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COMPARATIVE ANALYSIS OF VITAMINS, MINERAL, PHYTOCHEMICALS COMPOSITION OF *LAGENARIA SPHAERICA* LEAF

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Abstract

Medicinal plants has been utilized since human race, this has been used as the foundation of modern day medicine. Desire for herbal plant by man has been scientist interest in research to determine the safety and therapeutic potential. The research focus is in examining the vitamins (vitamins B_1, B_2 and C) with values of (1.232±0.008), (0.482±0.005) and (82.876±0.089) respectively. The mineral composition analysis revealed calcium (249.750±0.024), magnesium (19.480±0.004), zinc (0.527±0.001), copper (0.051±0.001), nickel (0.047±0.002), manganese (0.043±0.002), iron (0.044±0.001) and phosphorus (12.800±0.021).The results of phytochemicals screening revealed the presence of total phenol (12.037 ±0.012), saponin (8.013±0.090), flavonoid (12.718±0.205) and tannins (1.065±0.005). Likewise, the proximate analysis indicates (%) ash content (13.261±0.038), moisture content (7.214±0.575), crude fat content (13.233±0.830), crude fibre content (18.438±0.099), protein content (10.787±0.760) and carbohydrate content (37.067±0.067). Therefore, Lagenaria sphaerica could be examined and used to combat degenerative diseases and also be in cooperate with the modern medicine.

keywords: *Lagenaria sphaerica, medicinal plants, therapeutic potential*

INTRODUCTION

Local traditional knowledge and practice of plant based are still wide spread in rural areas. Medicinal plants has been utilized since human race, this has been used as the foundation of modern day medicine. *Lagenaria sphaerica* is a

herbaceous climber in the family Cucurbitaceae. It is commonly known as the wild melon. The melon gourd is green and flecked with white stripes (Dressler *et al.*, 2014). These plants are found in low-lying areas from the Eastern Cape of South Africa to East Africa. The plant is harvested from the wild for local use as a food, medicine and source of materials. Mature fruits are sold for medicinal use in local markets in South Africa. The plant is grown as an ornamental in gardens (Pooley, 1998). In southern Africa, the leaves are commonly eaten as a vegetable and are freshly added to maize porridge, and a relish is prepared from stem and mixed with other plants. Dried leaves are stored for use in lean season. Member of this family are annual or perennial herbs or shrubs. The leaves are alternate and variable, tendrils are almost always present. The flowers are mostly unisexual and white or yellow in colour, they occur on the same plant or on separate plants. In this view, the experiment was to evaluate analysis of selected vitamins, mineral, phytochemicals composition of *Lagenaria sphaerica* leaf

MATERIALS AND METHODS

Sample collection and preparations

The leaves for this research were collected from a farm garden at Boripe local Government area of Osun State, South West, and Nigeria.

It was washed, air-dried for about a week. The dried sample was grinded with mortar and pestle in the laboratory into a fine powdered and kept in an air tight container for further analytical analysis

Methods

The mineral element

The mineral element composition of the sample was analyzed using procedure of Association of Official Analytical Chemist (AOAC, 2000).

Proximate analysis

The proximate composition of the sample were carried out using (AOAC, 2000). The carbohydrate was determined by difference

Phytochemical analysis

The powdered sample was screened for various phytochemical constituents. Qualitative and quantitative phytohemical analysis were carried out to

confirm the presence of the various phytochemicals in the powdered sample according to the method of Sofowara (1993) .

