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Minerals and Phytochemical Analysis of Ocimum Gratissum (Scent Leaves) from Ikot Ekpene Metropolis

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Abstract:
Mineral phytochemical contents of *Ocimum gratissmum* from different farms in Ikot Ekpene metropolis Akwa Ibom State, Nigeria were analyzed using standard analytical methods. The observed data were subjected to statistical analysis using correlation test to compare their properties. the observed data revealed mineral content of samples A and B respectively: calcium (Ca) 66.73±1.68 mg/100g and 60.52±0.43mg/100g, Magnesium (Mg) 56.42±1.6 mg/100gand 60.92±0.02mg/100g, Potassium (K) 26.98±0.18 mg/100g and 34.63±0.05mg/100g, Zinc (Zn) 4.47±0.92 mg/100g ,and 15.44±0.15, Copper (Cu) 1.63±0.17 mg/100g, and 0.80±0.81Iron (Fe) 1.03±0.25 mg/100g and 15.42±0.64, Manganese (Mn) 1.38±0.63 mg/100g and 4.65±0.75mg/100g and Sodium (Na) 0.38±2.01 mg/100g and 35.20±0.02 .The phytochemical analysis shows that *sample A* contains phenols 1.22 ±0.81%, alkaloid 2.88±0.02%,flavonol 0.40±0.09%, saponin 1.50±0.02% and glycosides 0.086±0.02% while those of sample B recorded phenols 3.42 ±0.02%, alkaloid 5.46±0.05%,flavonol 1.40±0.02%, saponin 4.20±0.02% and glycosides 0.26±0.05%. The observed value agrees with recommended daily allowance (RDA).

Keywords:
Minerals composition, Phytochemicals Analysis and *Ocimum Gratissium.*

Introduction

Occimum *gratissum*, commonly known in English as scent leaves is one of the most highly consumed vegetable in Nigeria. It is known as 'Ntrong' in Ibibo, 'Efrin' in Youruba, and 'Nchanwu' in Igbo. It is a medicinal plant with a wide application in African traditional medicine system. WHO reported that more than 80% world's population consumed *Ocimum gratissum* directly or indirectly to treat certain diseases. It is a polymorphic branched aromatic vegetable. *Ocimum gratissium* belong to the plant family Lamiaceae. It is indigenous to tropical areas, in Nigeria, it is found in savannah and coastal areas.it is cultivated at homes. Vegetables are major sources of minerals, vitamins and some bioactive components which are needed by the body. Mineral elements required by the body are classified into micro and macro elements. Elements play vital role in the maintaining of good health and prevention certain diseases. Singh, (2012), identified *Ocimum gratissium* as a culinary herb with wide applications. Its nutritional contents form the basis of its usefulness as seasoning agents because of its aromatic flavor (Pandey, 2012). It is used as antibacterial, antimalarial, anti-epilepsy anti-convulsing, coughs depressant agent and food preservation (Kalita and Khan, 2014; Akinmolad *et al*., 2007). In Nigeria, it is cultivate at every homes due to its importance irrespective of the location, environmental condition and soil topography that may affect the soil properties and hence, affect the minerals and biochemical components in the plants. Therefore, this study aimed at evaluating the mineral and phytochemical contents of *Ocimum gratissium* cultivated within the polytechnic community.

Materials and Methods

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Fresh leaves samples of *Ocimum gratissium* were collected from different farms in Ikot Ekpene metropolis, Akwa Ibom state, were harvested and sun dried for 72hrs and grounded into powdery form and stored in a clean air tight bottle for further analysis. About 10g of the plant material was digested with 20ml HNO_3 and 10mls H_2SO_4 acids in a digestion flask as reported by (AOAC, 2000). After cooling, 30mls of water was added to the digested sample and shaken vigorously. It was later filtered with whatman filter paper and the solution made up to 100mls and stored used for elemental analysis. The analysis of the mineral content was analyzed using Bulk Scientific model AVG 210 atomic absorption spectrophotometer (AAS). The reading displayed on the screen was recorded for each element. Phytochemical analysis was carried out using the methods reported by (Harbone, 1973).

Results and Discussion

The result of Mineral and phytochemical compositions of *Ocimum gratissum* obtained are presented in Tables 1.0 and 2.0 below.

Table 1.0: Mineral Compositions of *Ocimum gratissium*

Parameters	Mineral Composition (mg/100g) Sample A	Sample B	Recommended Dietary Allowances(RDA)
Calcium	60.52±0.43	66.72±1.69	1000
Potassium	34.63±0.05	26.08±0.10	2000
Magnesium	60.92±0.02	56.42±1.70	350
Zinc	15.44±0.15	4.47±0.92	12-19
Copper	0.80±0.81	1.63±0.16	3-5
Iron	5.42±0.64	1.03±0.25	10-15
Sodium	3.20±0.02	0.38±2.02	500
Manganese	4.65±0.75	1.38±1.63	

The results expressed as mean ± standard deviation of the triplicate analysis.

