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Phytochemical Screening for Active Compounds in *Canarium schweinfurthii* (*Atile*) Leaves from Jos North, Plateau State, Nigeria

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Abstract: *Canarium schweinfurthii* (*Atile*) leaves from Lamingo Area of Jos North Local Government Area of Plateau State were screened for the presence of chemically active compounds by standard methods. The results revealed the presence of the following compounds: Saponins, Tannins, Cardiac glycoside, Steroids and Flavonoid. Alkaloid and anthraquinone were not detected from the leave extract. We recommend further research work on this plant leaves for possible use as a source of raw material for industrial and medical science utilization.

Key words: *Canarium schweinfurthii* leaves, ethanol extract, active compounds

INTRODUCTION

Plants could be described as a wonderful kitchen or chemical cabinets filled with attractive things. They are known to contain food and mixture of extraordinary chemicals, some of which act beneficially to human and others may have detrimental effects. From many wild plant species, nothing is known as regard their chemical make up beyond the fact that most contain carbohydrate, fats, protein and chlorophyll. *Canarium schweinfurthii* sp. which belong to plant Kingdom-plantae; Division: magnoliophyta; Class: magnoliopsida; Order: sapindales; Family: burseraceae and Genus: canarium is a tree growing in the equatorial forest region and is widely distributed in tropical Africa, predominantly across East, Central and West Africa (Keary, 1989). The tree is up to 36.6 m high with very slight blunt buttress. A cut on it bark copiously exudes gum which solidifies to a whitish resin; the flowers are creamy white and a ripe fruit is dark brown/purplish plum like containing a hard shaped trigonous stone. The purplish ripe fruits are common in the forest zone, while, the dark-brown fruits are common on the savannah region. The fruit pulp contains 30-50% oil used as essential oil and known to have analgesic effect (Agbo *et al*., 1992; Koudeu *et al*., 2005). The leaves are used as stimulant; against fever, malaria, constipation, diarrhoea, post-partum pain, rheumatism and sexually transmitted diseases (Koudou *et al*., 2005; Ake-Assi and Guinko, 1991). However, not much is known about the chemical composition of this plant leaves. The plant is found abundantly across the middle belt region of Nigeria. The aim of this study was to determine the phytochemical properties of *Canarium schweinfurthii* leaves found in the savannah region of Nigeria and the possible use of its chemical composition in industries and in medical sciences.

MATERIALS AND METHODS

Plant materials: *Canarium schweinfurthii* (Hausa name: Atile) leaves were collected in December 2007 and January 2008 from Lamingo area of Jos North Local Government, Plateau State, Nigeria and were allowed to air dry out in the room. A voucher specimen was deposited at the Botany Department of the University of Jos. Verification of identity was done by Professor Husein, Curatur of the Herbaruim.

Preparation of plant extract: The ethanolic extract of the plant leaves was prepared according to standard methods (Alade and Irobi, 1993; Sofowora, 1982; Williamson *et al.*, 1996). The plant leaves were air-dried, pulverized to powder using pestle and mortar. The powdered material was transferred into a flask and 4×500 mL of ethanol (95%) was added at room temperature and was extracted in a soxhlet extractor for 72 h. The extract was concentrated to dryness under vacuum. The residue were obtained as a brown gummy solid and weighed. The extract obtained was stored and later used for phytochemical screening.

Phytochemical screening: The leave extract of *Canarium schweinfurthii* was analysed for the presence of

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Alkaloids, *Saponins*, *Tannins*, *Cardiac glycoside*, *Anthraquinone*, *Steroid* and *Flavonoid,* according to standard methods (Odebiyi and Sofowora, 1978; Sofowora, 1982; Williamson *et al.,* 1996; Banso and Ngbede, 2006).

Screening for alkaloids: Three gram of extract was stirred with ethanol containing 3% tartaric acid. The filtrate was shared into 3 beakers and tested for alkaloids as follows: Into the first beaker, Hagar's reagent was added into the second beaker, Mayer's reagent was added and into the last beaker (the third) Marquin's reagent was added. Precipitations in any of the 3 tests indicate the presence of alkaloid (Odebiyi and Sofowora, 1978; Banso and Ngbede, 2006).

Screening for saponins: About 0.5 g of the plant extract was shaken with water in a test tube. Frothing which persist on warming was taken as a preliminary evidence for the presence of Saponins.

Few drops of olive oil was added to 0.5 g of extract and vigorously shaken. Formation of soluble emulsion in the extract indicates the presence of saponins (Odebiyi and Sofowora, 1978).

Screening for tannins: Into 10 mL of freshly prepared 10% potassium hydroxide (KOH) in a beaker, 0.5 g of extract was added and shaken to dissolve. A dirty precipitate observed indicated the presence of tannin (Odebiyi and Sofowora, 1978; Williamson *et al*., 1996).

