude protein 2.37%, crude fiber 0.66%, and carbohydrate content 8.47%.

TABLE 1: Chemical Composition Of Oha (*Pterocarpus Soyauxii*) Leaves

Parameter	Composition (%)
Moisture	79.63+0.06
Ash	8.87 + 0.85
Fat	6.69+ 0.95
Crude protein	2.37+ 0.15
Crude fish	0.66 +0.03
Carbohydrate	8.47+0.79

Values are expressed as means ± standard deviation of triplicate determination

Table 2 shows the mineral composition of the Oha leaves. The result showed that calcium content was 86.omg/100g, copper 3.30mg/100g, zinc 3 40mg/100, sodium 2.60 mg/100g, potassium, 8.60mg/100g, magnesuin 1.30mg/100g and iron 7.60mg/100.

TABLE 2: Mineral Composition Of Oha (*Pterocarus Soyauxii*) Leaves

Parameter	Composition (mg/100g)
Calcium	86.00
Copper	3.30
Zinc	3.40
Sodium	2.60
Potassium	8.60
Magnesium	1.30
Iron	7.60

Values are expressed as mean ± standard deviation of triplicate determination.

Table 3 shows the phytochemical content in Oha (*pterocarpus sayauxii*) leaves. The showed that oxalated content of 2.74mg/100, phytic acid 7.35g/kg, saponium 8.90%, flavonoid 12.6% and hydrogen cyanide 2.14/kg.

Table 3: phytochemical content of oha (*pterocarpus soyauxii*) leaves

Parameters	Composition
Oxalate (mg/100g)	2.74 + 0.00
Phytic acid (9/kg)	7.35 + 0.00
Flavonoid (%)	12.69 + 0.82
Saponin (5%)	0.89+ 0.15
HCN (g/kg)	2.14+0.03

Values are expressed as mean ± standard deviation of triplicate determination.

DISCUSSION

The moisture content of *P. soyauxii* was 79.63%. this value is lower when compared to *telferriria accidentals* (91.6%) and bitter leaf (*vernoniaamygdalina*) (87.7%) as reported by saidu and Jideobi (2009). It is higher than 72.98% for *A hybridus* and lower than 86.05% for it. Sabdariffa (Oulai et al, 2014). High moisture content may induce a greater, activity of water soluble enzyme and

coenzymes involved in metabolic activities of these leaf, vegetable (Iheanacho and Udebuani, 2009). The high moisture content of *P. soyauxii* explains its short shelf life.

The ash content of p.soyauxii was 8.87%. the value was higher than 1.44%, 2.23% and 2.32% for H. *Sabdariffa*, *v. lunguiculata* and *A. hydriotus*, respectively as reported by Oulai *et al.,* (2004). Ash content indicates the mineral content of the food leaves could be considered as a valuable source of minerals for alleviating micronutrient deficiency.

The fat content of Oha was 6.69%. This value is low when coupared with 9.05% for bitter leaf, 11.04 for Indian spinach and higher than 4.02% for scent leaf as reported by Adeniyi *et al.,* (2018). The fat content of *p.soyauxii* suggest that the leaves contains low quantities of lipid biomolecules and cannot serve as main source of these biomolecules which are important for body metabolism (Harbone, 1998).

Protein content of *p. soyauxii* (2.37%) is higher when compared with 0.70% for bitter leaf and compared well with the protein content of water leaf 2.52%) and fluted pumpkin (2.40%) as reported by Saidu and Jideobi (2009). This suggests that the leaf is a good source of proteins and could play a significant role in providing cheap and available proteins for rural communities.

Crude fiber content of *p. soyauxii* (0.66%) is very low when compared to 7.04% for scent leaf and 8.05% for A. hybridus as reported by Adeniyi et al. (2012). This result shows that *p. soyauxii* leaf may not contribute to a reduction in the incidence of certain diseases like colon cocereand digestive disorder (Uwaegbute 1989).

The carbohydrate content of *p. soyauxii* (8.47%) is low and close to the carbohydrate content of *H. sabdariffa* (7.86%) was reported by Oulai *et al.,* (2014). It is higher than 4.30% reported by saidu and Jide Obi (2009) for water leaf 4.3% for bitter leaf and 4.4% for puruted pumpkin leaf. Low carbohydrate content of *P. soyauxii* shows that they supply little or no energy when consumed except when supplemented with other food. This agrees with the statement of Adeniyi et al, (2018) that low carbohydrate contents of the vegetable are common phenomenon with leafy, vegetables in Nigeria and West Africa. These vegetables contribute very little to the energy values of meals.

The mineral composition of *p. soyauxii* with regard to calcium was 86.00mg/100g. this values is higher when compared with *L. Ovalifaria* (37.43mg/100g) as reported by Edeoga *et al.,* (2018).

Potassium content of p. soyauxii (8.60%) was high when compared to *G. africana* (3.40mg/100g) and close to that of *c. pepo* (9.08mg/100g) as reported by Iheanacho and Unebuani (2009).

Magnesium content of *p. soyauxii* (1.30mg/00g) obtained from this study is lower than *G. Africana* (3.60mg/100g), and *c. pepo* (11.52mg/100) as reported by Iheanacho and Udebuani (2009). Magnesium has also been linked with blood pressure lowering properties dilating arteries and preventing heart rhypha abnormalities (Mensah *et al.,* 2008).

The zinc content of *p. soyauxii* (3.20mg/100) obtained from this study is higher than (1.20mg/kg in *C.maxima* and (1.52mg/kg in *C. crepidiodes* as reported by Adeniyi *et al.,* (2018). Zinc is one of the most important mineral elements for normal growth and development in humans.

Iron content of *p. soyauxii* obtained from this study was (7.60mg/100g).

This value is low when compared with iron content of *C. maxima* (24. 7mg/kg) and 40.7mg/kg in *C. crepidioides* as reported by Chaturvedi et al, (2004).

The phytochemical content of p. soyauxii leaves were analyzed, the oxalate content was 2.74mg/100. This is low when compared to oxalate *cont of B. oleracea* (5.08mg/100g) as reported by Ajaji, et al. (2018) phytate content of *p. soyauxii* was (2.74mg/100). Phytate content from this study is low when compared to *A. Spinosus* (green vegetable 5.80mg/100), as reported by Agbaire, (2012).

The level of hydrogen cyanide (HCN) in this study for P.sogauxii was 2.14 mg/g and these value are lower when compared with HCN of *c.aconitifolius* (13.69,g/kg) and *T. expansa* (6.64,g/kg) reported by Edeoga, *et al.,* 2018.

The level of hydrogen cyanide is a hydrolyte of gynogenic glycoside which is established to be toxic to man and animals (Onyveka, and Nwambekwe 2007). Notwithstanding, the presence of this toxic agent the level in the p. soyauxii was far below the critical dose for man. Onwuka (2005) reported that HCN in foods are considered lethal et closes of 50-60mg/kg.

CONCLUSION

The distribution of nutrients and phytochemicals in *p. soyauxii* leaves studied showed that the leaves contain reasonable amount of nutrient and the phytochemical content of the leaves were below toxic doses. This study only looked at the raw *p. soyauxii* recommend similar study, be carried out to investigate the levels of the nutrient and phytochemicals on various processing method.

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