

PHYTOCHEMICAL ANALYSIS AND MINERAL ELEMENTS COMPOSITION OF *OCIMUM BASILICUM* OBTAINED IN JOS METROPOLIS, PLATEAU STATE, NIGERIA.

BY

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ABSTRACT

Phytochemical screening of aqueous extract and elemental analysis of *Ocimum basilicum* were carried out with the view to assess the therapeutic value and the safety of the plant. The result revealed the presence of saponins, tannins and cardiac glycosides in the plant. The mineral composition indicated high concentrations of potassium, K, (28770mg/kg), calcium, Ca, (17460mg/kg) and appreciable concentrations of sodium, Na, (280mg/kg) and magnesium, Mg, (266mg/Kg). It is therefore concluded that, *ocimum basilicum* contains bioactive compounds and minerals that could enhance the curative process of health.

Keywords: *Ocimum basilicum*, Phytochemicals, Mineral Elements, Therapeutic value.

INTRODUCTION

Some compounds present in plants known as phytochemicals are valuable sources of food and medicine for the prevention of illness and maintenance of human health [1]. Phytochemicals could either have antioxidant or hormone-like actions for treating health condition, including cancer, heart disease, diabetes, high blood pressure and preventing the formation of carcinogens on their target tissues. It has therefore become an acceptable notion that a diet rich in fruits, vegetables, grains and legumes reduces the risk of the diseases mentioned [2, 3]

Ocimum basilicum (commonly known as scent leave) is native to Africa, Asia and Pacific Island and is of the family lamiaceae. The plants in this family are mostly annual or perennial herbs. They have been reported to have exceptionally high content of B-carotene, and lutein-zeaxanthin. *Ocimum basilicum* is an important medicinal plant and a culinary herb that is said to contain several antioxidant compounds and display important effects at cellular level, including the platelet anti-aggregate property and inhibitory activity against HIV-1 reverse transcriptase [4].

These compounds serve as protective scavengers against oxygen derived free radicals and reactive oxygen species (ROS) that play important roles against aging and various disease processes. Zea-xanthin, an important dietary carotene, is selectively absorbed into retinal meculalutha, where it is thought to provide antioxidant protective light filtering functions (www nutrition-and-you.com.). It has also been reported that basil essential oils such as eugenol, linalools, citral limonene and terpenes are known to have anti inflammatory and anti-bacterial properties [5].

Medicinal plants are continually being utilized as therapeutic agents in formulation for treating diseases in traditional ethno-medical systems in Nigeria. However, environmental and atmospheric pollution, harvesting and handling are seen as factors that may be the important sources of contamination by microbial growth and metals [6, 7]. Another problem with the traditional ethno-medical systems is that, even the medicinal plants that seem to work have no sufficient data to prescribe the dosage required [8]. There is therefore the need for the traditional and orthodox medicine practitioners to work together in order to standardize the phytochemical contents of the plants for safety, seeing that medicinal plants are rich sources of these chemicals, coupled with the fact that they are cheaper and more accessible to the wider population of world [9]. Although there has been substantial research on the phytochemical analysis of *O. basilicum* and its composition, most studies in other countries have been limited to their locally grown cultivars. It is well-known that environmental conditions and agricultural practices may significantly modify productivity, oil content, and composition of sweet basil [9]. The aim of this paper is to determine the phytochemical compounds and some of the mineral composition of the plant grown on Jos, Plateau state of Nigeria.

Scope/Delimitation of Study

The work only determined the presence of the phytochemical and macronutrients in *O. basilicum* obtained in Jos-North Local Government Area of Plateau state, Nigeria. The work could not quantify the phytochemicals and also, could not determine the heavy metals in order to ascertain the full suitability of the plant for medicinal purposes.

MEHTHODOLOGY

Plant Sampling and Preparation

Fresh leaves of *Ocimum basilicum* were obtained from different parts of Jos-North Local Government of Plateau State, Nigeria. They were identified according to the description in literature [10] and were further authenticated at herbarium, Federal College of Forestry, Jos. The leaves were then dried in an oven at 50°C, ground and stored in an air tight polythene bag.

Extraction Procedures

20g of the ground leaf powder of *Ocimum basilicum* was soaked overnight in a container containing three (3) liters of deionised water. After twenty four (24) hours, the content was filtered using No.1 Watchman Filter Paper. The extract was dried and stored in an air-tight bottle.