Vitamins

Selected vitamins were determined using the method of AOAC (2000)

RESULTS AND DISCUSSION

Table 1: Proximate analysis of *Lagenaria sphaerica* leaves (%)

Parameters	Compositions
Ash content	13.261 ± 0.038
Moisture content	7.214 ± 0.575
Crude fat content	13.233 ± 0.830
Crude fibre content	18.438 ± 0.099
Protein content	10.787 ± 0.760
Carbohydrate content (by difference)	37.067 ± 0.067

Table 2: Minerals analysis of *Lagenaria sphaerica* leaves (PPM)

Parameters	Compositions
Calcium	249.750±0.024
Magnesium	19.480±0.004
Zinc	0.527±0.001
Copper	0.051±0.001
Nickel	0.047±0.002
Manganese	0.043±0.002
Iron	0.044±0.001
Phosphorous	12.800±0.020

Table 3: Vitamins analysis of *Lagenaria sphaerica* leaves

Parameters	Compositions
Vitamin B1 (mg/g)	1.232±0.008
Vitamin B2 (mg/g)	0.482±0.005
Vitamin C (mg/100g)	82.876±0.089

Table 4: Qualitative Phytochemical analysis of *Lagenaria sphaerica* leaves

Parameters	Constituents
Tannins	+ve
Phenols	+ve
Alkaloids	-ve
Flavonoids	+ve
Terpenoids	-ve
Saponins	+ve
Steroids	-ve

+ve= presence of constituents, -ve= absence of constituents

Table 5: Quantitative phytochemical analysis of *Lagenaria sphaerica* leaves

Parameters	Compositions
Total phenols (%)	12.037±0.012
Saponins (%)	8.013±0.090
Flavonoids (%)	12.718±0.205
Tannins (mg/g)	1.065±0.005

Table 1 reveals the proximate composition of *Lagenaria sphaerica* leaf (%) the values include ash (13.26 ± 0.099), moisture (7.21 ± 0.575), crude fat (13.233 ± 0.830), crude fibre (18.438 ± 0.099), protein (10.787 ± 0.760), carbohydrate (37.067 ± 0.067). The value for the ash was compared with the value obtained for *Moringa Oleifera* leaf (7.95 ± 0.04) as reported by Nweze and Nwafor (2014). Sample with high percentage of ash content are expected to have high level of numerous mineral elements which are expected to speed up metabolic processes and improved development and growth (Bello *et al.*, 2014).

The values for the moisture content was compared with the value from *bulb of Allium sativum* (60.35 ± 0.23) as reported by (Lawal *et al.*, 2018). Sample with low moisture content can be stored without spoilage for a very long time. Low moisture content of any item of food would be used as an index of stability and

susceptibility of fungi infections (Osanaiye *et al.,* 2013). The safe storage limit of moisture for seeds is 15% (Shaba *et al.,* 2015).

The value for the crude fat was compared with value obtained from bulb of *Allium sativum* (1.0.2 ± 0.02) as reported by (Lawal *et al*., 2018). Fat provide more energy compared to proteins and carbohydrates and serve as medium of transport of fat soluble vitamins such as vitamin A, D, E, and K. Edible oil and fats are essential nutrients in human diet and play a vital role in the supply of essential fatty acids and energy (Adel *et al.,* 2015).

The value for crude fibre content was compared with the value obtained from *Curcuma Longa* (1.95 ± 0.01) as reported by (Abdulsalam *et al*., 2017). Dietary fibre serve as a useful tool in the control of oxidative processes in products and as functional food ingredients. Crude fibre delays the digestion and conversion of starch to simple sugars an important factor in the management of diabetes (Shaba *et al.,* 2015). Fibre in diet acid absorption of trace element in the intestine helps in efficient elimination of body waste (Shdhakaran and Appakultan, 2016).

The value for the protein was compared with the value obtained for *Moringa oleifera* leaf (18.92 ± 0.02) as reported by (Nweze and Nwafor, 2014). Protein is essential components of diet needed for survival of animals and human beings and its basic function is to supply adequate amount of required amino acids for nutrition (Bello *et al.,* 2014).

Carbohydrate content of *Lageneia spharica* leaf indicates that the leaf is a source of carbohydrate (Esau *et al.,* 2016). Further more, an energy value of 1664kj/g obtained for *Lagenaria sphaerica* leaf also reveals that it is energy densed rich. It has potential for use as a source of energy in livestock feeds (Ibrahim *et al.,* 2015).

