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The Proximate and Mineral Composition of Ethanol Leaf Extract of *Rauwolfia Vomitoria*

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ABSTRACT

Herbal and natural products have been used in folk medicine for centuries throughout the world. This research was designed to determine the proximate and mineral composition of ethanol leaf extract of *Rauwolfia vomitoria*. This analysis was carried out using standard method.The result of proximate analysis indicated that carbohydrates (57.7%) > moisture (37.9%) > proteins (2.89%) > ash (1.09%) > fiber (0.04%) > fats (0.31). The results of mineral composition showed its magnitude of occurrence in the following order. K (140.525mg/100g) > Mg (130.625mg/100g) > Na (120.675mg/100g) >Ca (115.575mg/100g) > Zn (24.275mg/100g) > Cu (1.6mg/100g) > Fe (1.075mg/100g) > P (0.95mg/100g). The results obtained from this research indicated that *Rauwolfia vomitoria* could be used in treatment of many diseases and ailments due to the proximate and mineral contents of the plant.

Keywords: Proximate, Mineral, Composition, and *Rauwolfia Vomitoria.*

INTRODUCTION

It is widely believed that over 80% of people in developing countries use herbal medicines as their first line of choice in the treatment of diseases [1,2,3,4]. Despite advances in and availability of orthodox medicine, there is still a high patronage of traditional/herbal medicine for the treatment of mental and other disorders in Africa/Nigeria. In Africa, in general, and in Nigeria, in particular, about 80% of the population resorts to herbal remedies [5,6,7]. Plants are major source of therapeutic compounds and are the essential foundation of medicine since prehistoric time. Medicinal plants are important source of new chemical compounds with potential therapeutic effects [8,9]. Plants synthesize thousands of chemical compounds possessing different properties like defense against insects, bacteria, fungi, diseases and herbivorous mammals. Herbal and natural products have been used in folk medicine for centuries throughout the world. Some Indian medicines like Ayurveda, Sindha and Unani entirely and homeopathy to some extent, depend on plant materials or their derivatives for treating human diseases [10,11]. Medicinal plants are widely used in non-industrialized societies, mainly because they are readily available and cheaper than modern medicines. Medicinal plants have been discovered and used in traditional medicine practices since prehistoric times. There has been renewed interest in screening higher plants for novel biologically active compounds, particularly those that effectively intervene in human ailments in the field of chronic diseases [12]. Medicinal plants are the richest bioresource of drugs of traditional systems of medicine, modern medicines, nutraceuticals, food supplements, folk medicines, pharmaceutical intermediates, and chemical entities for synthetic drugs [13]. Medicinal plants, also called medicinal herbs, have been discovered and used in traditional medicine practices since prehistoric times. Plants synthesized hundreds of chemical compounds for functions including defense against insects, fungi, diseases, and herbivorousmammals. The earliest historical records of herbs are found from the Sumeriancivilisation, where hundreds of medicinal plants including opium are listed on clay tablets . Medicinal plants are widely used in non-industrialized societies, mainly because they are readily available and cheaper than modern medicines. The annual global export value of the thousands of types of plants with

suspected medicinal properties was estimated to be US$2.2 billion in 2012 [14,15]. In 2017, the potential global market for botanical extractsand medicines was estimated at several hundred billion dollars. In many countries, there is little regulation of traditional medicine, but the World Health Organization coordinates a network to encourage safe and rational usage. Medicinal plants face both general threats, such as climate change and habitat destruction, and the specific threat of over-collection to meet market demand [16,17]. *Rauwofia vomitoria* is a shrub found mainly in West Africa. The roots, leaves, and stem are used in medicine. It is a small tree or large shrub, growing to 8 m (26 ft) high. The branches grow in whorls, and the leaves grow from swollen nodes in groups of three. The leaf blades are broadly lanceolate or elliptical, tapering to a long point. The small, fragrant flowers are followed by globular red fruit. All parts of the plant, except the mature wood, contain latex [18]. It has been used across its range in traditional medicine [19]. The extract of the leaf is extensively used to treat diarrhoea, jaundice, venereal disease, rheumatism and snake-bites, and is also used to reduce colic or fever, to calm people with anxiety or epilepsy, and to lower blood pressure [20]. Proximate analysis is a way to determine the distribution of products when the samples are heated under specified conditions or the determination of the compounds contained in a mixture as distinguished from ultimate analysis, which is the determination of the elements contained in a compound [21,22,23]. The proximate system for routine analysis of animal feedstuffs was devised in the mid-nineteenth century at the Weende Experiment Station in Germany [24,25]. It was developed to provide a top level, very broad, classification of food components. The system consists of the analytical determinations of water (moisture), ash, crude fat (ether extract), crude protein and crude fibre. Nitrogen-free extract (NFE), more or less representing sugars and starches, is calculated by difference rather than measured by analysis.

