CHEMICAL COMPOSITION OF *Hippocratea welwitchi*: A COMMON INDIGENOUS SPICE CONSUMED IN SOUTH- EASTERN NIGERIA.

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ABSTRACT

Background: *Hippocrateawelwitchi*is an indigenous spice consumed in Nigeria. It is commonly used in preparing different types of soups.

Aim: This study evaluated the nutrient, antinutrient and photochemical composition of *Hippocrateawelwitchi*spiceconsumed in South- eastern Nigeria.

Materials and Methods: The spices were obtained from Relief market in Owerri municipal, Imo State and identified by a plant taxonomist. The samples were processed into spices and analysed chemically using standard methods. The data obtained was subjected to statistical analysis and result was presented with mean and standard deviation.

Result: The proximate composition showed that sample contained ash (1.98±0.007%), carbohydrates (76.6±0.007%), crude fibre (2.97±0.007%), fat (0.99±0.014%), protein (3.55±0.014%) and moisture (13.86±0.014%) respectively. The minerals present included: sodium (0.03±0.00 %), calcium (0.25±0.00%), potassium (0.42±0.00%), magnesium (0.32±0.00 mg/kg), manganese (45.50±0.00 mg/kg), zinc (5.50±0.00 mg/kg), iron (111±0.00 mg/kg) and copper (1.05±0.00 mg/kg) respectively. Vitamins were present in small quantities. The vitamin content included: vitamin C (0.1±0.00%), vitamin A (0.02±0.00%) and vitamin E (0.26±0.00%) respectively. The percentage quantities of phytochemicals and antinutrients present were 5.23±0.00, 3.96±0.00, 18.04±0.00, 19.11±0.00, 0.45±0.00, 0.26±0.00, 2.67±0.00 and 0.4±0.00 for phytic acid, saponin, flavonoid, alkaloid, oxalic acid, tannin, phenol and cyanide.

Conclusion: The study has identified that *Hippocrateawelwitchi*spice contained vital phytochemicals and nutrients which could contribute to the required nutrient intakes from our diets. Interestingly, the spice is low in sodium, making it healthy even for hypertensive patients.

Key words: *Hippocrateawelwitchi, Indigenous, Spice*

INTRODUCTION

Traditional local spices were used for a wide range of delicacies in the olden days. Spices are defined as aromatic substances used for seasoning of food devoid of any form of artificial colourants, adulterants and impurities but still retain its volatile oil or other flavouring attributes (1). In South Eastern part of Nigeria among the Igbo's, the use of spices has a long history before colonization and Nigeria independence, when they were used to manage and treat different illness. However, the emergence of orthodox medicine and lack of interest in understudying the health potency of these spices have led to underutilization and total neglect. These spices consist of rhizomes, barks, leaves, roots, flowers, seeds and other parts of plants (2). Plants contain carbohydrates such as cellulose, starch, sugar, pentose and mucilage in addition to proteins, tannins, resins, pigments, mineral matter and volatile oil (3). These volatile oils are responsible for the aroma and taste of most spices and also contains terpenes, sesquiterpenes, alcohols, esters, aldehyde, ketones, phenols, ethers and much more (3).

The major nutrients present spicesinclude: micronutrients (minerals and vitamins) and traces of macronutrients as spices are mostly consumed in small quantity. Phytochemicals which have been attributed to perform different immunological and antioxidant function in the body have been identified in different spices (3). Maturity and cultivation can affect the levels of micronutrients present in spices. Onigbinde (4) stated that despite the abundance of plants in our ecosystem yet deficiency diseases abound. Ramakrishmen (5) described micronutrient deficiency as quiet hunger thus it is popularly known

as hidden hunger. However, consumption of our local spices will enhance the nutritionally value of our indigenous diets as it will help in mitigating the effect of micronutrient deficiency.

*Hippocrateawelwitchi*is a staff vine of the bittersweet family of shrubs native to Liberia, Ghana and Nigeria (6). *Hippocrateawelwitchi*known as *obulumgbede*in Igbo (7)*Ijan* in Yoruba and *Nya worombombo*, *manogie*gbini in Liberia (6). In AkwaIbom state of Nigeria,the root of *Hippocrateawelwitchi*was used in the treatment of epilepsy (6). Okeke*et al* (7) also reported its medicinal use in the treatment of ailments like broken bones and anorexia. Thus, it serves as hunger stimulant. Figure 1a and 1b below presents the shrub of *Hippocrateawelwitchi*used in this study which is commonly used as a spice in different meals especially pepper soup in South Eastern Nigeria.