Table 2 shows the presence of the mineral elements of *Lageneria shpacrica* leaf such as calcium (2.49 ± 0.024), magnesium (19.480 ± 0.004), zinc (0.527 ± 0.001), copper (0.05 ± 0.001), nickel (0.047 ± 0.002), manganese (0.043 ± 0.03), iron (0.044 ± 0.001) and phosphorus (12.800 ± 0.020). Nutrient composition is important for nutrient formation. Minerals are essential for normal cellular function, it provide additional protection to the human body and act as second messenger in some biochemical mechanisms (Sudhakaran and Appakultan, 2016).

Calcium plays a role in the formation of bones and is also essential for blood clothing and muscle contraction. If calcium is taken in low quantities it would not meet the body's phosphorus. It is related to as a calcium for bone, teeth and muscles growth and maintenance. The availability of calcium for the body depends upon calcium to phosphorus ratio (Ayoade *et al.*, 2017).

Magnesium is an element in connection with circulatory diseases and calcium metabolism in bone. It is involved in enzyme action, normal muscles, contraction and transmission of nerve impulses. Iron is an essential micronutrient for hemoglobin formation, normal functioning of central nervous system and in oxidation of carbohydrate, protein and fat (Ayoade *et al.*, 2017).

Zinc is required for the proper functioning of reproductive system. Manganese is essential for normal functioning of the nerve, heartbeat, central nervous system and a good antioxidant (Bello *et al.*, 2014).

Copper is essential as it can be found in many enzymes including those involved in energy production, connective tissues formation, central nervous system function, antioxidant function and Iron metabolism. Zinc is important because it plays crucial roles in neurological functions, immune response, growth and development and reproduction (El Hawary *et al.*, 2014).

The result of vitamins is shown in table 3. Vitamin B_1 (1.23 ± 0.008), vitamin B_2 (0.482 ± 0.005), vitamin C (82.876 ± 0.089). Riboflavin helps to enhance the natural immunity by strengthening the antibody reserve and reinforcing the defense system against infection. Vitamin C is the body's first line of defense in alerting disease and infections (Khattak and Rahmon, 2017). Vitamin C an ascorbic acid traps radicals formed in aqueous environment preventing what harmful oxidation reactions radicals would cause. Thiamin is an essential factor in the function of the nervous system (Uchegbu *et al.*, 2017). If thiamin is difficult in the diet, glucose is only partially oxidized. The breakdown steps of pyruvic acid. A build up of pyruvic acid in the blood causes muscular weakness, palpitation of the heart and degeneration of the nerves. These are the symptoms of beriberi (Igwe and Okwu, 2013).

The qualitative and quantitative phytochemical of *Lagenaria sphaerica* leaf is shown in table 4 and 5 respectively. Tannins, phenols, saponins and flavonoids, total phenol were present while alkaloids, terpenoid and steroid were absents. The quantitative phytochemicals revealed total phenol (12.027 ± 0.012), saponin (8.013 ± 0.006), flavonoids (12.718 ± 0.205) and tannins (1.065 ±

0.005). Tannins are used in treatment of urinary tract infection, diarrhoea, healing of wounds and dysentery (Fahey, 2005; Akaneme, 2008). Saponins in plant can be used in enthnopharmacological to treat diabetes and hyperglycaemia, a disorder often associated with diabetes (Fahey, 2005 and Krishnaiah *et al.,* 2009). It also prevent the excessive intestinal absorption of the cholesterol and thus reduce the risk of cardiovascular diseases such as hypertension (Fahey, 2005). The presence of alkaloid together with saponins in plant can be used in the treatment of hypertension. The flavonoids have long been recognized to possess anti – allergic, anti – inflammatory, antiviral, anti proliferative and anti – carcinogenic activities as well as to affect some aspect of Mammalians metabolism (Akaneme, 2008).

CONCLUSION

The result of the proximate, vitamins and mineral analysis of the leaf extract revealed the presence of appreciable amount of nutrient *in the Laganeria sphaerica.* Furthermore, the phytochemical constituents has authenticates its usefulness in ethnomedicines.

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