Evaluation of the Mineral and Vitamin compositions of Leaves of *Thaumatococcus daniellii* and *Alchornea cordifolia*

ABSTRACT

The study was conducted to evaluate the vitamin and mineral compositions of leaves of *Thaumatococcus daniellii* and *Alchornea cordifolia* leaves. Standard methods were employed to determine the vitamin and mineral compositions of plant samples. Results obtained from the study showed that *T. daniellii* and *A. cordifolia* leaves contain considerable amount of vitamin B12 and B6 (7.87± 0.07 mg/100g) and (4.46 ± 0.02 mg/100g) respectively. However, both plant samples contain minimal amounts of vitamin B1 (1.07±0.01mg/100g) and (0.84±0.01 mg/100g) for *A. cordifolia* and *T.daniellii* respectively. Results on the mineral compositions of leaves of *T. daniellii* and *A. cordifolia* revealed that leaf of *T. daniellii* contains significant amount of calcium, phosphorus and potassium (6.15±0.03mg/100g) (5.75±0.12mg/100g) and (5.30±0.14mg/100g) respectively. However, reverse observation was made for *A. cordifolia* (1.79±0.12mg/100g), (4.58±0.13mg/100g) and (2.32±0.05mg/100g) respectively. In conclusion, it can be deduced from this study that both *T. daniellii* and *A. cordifolia* have the potential to offer extra value in addition to their conventional usage in the treatment of certain disease conditions even though there may variation in their potentials to offer these values

Keywords: vitamin, mineral, *T. daniellii*, *A. cordifolia*

INTRODUCTION

T. daniellii, also known as the sweet prayers plant is a tropical rain forest, large rhizomatous flowering herb. The height of a fully grown *T. daniellii* plant is about 3-4cm bearing some large papery leaves of about 46cm long with pale purple flowers and soft fruits containing a number of shiny black seeds (Benthan *et al*. 2014).

The usefulness of *T. daniellii* in the treatment of diverse diseases ravaging mankind cannot be overemphasized. In traditional medicine, the leaf sap of this plant has been used as an anti-dote against venoms, stings and bites, while the leaf and root sap have been used successfully as sedatives as well as in the treatment of mental illness (Onwueme *et al*. 1979).

Alchornea cordifolia, commonly known as the Christmas Bush is a medium-sized shrubby tree belonging to the family Acalypholdeae mostly found in marshy areas along the coastal regions of West Africa. The leaves of this plant have been used extensively in the treatment of diseases such as pain, rheumatism, and arthritis, pile, toothache and inflammation (Osadebe and Okoye, 2003).

Although *T. daniellii* and *A. cordifolia* have been used in the management of diverse disease conditions, their core values can only be defined by the extra benefits derivable with their usage as medication which may not obtainable with the conventional medications with similar therapeutic capacity. Thus, effort to holistically unveil the true values of these plants as a source of medication for the ever increasing human population should without reservation involve thorough evaluation of the micro nutrients contents of leaves of these important plants their considering indisputable roles in cellular metabolism, growth and function.

MATERIALS AND METHODS

Collection of Plant Material

300g of fresh mature leaves of *T. daniellii* and *A. cordifolia* used for the study were identified at the herbarium unit of Department of Forestry, Micheal Okpara University of Agriculture Umudike, Abia State Nigeria. The leaves were thoroughly washed with tap water, spread on a flat surface in the laboratory and allowed to dry at room temperature. Dried leaves were pulverized and stored in an airtight container prior to analysis.

Vitamin Analysis

The vitamins in *T. daniellii and A. cordifolia* were determined by the official methods of the Association of Official Analytical Chemists (AOAC, 1990).

Determination of Minerals

Five grams each of *T. daniellii* and *A. cordifolia* leaf samples were dry ashed in an electric furnace at 550^{o}C for a period of 24h. The resulting ash was allowed to cool in desiccators prior to being dissolved in 2ml of concentrated hydrochloric acid followed by the addition of five drops of concentrated HNO_3. The resulting solution was placed in boiling water bath and evaporated almost to dryness. The content upon being transferred into volumetric flask was diluted by the introduction of 100ml of deionized water. Suitable dilutions were made for each of the minerals prior to analysis by the using atomic absorption spectrophotometer (AOAC, 1990).

RESULT

Table 1: Vitamin Compositions of Leaves of *T. daniellii and A. cordifolia*

Vitamins	***T. daniellii***	***A. cordifolia***
	compositions (mg/100g)	
A	3.00 ± 0.09	2.27±0.09
B1	1.07±0.01	0.84±0.01
B3	1.32±0.02	3.30±0.12
B5	1.11±0.02	0.36±0.03
B6	1.34±0.02	4.42±0.02
B12	7.87±0.07	2.62±0.01
C	2.25±0.22	0.34±0.02

Values are expressed as mean± standard error of mean of three determinations

Table 2: Mineral Compositions of Leaves of *T. danielli and A. cordifolia*

Minerals	***T. daniellii***	***A. cordifolia***
	compositions (mg/100g)	
Calcium	6.15±0.03	1.79±0.12
Phosphurus	5.75±0.12	4.58±0.13
Potasium	5.30±0.14	2.32±0.05
Zinc	1.42±0.02	0.90±0.04

Values are expressed as mean± standard error of mean of three determinations

DISCUSSION

Table 1 shows the vitamin compositions of *T.daniellii* and *A. cordifolia* leaves. Results generated from the analysis carried out on plant samples show that leaf of *T. daniellii* contains higher vitamin B12 content (7.87±0.07mg/100g) than other vitamins reportedly present in leaf of both *T.daniellii* and *A. cordifolia*. Similarly, vitamin B6 was found to be higher (4.42±0.02mg/100g) than all other vitamins reported for both *A. cordifolia* and *T. daniellii* leaves but was still lower than B12 earlier reported for *T.daniellii*. However, both plant samples contain minimal amounts of vitamin B1 (1.07±0.01mg/100g) and (0.84±0.01 mg/100g) for *A. cordifolia* and *T.daniellii* respectively. Results from this study are consistent with the findings of Shalom *et al* (2017) and Ezeokeke *et al* (2015) which have demonstrated the antioxidant property of *T. daniellii* and *A. cordifolia* leaves which may be attributed to their rich vitamins B12 and B6 content respectively.

Table 2 shows the mineral compositions of *T.daniellii* and *A.cordifolia* leaves. The outcome of the analysis shows that calcium, phosphorus and potassium were higher in *T. daniellii* leaf sample (6.15 ±0.03mg/100g), (5.75±0.12mg/100g) and (5.30±0.14mg/100g) respectively than those of *A. cordifolia* (1.79±0.12), (4.58±0.13), (2.32±0.05) respectively. However, zinc was considerably low (1.42±0.02 mg/100g) and (0.90±0.04 mg/100g) in the leaves of both *T.daniellii* and *A. cordifolia* respectively. These results is in tandem with the finding of Ngaha *et al* (2016) and Shalom *et al* (2014) which showed that the bark of *Alchornea cordifolia* is rich in minerals and *T. daniellii*, a dependable source of minerals particularly calcium, magnesium and phosphorus.

CONCLUSION

Although more emphasis are laid on the use of conventional synthetic drugs in the treatment of diverse human diseases, It is important to give certain medicinal plants their pride of place in the health care system primarily owing to their multiple potential to serve as drugs and sources of cofactors and co-enzymes required by some of the drug metabolizing enzymes. *T. daniellii* and *A. cordifolia* have been proven through this research to be some of the very few medicinal plants with multiple potentials to function both as therapies for numerous human diseases as well as sources of supporting machineries for the drug metabolizing enzymes.

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