Phytochemical Analysis and Proximate Composition of the Leaves of *Gongronema latifolium*

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**Abstract:** The phytochemical and proximate compositions of the dried leaves of *Gongronema latifolium* were analyzed using the methods of Association of Official Analytical Chemists (A.O.A.C). The results of proximate composition showed that the leaves contained moisture (11.13±0.01%), crude protein (33.60±0.00%), carbohydrate (38.55±0.00%), crude fat (3.41±0.01%), crude fibre (4.20±0.01%), ash (9.11±0.01%) and energy (327.44±0.00 kcal/100g). The phytochemical constituents of the leaves recorded the following: saponins (18.11±0.01%), tannins (16.23±0.00%), cyanide (14.32±0.00%), phenols (11.11±0.01%), flavonoids (11.13±0.01%) and alkaloids (0.12±0.00%). The results showed that *Gongronema latifolium* leaves possess moderate concentrations of carbohydrate, protein, saponins, tannins and least levels of alkaloids and fat content.

**Key words:** Phytochemicals • Proximate Composition • *Gongronema Latifolium*

**INTRODUCTION**

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 [1]. Chemical compounds in plants mediate their effects on the human body through processes identical to those already well understood for the chemical compounds in conventional drugs; thus herbal medicines do not differ greatly from conventional drugs in terms of how they work. This enables herbal medicines to be as effective as conventional medicines, but also gives them the same potential to cause harmful side effects [2].

The term medicinal plants include various types of plants used in herbs and some of these plants have medicinal activities. These medicinal plants are considered as rich sources of ingredients which can be used in drug development and synthesis [3]. Medicinal plants are important sources of drugs for the treatment of several ailments. These plants can be used alone or combined with other plants. The medicinal value of plants lies in some chemical substances that produce a definite physiological action on the human body. The most active of these bioactive compounds (phytochemicals) of plants are alkaloids, flavonoids, tannins and phenolic compounds. Phytochemicals are chemical compounds that occur naturally in plants and which may affect health and are not yet established as essential nutrients [4]. Phytochemicals give plants their colour, flavour, smell and texture and they also work to affect antioxidant activity, hormonal action, stimulation of enzymes, interference with DNA replication and antibacterial effect among others [5]. Medicinal plants have been identified and used throughout human history. A great number of the world’s populations, particularly Nigerians, rely on traditional medicines for their primary health care needs [6].

*Gongronema latifolium* is a non-woody herbaceous plant from the family of asclepiadaceae. It is widespread in the tropical and subtropical regions, especially in Africa and South America, with a moderate representation in Northern and South-Eastern Asia [7]. In South Eastern and South Western Nigeria, *Gongronema latifolium* is commonly called “utazi” and “arokeke” respectively [8,9]. *Gongronema latifolium* is utilizable in many different ways in different places to prepare delicacies in homes and is primarily used as a spice and vegetable in traditional folk medicine. In many situations it is part of herbal prescriptions or preparations administered by herbalists for treatment and or management of certain health challenges. *Gongronema latifolium* is consumed fresh, cooked or dried and applied as powdery spice. Whichever way, it carries a moderate bitter taste that contributes tremendously to its flavour. This work investigated the phytochemical constituents and the proximate composition of the fresh leaves of *Gongronema latifolium*. 

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MATERIAL AND METHODS

Materials: Gongronema latifolium fresh leaves were collected from Onicha local government area of Ebonyi State in the month of October. All chemicals and reagents were of analytical standard.


RESULTS AND DISCUSSION AND CONCLUSION

The phytochemical results showed that the leaves of Gongronema latifolium had a high concentration of saponins (18.11%) followed by tannins (16.23%), cyanides (14.32%), flavonoids (11.13%) and phenols (11.11%); while alkaloids (0.12%) had the least concentration (Fig. 2). A report on the phytochemical composition of dried leaves of Gongronema latifolium also showed that saponins had the highest concentration (18.2%), followed by cyanides (17.0%), tannins (16.1%), phenols (12.0%) and flavonoids (11.0%) while alkaloids (0.11%) had the least concentration [12]. Osuagwu et al. (2013) [1] reported also high concentrations of saponins (38.0%), tannins (30.0%), flavonoids (23.4%) and alkaloids (10.0%) in the fresh leaves of Gongronema latifolium. Lower concentrations of saponins (0.66%), tannins (2.04%), cyanides (13.20%) and alkaloids (1.97%) were reported on the phytochemical composition of dried leaves of Vernonia amygdalina [13]. Alkaloids, steroids and phenols were found in higher concentrations in the leaves of Terminalia catappa [14]. However, the different drying techniques used during the processing of these samples may account for the variations observed in these results [15].

Saponins and flavonoids are known to have anti-diabetic property [16]. The significant levels of saponins and flavonoids obtained in this study may account for the hypoglycemic activity of ethanol extract of Gongronema latifolium leaves [17]. The phytochemical analysis of the powdered leaves of Psidium guajava showed high concentrations of saponins and glycosides with moderate levels of flavonoids [18]. Also the presence of saponins and alkaloids in the leaves of Gongronema latifolium may account for the bitter and astringent taste of the leaves [1], which has been reported by Ugochukwu et al. (2003) [8] in the use of the bitter vegetable (Gongronema latifolium) as substitutes for commercial hops in lager beer production. The presence of these phytochemicals gives an insight on the medicinal properties of Gongronema latifolium leaves.

The proximate analysis showed that the leaves of Gongronema latifolium contained carbohydrate which had the highest concentration (38.55%) followed by protein (33.60%), moisture content (11.13%), ash content (9.11%) and crude fibre (4.22%); while fat content (3.41%) had the least concentration (Fig. 3). Mensah et al. [15] reported high concentrations of moisture and crude fiber (18.5%) in the fresh leaves of Gongronema latifolium. Asaolu et al. [9] reported almost the same concentrations of moisture (11.05%), ash (9.01%), crude fibre (4.02%) and fat content (3.51%), with lower carbohydrate concentration (5.81%) and higher protein concentration (66.60%) in their report on proximate composition of dry leaves of Gongronema latifolium. The caloric value of Gongronema latifolium was 327.44 kcal/100g which is higher than 58.46 kcal/100g reported for Brassica oleracea Embeu and Anyika [13] and lower than 360.55kcal/100g for Cymbopogon citratus Asaolu et al. [9]. The leaves of Terminalia catappa recorded high levels of carbohydrate and fat with low levels of protein and ash while Gmelina arborea...
leaves showed high carbohydrate, protein, moisture, fibre, ash and low fat content Offor et al. [5]. However, the differences observed in these results may be attributed to different drying techniques used during the processing of these samples Dzowela et al. [12].

In conclusion, the phytochemical analysis of the leaves of Gongronema latifolium showed that the leaves contained saponins, tannins, phenols, flavonoids and cyanides in moderate concentrations, while alkaloids had the least concentration. The proximate composition also showed that the leaves contained significant concentrations of protein and carbohydrate. The results suggest that Gongronema latifolium leaves could serve nutritional and medicinal purposes.

REFERENCES