Aim of the study

The aim of this study was to assess the proximate and mineral composition of ethanol leaf extract of *Rauwolfia vomitoria.*

Plate 1: The leaves of *Rauwolfia vomitoria*

MATERIALS AND METHODS

Methods

Preparation of the Plant Extract

The leaves of *Rauwolfia vomitoria* were harvested and washed under tap water to remove contaminants and air dried under shade. They were pulverized using laboratory milling machine and sifted using 0.25 mm sieve. One thousand five hundred gram (1500g) of the powdered leaf sample of *Rauwolfia vomitoria* was soaked in 7500 ml of ethanol for 48 hours with agitation. The resulting ethanol leaf extract was filtered using muslin cloth and evaporated to dryness using rotary evaporator at a temperature of 45^{0}C. The concentrated ethanol leaf extract of *Rauwolfia vomitoria* was used for subsequent analyses. Proximate Composition and Mineral contents of *Rauwolfia vomitoria* Coarse and Ethanol leaf Extract of *Rauwolfia vomitoria* were determined using the methods of [16] and [18].

Statistical Analysis

Results were expressed as mean± standard deviations where applicable. The data were subjected to one-way analysis of variance (ANOVA), followed by Post hoc Duncan multiple comparison test using SPSS software version 21 and $p < 0.05$ was regarded as significant.

RESULTS

The result of mineral content of *Rauwolfia vomitoria*

The results of mineral composition of *Rauwolfia vomitoria* as shown in figures 1 and 2 revealed the presence of the following minerals: Sodium, potassium, calcium, magnesium, copper, zinc, iron and phosphorous, with potassium having the highest value. The magnitude of occurrence of the minerals was in the following order. K (140.525mg/100g) > Mg (130.625mg/100g) > Na (120.675mg/100g) >Ca (115.575mg/100g) > Zn (24.275mg/100g) > Cu (1.6mg/100g) > Fe (1.075mg/100g) > P (0.95mg/100g).