The knowledge of the nutrient and chemical composition of food which could include spices in fundamental in effective dietary counselling. Thus, due the dearth of information in the chemical composition of *Hippocratea welwitchi*, this study therefore evaluated the nutrient, antinutrient and photochemical composition of *Hippocratea welwitchi*.

Figure 1a: Picture of *Hippocratea welwitchi* Figure 1b: Picture of *Hippocratea welwitchi*

MATERIALS AND METHODS

Sample Collection and Selection

These spices were sourced from Relief market in Owerri Municipal, Imo State and identified by qualified plant taxonomists from Imo state Polytechnic Umuagwo and Imo State University.

Sample preparation

A well dried sample of the plant weighing 1100g was prepared, after processing the left over was 639g while pulp containing the active ingredients weighed 580g. The flow chart for the spice processing is shown in figure 2

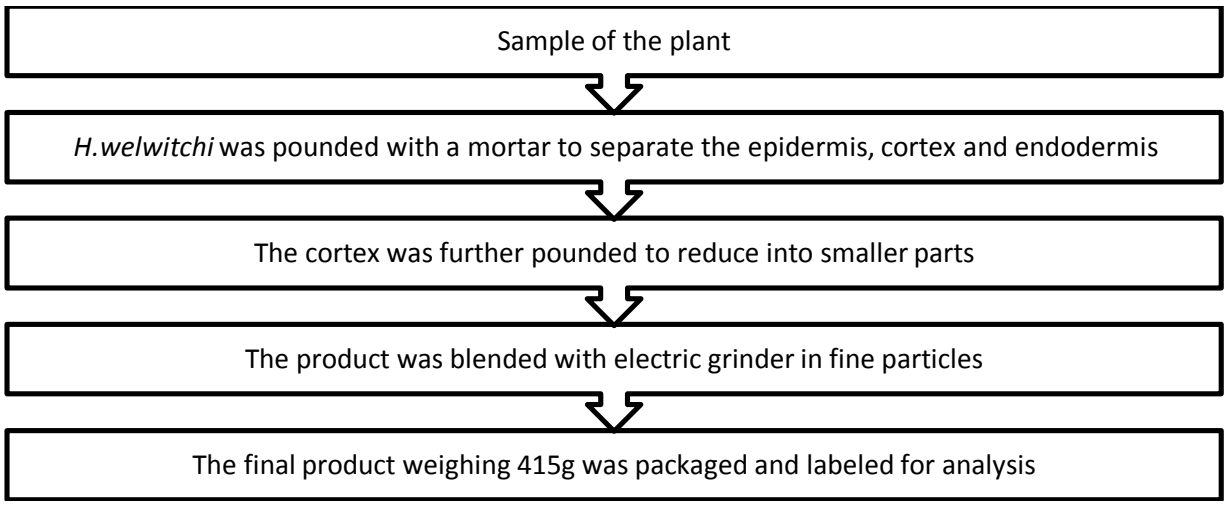

Fig 2: Flow chart for processing of *Hippocratea welwitchi*

Chemical analysis

The moisture, ash, fat, protein and crude fibre content of the spices were determined using standard methods AOAC (8). Carbohydrate content was obtained by difference. Oxalate was determined using Harbone (9) method, phytate was determined using Lucas, and Markakes(10), alkaloids were determined using the Harbone (9) method, flavonoids was determined using Baham and Kocipia (11) method, saponins were determined using the Obadoni and Ochuka (12) method, phenol was determined using Singleton and Rossi (13). Cyanides were determined using Folin-Denis spectrophotometric method described by Pearson (14) was used for the determination of tannin. Vitamin A and C were determined by Pearson (14) method. AOAC(15) procedures were used to determine iron, calcium, zinc, magnesium and potassium.

Data analysis: The data analysis coded into computer software, Statistical Product and Service Solution (SPSS) version 17 was used analyze for means and standard deviation.

RESULTS

Table1: Proximate composition of *Hippocrateawelwitchi*spices

Ash (%)	Carbohydrates (%)	Crude fibre (%)	Fat (%)	Protein (%)	Moisture (%)
1.98±0.007	76.6±0.007	2.97±0.007	0.99±0.014	3.55±0.014	13.86±0.014

Mean ±SD of triplicate determinations

Table 2: Vitamins and Heavy Metal Composition of *Hippocrateawelwitchi and* spice

Sample	Vit C (%)	Vit A (%)	Vit E (%)	Pb (mg/kg)	Cr (mg/kg)	Cd (mg/kg)	Co (mg/kg)	Ni (mg/kg)
H.welwitchi	0.1±0.00	0.02±0.00	0.26±0.00	BDL	BDL	BDL	BDL	BDL

