



Scholars Research Library

Archives of Applied Science Research, 2017, 9 (3):24-26
(<http://scholarsresearchlibrary.com/archive.html>)



Mineral Content of *Ocimum bacilicum* Leaves grown in Olupona, Iwo, Nigeria

Emma-Okon BO*, Obonariemu FF, Oyeneeye SO

Bowen University, Iwo

ABSTRACT

Ocimum bacilicum is well known as a culinary herb, a rich source of nutrients and a folk remedy in alternative medical therapy. Although many studies have been carried out to determine its nutritional components, it is well known that this varies across different species and also depends on geographical location and type of soil on which the plant is cultivated. The present study seeks to determine levels of Ca, Na, K, Zn, Fe, Mn, Mg and Cu in leaf extracts of *Ocimum bacilicum* leaves grown in Olupona, a suburb of Iwo, South Western Nigeria. Plant leaves were washed, dried, ground into powder and extracted using standard procedures. The extract was digested using concentrated HCl. Levels of Na and K in the extract was determined using a flame photometer while atomic absorption spectrophotometer was used to determine the levels of the other minerals.

Levels of Na and K found in the extract was 41.38 and 12.37 mg/ml respectively while those of Ca, Fe, Mg, Zn and Mn were 60.88, 6.58, 5.35, 1.14 and 0.88 mg/ml, respectively. Cu was not detectable in the sample. The study concludes that the study plant contains very high levels of Ca and is also rich in other essential minerals.

Keywords: *Ocimum bacilicum*, Leaf extract, Essential minerals, Nutritional components

INTRODUCTION

Ocimum bacilicum also called great Basil or Saint-Joseph's wort is a tender plant best known as a culinary herb with a strong, pungent and often sweet smell. It is a genus of aromatic annual and perennial herbs and shrubs in the family Lamiaceae, found in the tropical and warm temperate regions of all six inhabited continents, with the greatest number of species in Africa [1,2]. In addition to its culinary uses in fresh recipes and as a main ingredient in local and continental soup and sauces, *Ocimum bacilicum* is also well known as a popular folk remedy in complementary and alternative medical therapy due to the fact that it is believed to possess antioxidant, antiseptic, anti-spasmodic, antidiarrheal and analgesic properties, most of which can be traced to several organic compounds found in its extracts [3-7]. Although much more interest is being directed at the medicinal benefits of the plant than its culinary properties in recent times, it should be noted that the plant contains many essential nutrients, including vitamins and macro and micronutrients [8-10] and so its consumption can serve as natural sources of these nutrients

Although a lot of research has been carried out to investigate the nutritional components of *Ocimum bacilicum*, it is well known that coupled with the existence of very many varieties of the herb with different chemical constituents, plant species grown in different geographical areas may also have different contents [11,12]. The present study seeks to determine the amount of selected minerals (Ca, Na, K, Zn, Fe, Mn, Mg and Cu) present in leaves of *Ocimum bacilicum* grown in Olupona, a suburb of Iwo, a tropical town in South West Nigeria.

METHODS

Ocimum bacilicum plants were obtained from Olupona farmland in Iwo, Osun State, Nigeria. A specimen of the plant was identified taxonomically and deposited at the herbarium of the Botany Unit of the Department of Biological Sciences, Bowen University, Iwo.

Extraction and digestion of leaves for flame and atomic absorption spectrophotometric analysis

This was carried out according to the method of Daniel et al. [13]. Leaves of the plant were plucked and 100 g of it weighed and soaked in a basin of clean water for washing. The leaves were then drained, allowed to air-dry and then dried in the oven (at 60°C) for 1 h, after which they were ground into fine powder using a micro electric grinder. Twenty gram (20 g) of the powder was soaked in 3 L of deionized water overnight. The content was filtered using large watchman filter paper and the filtrate was discarded while the extract was dried. The dried extract was stored in an airtight bottle. Two grams (2 g) of the extract was placed inside a 50 ml beaker; 40 ml of concentrated HCl and 10 ml of water were added. The mixture was placed on a hot plate (inside a flame cupboard) and stirred until a white paste was formed. This took about 1 h. The digested sample was left to cool and 40 ml of deionized water added. The mixture was then filtered into another beaker and more water used to wash the residue. The filtrate was poured into a 100 ml volumetric flask and made up to the mark with water. The Na and K content was then determined using a flame photometer while an atomic absorption spectrophotometer was used to determine the Ca, Zn, Fe, Mg, Mn and Cu content of the leaves.