Table 2.0 Phytochemical composition of *Ocimum gratssium*

Parameters	Sample A (%)	Sample B (%)
Phenols	3.42 ±0.02	1.22 ±0.81
Alkaloid	5.46±0.05	2.88±0.02
Flavonoid	1.40±0.02	0.40±0.09
Saponin	4.20±0.02	1.50±0.02
Glycosides	0.26±0.05	0.086±0.02

The results expressed as mean ± standard deviation of triplicate analysis.

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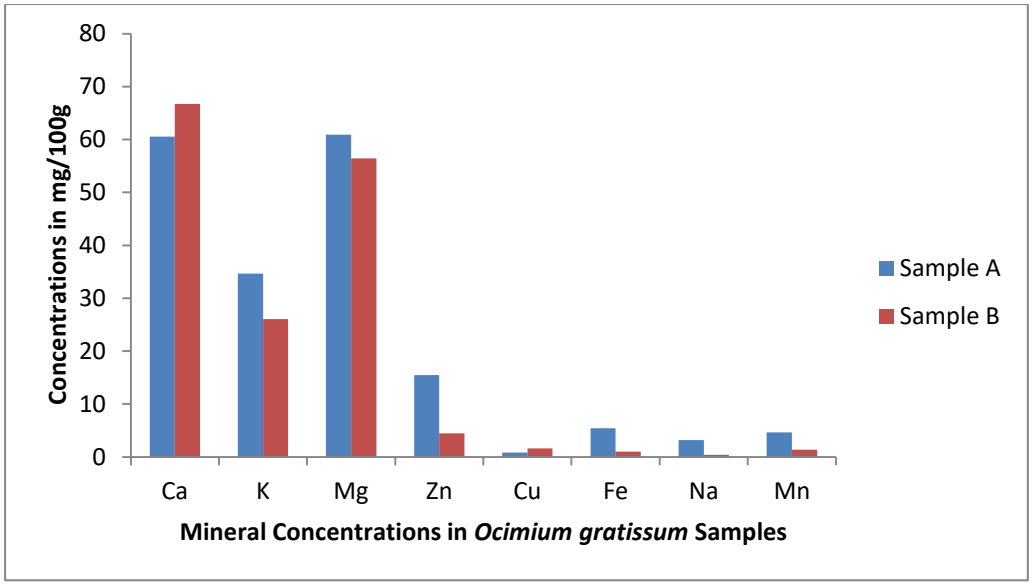

Figure 1.0: A bar chart showing the mineral composition of *Ocimum gratissum*

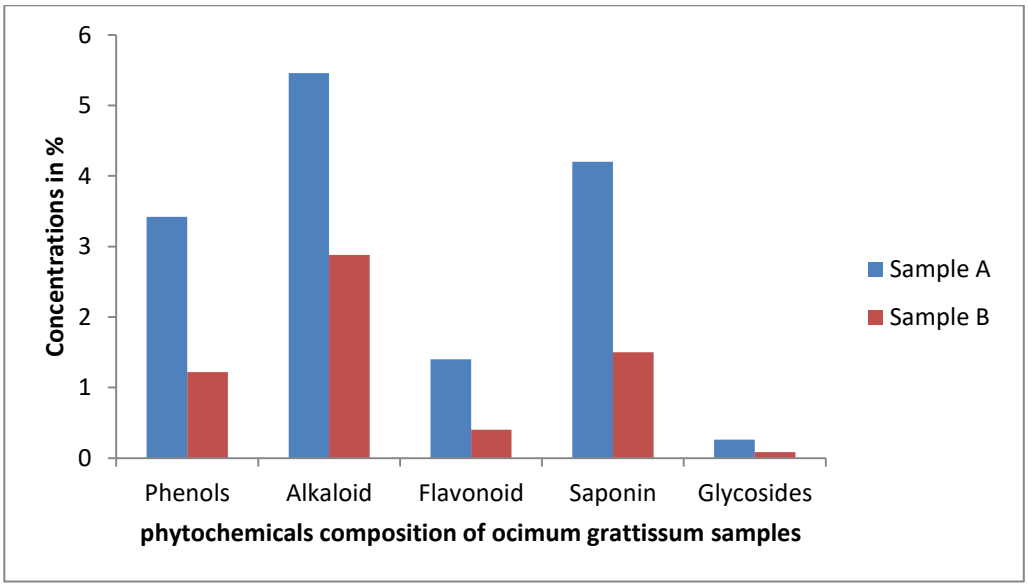

Figure 2.0: A bar chart showing the phytochemical composition of *Ocimum gratissium*

