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PHYTOCHEMICAL CONTENTS OF *Allanblackia floribunda* Oliv. (Guttiferae) LEAVES USE AS COMPONENTS OF HUMAN AND ANIMAL ETHNO-MEDICINE IN NIGERIA

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ABSTRACT
A study of the phytochemical properties of *Allanblackia floribunda* leaves from different locations: Ikwuano L.G.A. in Abia State, Ikom L.G.A. in Cross River state and Eleme L.G.A. in Rivers State in the Southern Nigeria was carried out in a quest to evaluate their potentials as sources of alternative medicine as well as uses in other industrial application. Leaves samples were analysed in the laboratory to determine their phytochemical properties. The results obtained showed that alkaloid: 1.07%, 0.97%, 1.29%; phenol: 0.88%, 0.70%, 1.11%; flavonoid: 0.88%, 0.70%, 1.02%; tannin: 0.12%, 0.13%, 0.13%; saponin: 0.17%, 0.24%, 0.13% were tested for Ikwuano, Ikom and Eleme *Allanblackia floribunda* leaves respectively. The Anova results of the phytochemical properties of the leaves samples studied showed significant differences ($P<0.05$) in phenol, flavonoid and saponin. However there were no significant differences in alkaloids and tannin of Allanblackia leaves from Ikwuano, Ikom and Eleme. HCN also varied significantly. The presence of these wide ranges of phytochemicals was seen as conferring potentials of pharmaceutical values to the plant and could be exploited for pharmaceutical uses.

Keywords: Allanblackia floribunda leaves, phytochemical properties, ethno-medicine, and Southern Nigeria

Introduction

Many indigenous Nigerian trees species, which have little importance as timber trees, are becoming increasingly recognized as valuable sources of raw materials for various food and industrial uses. These uses include; extraction of vegetable oils from the seeds for various purposes, alkaloids from several parts of the plants for medicinal purposes and fibre for pulp. In Nigeria and other countries in Africa, there are several forest plant species which have leaves and other important parts from which medicines and other important substances could be produced. Several varieties of plants which occur in the forest are known to have chemical and nutritional substances. *Allanblankia floribunda* is an evergreen tree found in the rainforest. Its fruits are large, up to 30 cm long and 10 cm in diameter containing seeds in translucent mucilage. Ayoola *et al*., (2008), the decoction of the bark is taken for dysentery and mouthwash in Gabon; stomach ache in Congo, and a decoction of the bark or the leaves is also taken for cough, asthma, bronchitis and other bronchial infections. A decoction of the whole fruit is used in Ivory Coast to relieve scrotal elephantiasis. The decoctions of the leaves and fruits have also been reported for use in the treatment of malaria and toothache (Burkill, 1984; Odugbemi, 2006). Consequently, the species is one of the most commonly used medicinal plants in Cameroon (Laird, 1996) and possibly has greater pharmaceutical potential. Guttiferone F, an HIV-in hibitor, was found in extracts of *Allanblackia stuhlmannii* (Fuller *et al*., 2003). The fatty substance of the seeds is mildly purgative. The seeds contain a fat that is solid at ambient temperature. The kernel, which makes up about 60% of seed, contains about 72% fat. The fatty acid composition of the fat is approximately: stearic acid 45-58% and oleic acid 40-51%. Its composition and relatively high melting point (35^0C) makes the fat a valuable raw material that can be used without transformation to improve the consistency of margarine, cocoa butter substitutes and similar products. *Allanblackia floribunda* leaves can be managed to provide better and more nutritionally balanced food inputs particular during lean seasons and periods of vulnerability and deliver ecosystem services for leaves production (Bhaskar, 2015). This study aims at investigating the phytochemical contents

of *Allanblackia floribunda* leaves as component of human and animal ethno-medicine.