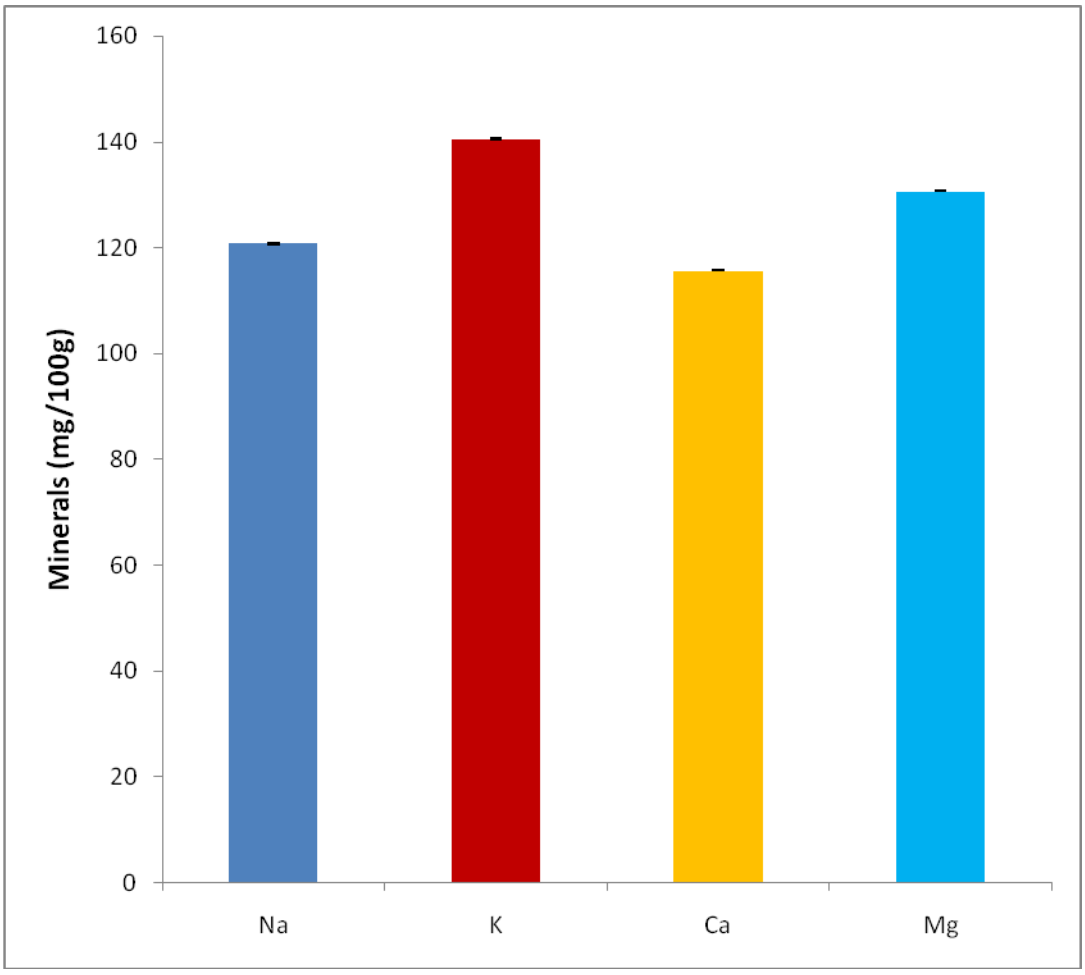

Figure 1: Mineral composition of *Rauwolfia vomitoria*. Results are presented as mean ±SD