Minerals play a vital role in the body. It is needed for the proper functioning of tissues (Asaolu *et al*., 2012). According to Balogun and Olatidoye, (2012), mineral elements serve as a cofactor for numerous phytochemical and metabolic functions in both plants and animals. Tables 1.0 and 2.0 above show the mineral contents in (mg/100g) and phytochemical contents in (%) of *Ocimum gratissum* samples. Sample A, recorded the following values; Calcium (Ca) 60.52±0.43, Potassium(K) 34.63±0.05, Magnesium (Mg) 60.92±0.02, Zinc (Zn) 15.44±0.15,Copper (Cu) 0.80±0.81, Iron (Fe) 5.42±0.64, Sodium (Na) 3.20±0.02, and Manganese (Mn) 4.65±0.75. The observed values (sample A) did not significantly different from that of sample B with the mineral contents; Calcium (Ca) 66.72±1.69, Potassium(K) 26.08±0.10, Magnesium (Mg) 56.42±1.70, Zinc (Zn) 4.47±0.92,Copper (Cu) 1.63±0.16, Iron (Fe) 1.03±0.25, Sodium (Na) 0.38±2.02, and Manganese(Mn) 1.38±1.63.

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Figure 1.0: above shows that Calcium (Ca) content in sample A was lower than sample B. Calcium (Ca) in sample was in agreement with (60.12mg/100g) reported by Pandey, (2017) but higher than (0.525mg/100g) reported by Alikwe *et al*., (2012). However, the observed values are lower than the recommended daily allowance (RDA) of 1,000mg/day for adults (Brini *et a.,l* 2013).

Calcium (Ca) is an important element need for the formation of strong bones and teeth in the body. The variation in the values obtained may be attributed to the different in the soil compositions of the different farm lands. The observed values compared favorably with values reported for some edible vegetables consumed in Nigeria (Landan *et al*.,(2006). Potassium (K) content ranged from 34.63 (sample A) to 26.08 (sample B). The obtained values were less than the RDA value limit of 200mg/100g per day.

Magnesium (Mn) content in *Ocimum gratissium* leaves analyzed ranged from. 60.92 in sample A to 56in sample B. This shows that sample A has higher Magnesium (Mg) content than sample B (fig. 1.0) However; the observed values were less than the value (80.92) reported by Ijhida *et al*., (2007) in Sweet Potatoes leaves. Magnesium (Mg) is naturally abundant in chlorophyll. It helps in calcium metabolism in the bones. Over exposure to Magnesium (Mg) in food supplement leads to gastro internal disorder and muscle weakness (Vincente *et al*., 2014). Iron was also detected in the samples analyzed. Iron (Fe) concentrations obtained ranged from 5.42 to 1.03 (mg/100g) in samples A and B respectively. The observed values were lower than that reported by (Fabohum *et al*., 2022 and Pandey, 2017). Iron is an important factor for red blood cell formation and oxygen transport in the body. It is a micro element required in minute quantities. Over exposure to Iron (Fe) causes free radical damage to the tissue leading to liver disease, heart failure and skin damage

Nevertheless, Manganese (Mn) content observed was 4.65mg/100g (sample A) and 1.38mg/100g (sample B). The values obtained are lower than the RDA values of 2-5 mg/100g but higher than 0.46mg/100g reported by Bahl and Balh, (2006). This indicates that *Ocimum gratissium* is essential for immune functioning and protein synthesis. Chronic overexposure to Manganese (Mn) may lead to severe health challenges. Copper was present in trace amount which agrees with the RDA values. Similar trend was observed for sodium.

Phytochemical analysis indicates the presence of Phenols, Alkaloids, Flavonoid, Saponins and Glycosides, others were below detectable limit. These bioactive components (in percent %) were present in low quantities ranging from 5.46 - 0.26 (sample A) and 2.88- 0.08 in sample B. this indicated that sample A has higher concentrations of these bioactive components than sample B. The results obtained followed the trends: Alkaloids > Saponins > Phenols > Flavonoid > Glycosides in both samples. The presence of flavonoids signifies that the plant leaf possess antibacterial, anti-viral, anti-inflammatory and anti-cancer potentials (Okwu, 2004; Farquar, 2006). Similarly, alkaloids have anti-bacterial, antiplasmodic and analgesic properties (Kasolo *et al*, 2010). The present of saponins indicates that the sample has great benefit effect on blood cholesterol levels, bone health and immune stimulation (Okwu, 2004). Generally, phytochemicals play a major role in drugs formations (Kwawo *et al.*, 2009 and Thomas *et al* 2025). They have medicinal potentials and this may be the reasons our fore -parents used herbs in treatment and prevention of certain sicknesses and diseases.

Conclusion

This study indicates the presence of mineral elements and bioactive components analyzed in *ocimum gratissium.* The elemental analysis revealed a high concentration of Mg, Ca, k and Zn compared to other edible vegetables. Additionally, the presence of alkaloids, saponins flavonoids and cardiac glycosides at diverse concentrations support the potent of this plant in traditional medicine. Thus, this study supports the medicinal relevance of *ocimum gratissium,* highlighting their usage in traditional therapies and drug formations.

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