Materials and Methods

Allanblackia floribunda leaves were sourced from three states in southern Nigeria: Ikwuano in Abia State, Ikom in Cross River State and Eleme in Rivers State. The three states lie approximately within Latitude $4^{0}40^{1}$ and $6^{0}14^{1}$N and Longitude $7^{0}10^{1}$ and $8^{0}02^{1}$E. They have similar weather conditions which include rainy and dry seasons. The rainfall pattern of the areas is that of bimodal distribution. The rainy season is from April to October while the dry season is from November to March. Annual range of temperature is 20^{0}C (68^{0}F) to30^{0}C (86^{0}C) with a mean of 25^{0}Cwhile relative humidity is 60-80%; mean daily sunshine hours is between three to six hours and may sometimes fall to two hours in the wet season (N.R.C.R.I. 2008).

Sample Collection

Leaves of *A. floribunda* were collected from young *A. floribunda* plants of four years old from Ikwuano in Abia State, Ikom in Cross River State and Eleme in Rivers State. The leaves were thoroughly washed and dried fourteen days under room temperature after which they were taken to the National Root Crops Research Institute Central Laboratory for laboratory analysis to determine their phytochemical properties.

Qualitative Analysis of Phytochemical properties *A. floribunda* leaves

The qualitative analysis of tannin was carried out using the ferric chloride test as described by BeMiller (2003). A blue or greenish black precipitate was indicative of the presence of tannin in the test sample. The test was conducted against a blank control consisting of water and ferric chloride. For the saponins, it was done using the saponin froth test. The presence of a steady froth was observed indicating the presence of saponins. The presence of flavonoids in the test sample was determined by the acid alkaline test described by BeMiller. The formation of a yellow colouration indicated the presence of flavonoids. The presence of alkaloids in the test sample was investigated using the Mayer's colourmetric method as described by BeMiller. The formation of an orange precipitate/colour showed the presence of alkaloids. The presence of green, blue or black colouration indicated presence of phenol.

Quatitative Analysis of Phytochemical properties *A. floribunda* leaves

Alkaloid was determined by the alkaline precipitation gravimetric method described by BeMiller (2003). Flavonoids was determined gravimetrically using the method describe by BeMiller (2003). Tannin was determined by Follin Dennis spectrophometric method as described by Pearson (1976). Saponin content of the sample was determined by the double extraction gravimetric method as described by BeMiller (2003). The phenol content was determined by Follins method described by Pearson (1976).

Results and Discussion

The result of qualitative Analysis of Phytochemical properties *A. floribunda* leaves, Table 1 showed that alkaloid, phenol, flavonoid, tannin and saponin are present in *A. floribunda* leaves. Table 2 shows the phytochemical contents of the leaves from the three locations: Ikwano, Abia state, Ikom Cross River and Eleme, Rivers state. There was no significant difference ($p<0.05$) in alkaloid contents of the leaves from the three locations. Alkaloids consist of chemical compounds that contain mostly basic nitrogen atoms which occur naturally, mainly, in plants but may be produced by bacteria, fungi, and animals. According to literature, alkaloids have a wide range of pharmacological activities including antimalarial (quinine), anticancer (homoharringtonine) (Kittakoop *et al*., 2014), antibacterial (chelerythrine) (Cushnie *et al*., 2014) and antihyperglycemic activities (piperine) (Qiu *et al*., 2014). Other alkaloids possess psychtropic (psilocin) and stimulant activities (cocaine, caffeine and nicotine) and have been used as recreational drugs (Qiu *et al*., 2014). Although alkaloids carry out many metabolic activities in humans and other animals, they almost uniformly evoke a bitter taste (Rhoades, 1979). Alkaloids are bio-active phytochemicals that has been known for a length due to its toxicity and ability to cause change in body physiology. However, Edeoga and Eriata (2001) assumed that alkaloids are recognized more for their pharmacological activities than their toxicity.