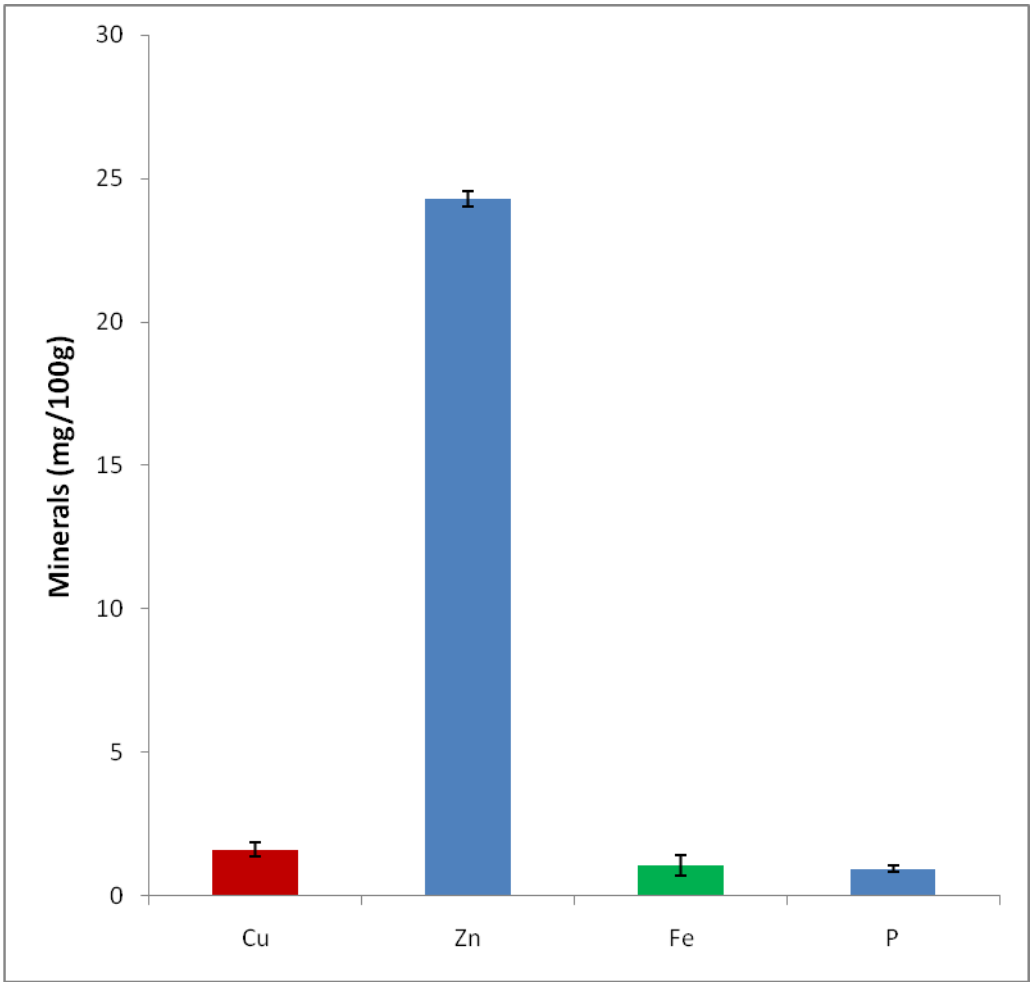

Figure 2: Mineral composition of *Rauwolfia vomitoria*. Results are presented as mean ±SD

Proximate composition of *Rauwolfia vomitoria*

Proximate composition of the leaf of *Rauwolfia vomitoria* shown in figure 3 revealed that the ethanol leaf extract of *Rauwolfiavomitoria* have high levels of carbohydrates (57.7%) and moisture (37.9%). The results indicated that carbohydrates (57.7%) > moisture (37.9%) > proteins (2.89%) > ash (1.09%) > fiber (0.04%) > fats (0.31).