Phytochemical Screening

The phytochemical compounds of this leaf were analyzed by the standard method of Trease and Evans [11]. The compounds analyzed for were cardiac glycosides, terpenes, saponins, flavonoids, alkanoids and resins.

Elemental Determination

Five (5) ml of concentrated HNO₃ was added to 1g of the dried extract in a conical flask and few anti bombing granules were added to it. The mixture was placed in a fume cupboard and gradually heated on a heating mantle with addition of more of the acid until a light colored solution was obtained. The solution was then cooled and filtered in a 100ml volumetric flask and made to the mark with deionized water. The mixture was then analyzed for calcium, magnesium, sodium and potassium using Pye Unicam 969, Atomic Absorption Spectrophotometer.

Results and Discussion

The result of the phytochemical screening of the aqueous *Ocimum basilicum* extract is presented in Table 1 and the mineral analysis is presented in Table 2.

Table 1: Result of the Phytochemical Screening of *Ocimum basilicum*

Parameter	Result
Saponins	+ve
Alkaloids	-ve
Tannins	+ve
Steroids or terpenes	-ve
Flavonoids	-ve
Cardiac glycosides	+ve
Resins	-ve

Table 2: Results of the Average (SD, n=3) Elemental Analysis of *Ocimum basilicum*

Mineral	Concentration (ppm)
Calcium	17,460 90
Magnesium	2,660 34
Sodium	289 13
Potassium	28,770 76

The results indicated the presence of saponins, tannins and glycosides (Table 1). The work (Table 2) reveals that *Ocimum basilicum* has high potassium content (28,770mg/kg), calcium (17,460mg/kg) and appreciable quantity of sodium (290mg/kg) and magnesium (266mg/kg). All these are nutritionally valuable minerals. However, these values are lower than those found in other plants [1]. Reports from workers in other areas indicated the presence of alkaloids and flavonoids. This is contrary to what was obtained in this work. In most cases, tannins are usually associated with flavonoids, which are their monomeric precursors. The positive result obtained for tannins in this work is therefore difficult to reconcile with the negative results for flavonoids. This difference might be attributed to one or both of two factors. The solvent used in this work (water) might not be one that can extract all the phytochemicals, particularly the non-polar components. Even if some were extracted, the levels might have been too low to give positive results in qualitative tests for the compounds. Another factor is geographical. It has been reported that the same plant specie grown in different geographical areas may contain different chemical contents; and in tree plants, the age of the plant also determine their phytochemical contents.

Many phytochemicals found in plants are either the product of plant metabolism or synthesized for defense purposes. The phytochemicals are either useful or toxic to human body [12]. Saponins are steroidal glycosides with foaming characteristics and bitter taste that have beneficial effect on the blood cholesterol levels, fight cancer and help in health and the stimulation of immune system [13]. Saponins have hemolytic properties and are used as starting materials for the synthesis of steroidal drugs like corticosteroids, the sex hormone stimulants and contraceptives [14, 1]. They are also used for the treatment of viral diseases [12].

Tannins are stringent bitter plant polyphenols that bind, precipitate and shrink proteins and various organic compounds. Tannins are known to have anti – viral, anti-tumor, anti – inflammatory and healing properties on wounds, kidney etc [13, 14]. Cardiac glycosides are useful for the treatment of failing heart disorders and have beneficial effect on cardiac arrhythmias [12]. Thus *ocimum basilicum* extract, which was found to contain saponins, tannins and glycosides, could be useful for medicinal purpose.

The minerals are very important in human nutrition. Calcium (Ca), potassium (K) and magnesium (Mg) are reported to be responsible for the repair of worn out cells, strong bones and teeth, building of red blood cells and for body mechanisms (15). Also, Ca and K are essential for disease prevention and control and may therefore contribute to the medicinal influences of the plant [1]. Pottasium (K) is needed for growth and transmission of the nervous system to transmit messages as well as regulating the contractions of muscles [13].

Conclusion and Recommendations

Very important phytochemicals were obtained in *Ocimum basilicum*. These are biologically active substances that perform the function of preventing, healing and provision of antioxidant properties to the body. They also contain appreciable quantity of K, Na, Ca and Mg which are essential component of human nutrition. These findings justify the ethno-medicinal use of the plant. It is therefore recommended that a quantitative phytochemical analysis of the plant should be conducted. The presence of some other nutritive as well as toxic elements may be investigated. Different solvents may be used in the extraction to provide full data on the components. This would maximize information on its nutritional and medicinal uses.

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