While the phenol (1.11±0.03%) and flavonoid (1.02±0.05%) contents are significantly higher at ($P<0.05$) for leaves samples from Eleme, there is no significant differences in the tannin property for the leaves from the three locations. Phenols are antioxidants in human and plants (Dillard and German, 2000). Flavonoids are known to have antioxidant effects and have been shown to inhibit the initiation, promotion, and progression of tumors (Kim *et al*., 1994); reduction of coronary heart disease has been reported to be associated with intake of flavonoid (Hertog *et al*., 1993). Apart from the antioxidant properties of flavonoid, other biological functions it possesses include protection against platelet aggregation, microorganisms. Tannin is one of the major active ingredients found in plant based medicines (Haslam, 1996); it serves as caustics for cationic dyes (tannin dyes) used in the dyestuff industry as well as in the production of inks. Other

uses of tannin are for wine, fruit juice, and beer clarification in food industries (Würdig and Woller, 1989). Tannins are used in textile dyes, antioxidants in beverages, and coagulant in rubber production (Falbe *et al*., 1995) as well as possessing antiviral, antibacterial, and antitumor activity (Halsam, 1996; Khanbabaee and van Ree, 2001; Kakiuchi *et al*., 1986). Tannin has been reported to selectively inhibit HIV replication (Kashiwada *et al*., 1992). Therefore, *Allanblackia floribunda* leaves have potential in the provision of tannin. Appreciable quantities of saponin are found in *Allanblackia floribunda* as shown in Table 2. Saponin protects against microbial attack in plants; it is also useful in treating yeast and fungal infection (Sheikh *et al*., 2013).

The flavonoid content was highest in the leaves from Eleme Rivers state (1.02±0.05%) and lowest in the leaves from Ikom, Cross River State (0.70±0.02%). The leaves from Ikwuano, Abia State contained (0.88±0.04%) Flavonoid. The Hydrogen Cyanide content was highest (10.96mg/kg) in Eleme, Rivers State. Although the content of the toxic substances varied significantly in the leaves from the different locations, observed that their variations were below the critical level of 500mg/kg (Onwuka, 2005). Generally, the phytochemical contents of the leaves showed variation in their concentrations in the different leaf samples from the different areas. Comparatively, the phytochemicals were significantly higher in the Rivers State sample than those of Abia State and Cross Rivers State samples respectively. Interestingly, the levels of these constituents in the plant leaves vary with locations and this were attributed to possible agronomic factors since the soil is the basis of plant life and nutrients. Also, on a general view, the different phytochemicals contained in the leaves suggest a high potentials of the leaves to be useful in ethno medical formulas. This is so since the efficacy of the leaves extract in traditional medicine is a function of their phytochemical composition Sofowara (2008).

Conclusion

It was concluded based on the obtained result that the leaves of *A. floribunda* contained appreciable levels of phytochemicals, some of which are regarded as antimutants while there are others which have been established to possess health benefits with antimicrobial activities and antihelminthes, anti parasite and anti oxidant activities.

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Table 1: Qualitative phytochemical screening result of *A. floribunda* leaves samples

Phytochemical	**Qualitative screening**
Alkaloid	+
Phenol	+
Flavoniod	+
Tanin	+
Saponin	+

+ = present

Table 2: Statistical analysis of the phytochemical properties of *A. floribunda* leaves samples

Locations	**Alkaloid (%)**	**Phenol (%)**	**Flavoniod(%)**	**Tanin (%)**	**Saponin (%)**	**HCNmg/kg**
Ikwuano	$1.07^{a}\pm0.04$	$0.88^{b}\pm0.04$	$0.88^{b}\pm0.04$	$0.12^{a}+0.00$	$0.17^{a}\pm0.01$	$5.98^{b}\pm0.58$
Ikom	$0.97^{a}\pm0.02$	$0.70^{c}\pm0.02$	$0.70^{c}\pm0.02$	$0.13^{a}\pm0.00$	$0.24^{b}\pm0.62$	$5.82^{c}\pm0.63$
Eleme	$1.29^{a}\pm0.28$	$1.11^{a}\pm0.03$	$1.02^{a}\pm0.05$	$0.13\ ^{a}\pm0.00$	$0.13^{a}\pm0.00$	$10.96^{a}\pm0.58$

$^{a-c}$ mean in the same column with different superscripts are significantly different ($p<0.05$)