Mean ±SD of triplicate determinations, Note: BDL=Below Detectable limit

Table 3: Minerals composition of *Hippocrateawelwitchi*spice

Sample	Na (%)	Ca (%)	K (%)	Mg (mg/kg)	Mn (mg/kg)	Zn (mg/kg)	Fe (mg/kg)	Cu (mg/kg)
h.welwitchi	0.03±0.00	0.25±0.00	0.42±0.00	0.32±0.00	45.50±0.00	5.50±0.00	111±0.00	1.05±0.00

Mean ±SD of triplicate determinations

Table 4: Phytochemical and antinutrient composition of *Hippocrateawelwitchi*spice

Phytic Acid(%)	Saponin (%)	Flavonoid (%)	Alkaloid (%)	Oxalic Acid (%)	Tannin (%)	Phenol (%)	Cyanide (%)
5.23±0.00	3.96±0.00	18.04±0.00	19.11±0.00	0.45±0.00	0.26±0.00	2.67±0.00	0.4±0.00

Mean ±SD of triplicate determinations

DISCUSSION

The analytical methods and the reagents can have significant effect on the quantitative value of components in plant samples (16). The ash content was 1.98±0.007%.Ash content of foods is reflection of the minerals present in the food sample. There fore, this suggests that *H.welwitchi*couldprovide essential, valuable and useful minerals needed for the metabolism and body processes. The sample contained an appreciable amount carbohydrate content (76.6±0.007%) although it is not eaten in large quantity but it could supply some carbohydrates to diets. However, further studies are required to find out the type of carbohydrates present, and its bioavailability. *H.welwitchi*could be useful to prepare soups for those having loss of appetite which will help enhance their energy intake (3). This value for carbohydrateswas similar to another study by Uhegbu, *et al.*(17) reported that carbohydrate content ranged between 13.18 ±0.03% to 76.16±0.02% for *G.latifolium, X.aesthiopica, M.myristica and A.sativum spices.* But importantly, *H.welwitchi*contained low fat (0.99±0.014%). High carbohydrate, low fat diets are used in the management of cardiovascular diseases (18; 19; 20). This attribute could be necessary in promoting cardiovascular wellbeing. Relatively, spices are poor sources of protein (17)as demonstrated in this study, the protein composition was 2.65±0.014%.

Phytochemical results revealed that *H.welwitchi*containedsaponins, alkaloids and phenols in varying amounts. The presence of saponin, phenols

and alkaloids could be responsible for antibiotic and anti-microbial properties of *H.welwitchi*spice as reported by Okoh-Esene, et*al* (6)whostated thatcombined effect of these phytochemicals could be responsible for the anti-microbial activity. Alkaloid was relative high in with a value of 19.11±0.00. Some plant extracts containing alkaloid have been reported to possess a long lasting effect on hypertension and contraction of the smooth muscles fibers in the intestine both in-vivo and in-vitro when administered to animals (6; 20). Similarly, Jacob andBurri (21) revealed that plants with phenol, saponins and alkaloid are used to treat cough, dysentery, inflammations and ringworms.

The vitamin contents were negligible, though they are needed in small amount to prevent hidden hunger (20). These poor values in vitamins could be attributed to poor pigmentation (22). Similarly,Uhegbu, *et al.*(17) reported the presence of Vit C, Vit A and Vit E but not in amounts to meet nutritional requirements but were absent in *A.sativum.* Heavy metals were not detected in the sample. The value of minerals reported was of public health importance with a sodium (Na) content of 0.03±0.00%. Low sodium is significant because most commercially available spices are popularly known to contain high salt, most times they are used as substitute of salt in meal preparation especially for hypertensive patients. Brown (23), indicated that plants with low concentration of Na is safe for preventing hypotension as RDA of <2g/day. Iron (Fe) was high (111.05±0.00 mg/kg) in *H.welwitchi*. This value is higher than what was reported earlier for other spices by Abii and Elegalem (24) but lower in other Nigerian herbs (25). Adding these spices in daily menu can improve intake of dietary iron and prevent anaemia which is responsible especially among children and women of child bearing age (18). However, it is important to note that the iron is a non-haem iron, thus is bioavailability need to be studied. Calcium contents was low (0.25±0.00%), though Okeke*et al*(7) reported that *H.welwitchi* is used in treating fractures and stomach pain in Ghana and Nigeria. Further studies are therefore recommended.

CONCLUSION

The study has identified that *Hippocrateawelwitchi*spice contained vital phytochemicals and nutrients which could contribute to the required nutrient intakes from our diets. Interestingly, the spice is low in sodium, making it healthy even for hypertensive patients.

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