

Determination of Proximate and Vitamin Compositions of *Blighia unijugata* Leaves

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Abstract: The proximate and vitamin compositions of *Blighia unijugata* leaves were investigated using spectrophotometric methods. The results showed high carbohydrate (41.31%) and protein (24.13%) contents and relatively low percentage levels of fiber (12.61%), moisture (12.13%), ash (6.02%) and fat (3.80%). The results also recorded high concentrations of retinol (24.15±0.05 mg/100g) and ascorbic acid (14.64±0.02) with low concentrations of thiamine (0.22±0.01 mg/100g) and riboflavin (0.31±0.01). The high concentrations of some of the vitamins indicated that *Blighia unijugata* leaves could serve as a good source of some vitamins in human nutrition.

Key words: Proximate • Vitamins • *Blighia unijugata* Leaves

INTRODUCTION

Plants have been used by human beings for medicinal purposes and even in modern times have formed the basis of many pharmaceuticals in use. Plants produce a vast array of secondary metabolites as defense against environmental stress or other factors like pest attacks, wounds and injuries. The complex secondary metabolites produced by plants have found various therapeutic uses in medicine from time immemorial [1]. Plants have the ability to synthesize a wide variety of chemical compounds that are used to perform important biological functions and to defend against attack from predators such as insects, fungi and herbivorous mammals [2].

Blighia is a genus of four species of flowering plants in the soapberry family, Sapindaceae, native to tropical Africa from Guinea east to Kenya. The fruit is partly edible with the Ackee being grown commercially for fruit production. The genus is named from Captain William Bligh (formerly of the HMS Bounty), who brought samples back to England [3]. The species are evergreen trees growing to 10-20 m tall, with pinnate leaves. The flowers are produced in small panicles. The fruit is an oval capsule 4-8 cm long containing three seeds,

each surrounded by an edible fleshy yellow aril and a thick, leathery orange or red skin; the fruit, apart from the aril, is very poisonous [4]. *Blighia* comprises three species and is restricted to tropical Africa. *Blighia unijugata* can be distinguished from the other two species by its leaflets having tufts of hairs in the axils of lateral veins and its fruits which are up to 3 cm long (at least 4 cm long in the other species) [5].

Vitamin is an organic compound and a vital nutrient that an organism requires in limited amounts. An organic chemical compound (or related set of compounds) is called a vitamin when the organism cannot synthesize the compound in sufficient quantities and must be obtained through the diet; thus, the term "vitamin" is conditional upon the circumstances and the particular organism. For example, ascorbic acid is a vitamin for humans, but not for most other organisms. Supplementation is important for the treatment of certain health problems [6].

Proximate analysis studies the evaluation of plants. Plants are considered basic nutritional sources as they contain protein, carbohydrates, fats, oils, minerals, vitamins and water which are obligatory for growth and development in humans and animals [7].

The work investigated the proximate composition and vitamin contents of *Blighia unijugata*.

MATERIALS AND METHODS

Materials: Fresh *Blighia unijugata* leaves were gotten from Abakaliki in Ebonyi State, Nigeria. All chemicals and reagents were of analytical standard.

Methods: The methods of Association of Official Analytical Chemists AOAC, [9] were used for proximate analysis. The methods of Okwu and Josiah [10] were used for determination of thiamine, riboflavin, niacin and retinol while determination of ascorbic acid, calciferol and tocopherol were done by the methods of Osborne and Voogt [11].