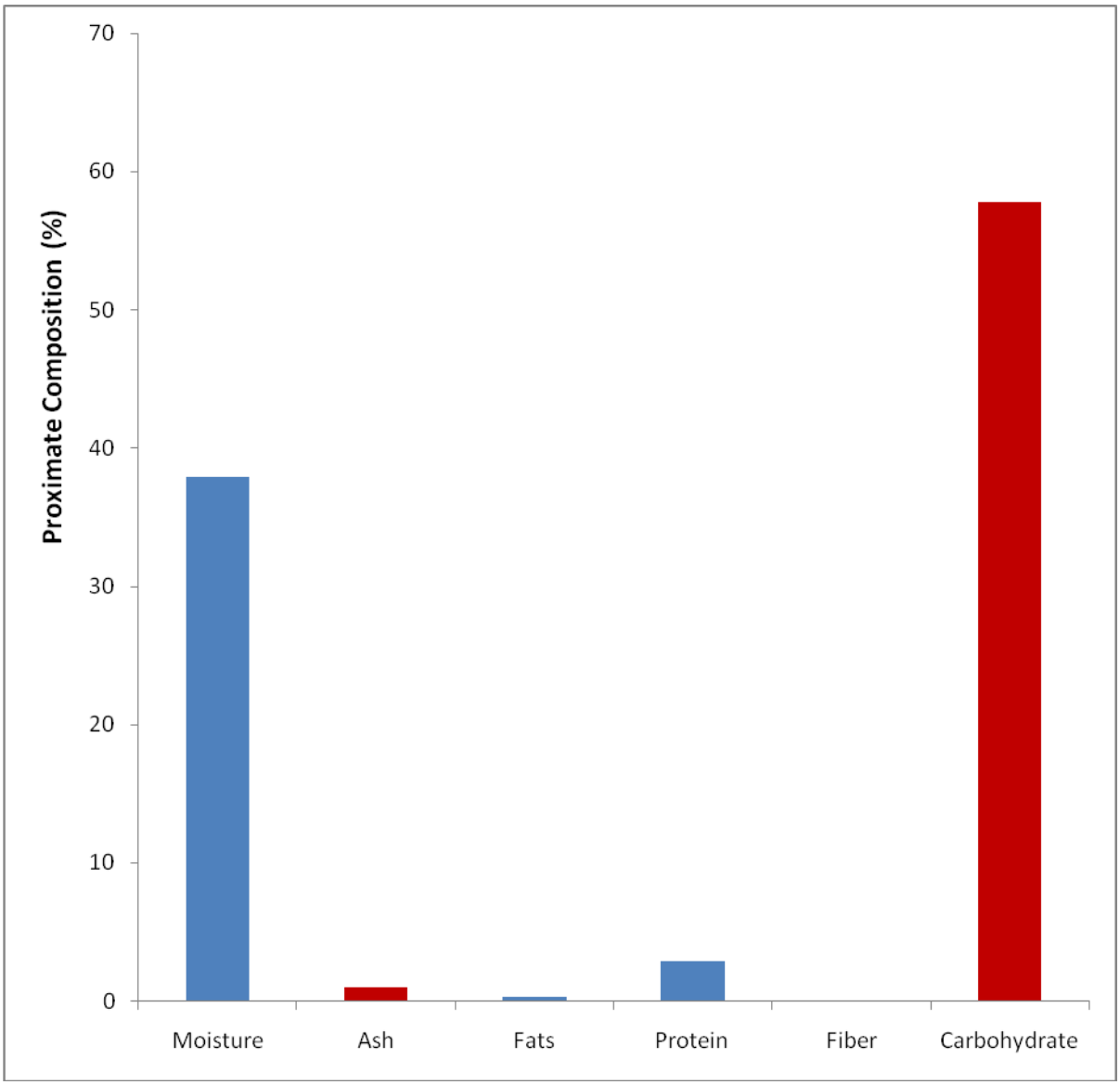

Figure 3: Proximate composition of *Rauwolfia vomitoria*. Results are presented as mean ±SD

DISCUSSION

The result of proximate content of *Rauwolfia vomitoria* leaf as presented in figure 3 showed that the plant is rich in carbohydrates, moisture, protein, ash, fats and fiber. Though the percentage of both fats and fiber are low, this result agrees with the work of [11]. From the proximate result, carbohydrates are known to be important components in many foods and the digestible

carbohydrates are considered an important source of energy. Our findings revealed that the selected leaf is a good source of carbohydrate with high energy values for human and livestock. As a nutritive value of food, fibers in the diet are necessary for digestion and for effective elimination of wastes, and can lower the serum cholesterol, the risk of coronary heart disease and hypertension [11]. Thus these medicinal plants can be considered as a valuable source of dietary fiber in human nutrition. [10], suggested a strong correlation between moisture contents and fiber, which could be of interest to human health as the fiber are easily digested and disintegrated. The result of mineral composition of *Rauwolfia vomitoria* as shown in figures 1 and 2 revealed the presence of the following minerals: K (140.525mg/100g) > Mg (130.625mg/100g) > Na (120.675mg/100g) >Ca (115.575mg/100g) > Zn (24.275mg/100g) > Cu (1.6mg/100g) > Fe (1.075mg/100g) > P (0.95mg/100g), with K (140.525mg/100g) having the higest value. These results agree with the earlier reported works of [11], which showed the presence of minerals in medicinal plants in appreciable amounts. Minerals are required for normal growth, activities of muscles and skeletal development, cellular activities and oxygen transport in the body [8].

CONCLUSION

The results obtained from this research indicated that *Rauwolfia vomitoria* can be used in treatment of many diseases and ailments in ethnomedicinal medicine because of its proximate and mineral contents.

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APPENDIX

Minerals (mg/100g)

Sodium	Potassium	Calcium	Magnesium	Copper	Zinc	Iron	Phosphorous
120.7	140.4	115.6	130.7	1.9	24.0	1.0	0.9
120.9	140.7	115.8	130.8	1.4	24.6	1.6	0.8
120.5	140.3	115.4	130.4	1.4	24.4	0.8	1.1
120.6	140.7	115.5	130.6	1.7	24.1	0.9	1.0

Proximate Composition (%)

CODE	Moisture %	Ash %	Fats %	Protein %	Fiber %	*Carbohydrate %*
Sample	37.941	1.014	0.310	2.897	0.055	57.783
Sample	37.948	1.012	0.317	2.896	0.041	57.765
Sample	37.933	1.002	0.318	2.893	0.042	57.812