RESULTS AND DISCUSSION

Various species of *Ocimum bacilicum* is found in all six continents of the world and is said to be most abundant in Africa. The plant has been reported to contain enough amounts of Vitamins A to serve the daily requirement for adults [14]. This study was undertaken to determine the amount of essential minerals (Ca, K, Na, Fe, Mg, Zn, Mn and Cu) contained in leaves of the plant grown in Olupona, SW Nigeria. The plant was found to contain very high amounts of Ca as shown in Table 1. In fact, the extract had to be diluted 20-fold before the Ca level could be measured. Other minerals were also found in substantial amounts. It is well known that Ca, in addition to supporting skeletal structure and function also plays key roles in cell signaling, blood clotting, muscle contraction and nerve function, with many neuromuscular and cellular functions depending on a constant concentration of ionized calcium. Recommended intake per day is about 1000 mg for adults and it is reported that the lowest calcium intake is found in developing countries. Potassium and Sodium, which are also important for maintaining electrolyte balance of the body and which serve as cofactors for many enzymes were also found in significant amounts in this plant. This suggests that consumption of the plant will provide a cheap source of these important nutrients, especially in rural communities where resources are scarce. Although the results of the study compares well with previous work on this plant [13,15,16], a major difference in this specie is that it contains very low levels of Cu, which could not even be detected by the Atomic absorption spectrophotometer and it is represented in graphical form in Figure 1.

Table 1: Concentration (mg/L) of the various elements measured in the plant leaf extract

Element	Concentration (mg/L)
Ca	60.88
K	41.38
Na	12.37
Fe	6.58
Mg	5.35
Zn	1.14
Mn	0.88
Cu	0

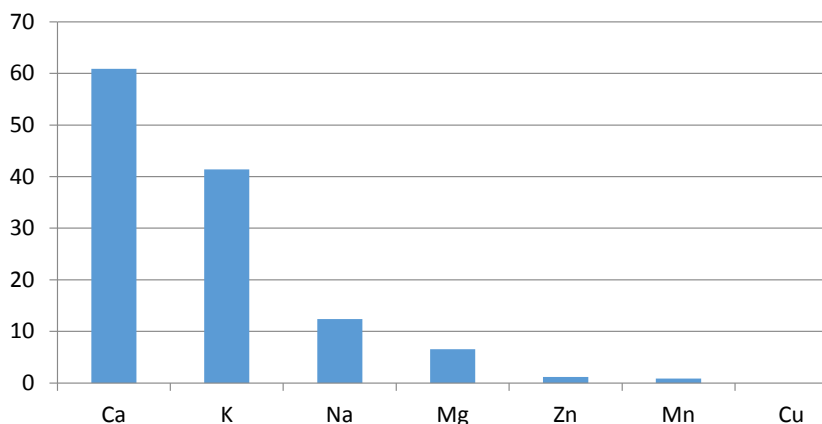


Figure 1: Mineral composition of *Ocimum bacillicum* leaf extract (mg/ml)

CONCLUSION

We conclude that *Ocimum bacillicum* cultivated in Olupona is a rich source of Ca, K, Na, Fe, Mg, Zn and Mn and its consumption should be encouraged as an affordable source of these important minerals.

REFERENCES

- [1] Simon, J.E., et al., ASHS Press, **1999**.
- [2] WCSP. World Checklist of Selected Plant Families. **2017**.
- [3] Lee, K.G. and Shibamoto, T., *J Agri Food Chem*, **2002**. 50: p. 4947-4952.
- [4] Lee, S.J., et al., *Food Chem*, **2005**. 91: p. 131-137.
- [5] Bozin, B.N., Mimika-Dukie, N.S. and Anaekov, G., *J Agric Chem*, **2006**. 54(5): p. 1822-1888.
- [6] Chiang, L.C., et al., *Clin Exp Pharmacol Physiol*, **2005**. 32(10): p. 811-816.
- [7] Khalil, A., *Biotechnology*, **2013**. 12: p. 61-64.
- [8] Miyamoto, Y., et al., *J. Radioanal Nucl Chem*, **2002**. 43: p. 747-765.
- [9] Singh, V. and Garg, A.N., *Food Chem*, **2006**. 94: p. 81-89.
- [10] Karada, C. and Kara, D., *Food Chem*, **2012**. 130: p. 196-202.
- [11] Ličina Vlado, D., et al., *Hem Ind*, **2014**. 68(4): p. 501-510.
- [12] Zheljzakov, V.D., Amber, C. and Charles, L.C., *J Agric Food Chem*, **2008**. 56: p. 241-245.
- [13] Daniel, V.N., Daniang, I.E. and Nimyel, N.D., *Int J Eng Technol*, **2011**. 11(6): p. 135-137.
- [14] <http://www.whfoods.com>
- [15] Agunbiade, S.O., Ojezele, M.O. and Alao, O.O., *Adv Biol Res*, **2015**. 9(3): p. 151-155.
- [16] Shuaib, O.R., et al., *Academ Arena*, **2015**. 7(7): p. 77-81.