RESULTS DISCUSSION AND CONCLUSION

The quantitative determination of vitamin composition of *Blighia unijugata* leaves revealed that the leaves contained some vitamins. The results of the study showed high concentrations of retinol and ascorbic acid and low concentrations of thiamine and riboflavin (Fig. 3). The concentration of retinol in *Blighia unijugata* leaves was higher than the result obtained by Olayiwola [12] from the leaves of *Bambusa vulgaris*, but lower than the result obtained by Alanguho *et al.* [13] from the leaves of *Azadirachta indica*. The presence of retinol in high concentration could indicate that the leaves would be good for growth and development, maintenance of immune system and good vision [14 and 15]. The concentration of thiamine in *Blighia unijugata* leaves is lower than the result obtained by Ogbonna *et al.* [16] from the leaves of *Tetracarpidium conophorum*. This could also indicate that the plant does not contain appreciable amount of thiamine. Thiamine functions as coenzyme in the metabolism of carbohydrate [17]. The result showed that the *Blighia unijugata* leaves do not contain appreciable value of riboflavin. There was also an appreciable amount of niacin. The concentration of niacin was consistent with the result obtained by Olayiwola [12] from the leaves of *Bambusa vulgaris*.

Quantitative determination of proximate compositions revealed that the carbohydrate content of *Blighia unijugata* leaves was high (41.31%) (Fig. 2). However, the carbohydrate content of *Blighia unijugata* was higher than that of *Amaranthus hybridus* (52.18%) [18].

The analysis showed a protein content of 24.13%. This concentration was higher than that (3.3%) recorded by the USDA Nutrient Database for Standard Reference



Fig. 1: *Blighia unijugata* plant [8]

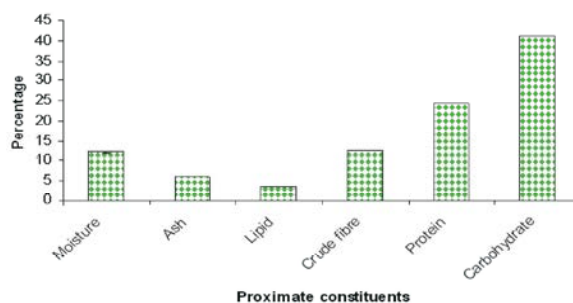


Fig. 2: Proximate compositions of *Blighia unijugata*

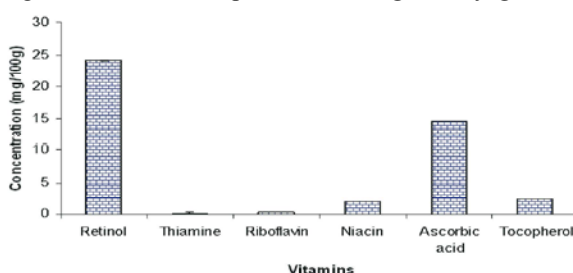


Fig. 3: Vitamin compositions of *Blighia unijugata*

[19]. The protein value of *Blighia unijugata* confers on it the advantage as a rich source of vegetable protein over raw cocoyam leaf (3.4%), cooked cocoyam leaf (2.1%), *Amaranthus* (6.1%) and *Moringa oleifera* (4.2%) as reported by Adepoju *et al.* [20].

The moisture content was found to be 12.13%. The observed concentration might imply that *Blighia unijugata* could have a long shelf life since microorganisms that cause spoilage thrive in foods having high moisture content and also is indicative of low total solids Adepoju *et al.* [20]. Ekumankama [21] reported high moisture values for “oha” (83.75%), “nturukpa” (80.75%) and “okazi” (83.75%).

Fiber content was 12.61%. The concentration was higher than “oha” (*Pterocarpus soyauxii*) (13.1%) Ekumankama [21]. According to Gates [22], a number of studies have indicated that components of plants such as dietary fiber have beneficial effects in lowering blood

cholesterol levels aside from the decreased intake of saturated fat and cholesterol that occurs with high intakes of plant foods.

It was observed that ash content was relatively low (6.02%) The value of ash content was found to be lower than the values reported in leaves of *Talinum triangulare* (20.05%), *Ipomea batatas* (11.10%), *Vernonia colorate* (15.86%) and *Moringa oleifera* (15.09%) [17]. Ukam [7] stated that the lower the ash content, the higher the nutrient quality.

In conclusion, the results of the study confirmed that the leaves of *Blighia unijugata* contain substantial amounts of some nutrients and vitamins.

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