Screening for steroid: (Salkowski test for steroidal ring) Total 100 mg of *Canarium schweinfurthii* extract was dissolved in 2 mL of chloroform. Sulphuric acid was carefully added to form a lower layer. A reddish brown colour at the interface is indicative of the presence of steroidal ring (Sofowora, 1982).

Screening for flavonoids: About 2 g of the powdered leaves was completely detanned with acetone. The residue was extracted in warm water after evaporating the acetone in a water bath. The mixture was filtered while still hot. The filtrate was cooled and used.

Sodium hydroxide test: Five mL of 20% sodium hydroxide was added to equal volume of the detanned water extract. A yellow solution indicates the presence of flavonoid.

Screening for anthraquinones

Borntrager's test: About 0.5g of the extract was taken into a dry test tube and 5 mL of chloroform was added and shaken for 5 min. The extract was filtered and the filtrate shaken with an equal volume of 100% ammonia solution. A pink violet or red colour in the ammoniacal layer (lower layer) indicates the presence of free anthraquinones.

Screening for cardiac glycoside

(Keller Killiani test): Total 100 mg of extract was dissolved in 1 mL of glacial acetic acid containing one drop of ferric chloride solution. This was then underlayered with 1 mL of concentrated sulphuric acid (H_2So_4). A brown ring obtained at the interface indicates the presence of a de-oxysugar characteristic of cardenolides.

RESULTS AND DISCUSSION

This study on *Canarium schweinfurthii (Atile)* leave extract revealed the presence of sapnins, tannins, cardiac glycoside, steroid and flavonoid. The leave extract did not show the presence of alkaloid and anthraquinones that were tested for their presence (Table 1). The various phytochemical compounds detected are known to have beneficial use in industries and medical sciences.

For many decades, Chinese medicine has documented the effectiveness of plant therapies. Thousands of these plant species are now been categorized according to their medicinal properties. The basic principles in formulation of their remedies have also been developed by these herbal therapy enthusiasts. Also, many of these plant extracts have been employed in formulation of modern drugs, chemicals and food. Therefore, plant extracts are now been used in industries and in medical sciences. Among the Chinese and African herbal therapists, a principal herb denoted as emperor herb is chosen as the main therapeutic herb and a minister herbs are selected to assist carry the treatment to the specific channels and organs. The results of these formulations are in many ways have proved a better alternative to some of the modern potentially toxic agents that are used in the treatment of infectious diseases. Most herbalists, especially the ancient ones knew more than we do today, at least about the benefits of using various wild plant species. Their connection with nature was of much more profound order.

Table 1: Phytochemical screening of ethanol extract of *Canarium schweinfurthii*

Phytochemical constituents	Results
Saponin	+
Tannins	+
Cardiac glycoside	+
Alkaloid	-
Anthraquinone	-
Steroid	+
Flavonoid	+

Key: + = Present; - = Absent

There are records that show the benefits of these compounds detected from *Canarium schweinfurthii*. For example:

Saponin is used as mild detergents and in intracellular histochemistry staining to allow antibody access to intracellular proteins (http//en.wikipendia.org./wiki/saponin). In medicine, it is use in hypercholestrolaemia, hyperglycaemia, antioxidant, anti-cancer, anti-inflammatory and weight loss etc (http//en.wikipendia.org/wiki/saponin). It is also known to have ant-fungal properties (De-Lucca *et al*., 2005).

Tannins was reported to exhibited antiviral, antibacterial and anti-tumour activities. It was also reported that certain tannins are able to inhibit HIV replication selectively and is also used as diuretic (Haslem, 1989). Plant tannins have been widely recognized for their pharmacological properties and are known to make trees and shrubs a difficult meal for many caterpillars (Haslem, 1989).

Cardiac glycosides on the order hand are known to work by inhibiting the Na^+/K^+ pump. This causes an increase in the level of sodium ions in the myocytes which then lead to a rise in the level of calcium ion. This inhibition increase the amount of Ca^{2+} ions available for contraction of the heart muscle which improves cardiac output and reduces distention of heart; thus are used in the treatment of congestive heart failure and cardiac arrhythmia (http://en.wikipedia.org/wiki/cardiac-glycoside).

Plant steroids are known to be important for their cardiotonic activities, possess insecticidal and anti-microbial properties. They are also used in nutrition, herbal medicine and cosmetics (Callow *et al.,* 1936).

Flavonoid has been referred to as nature's biological response modifiers because of strong experimental evidence of their inherent ability to modify the body's reaction to allergen, virus and carcinogens. They show anti-allergic, anti-inflammatory, anti-microbial and anti-cancer activity (http://en.wikipedia.org/wiki/flavonoid).

In view of the various uses associated with these compounds found in *Canarium schweinfurthii* leave extract, we recommend further research work on this plant leaves to quantify the concentration of these compounds per known amount for industrial use. The essential oil of this plant is already known to contain lipid, fatty acids, chemicals and significant analgesic effect (Koudou *et al.,* 2005). We believe these compounds in *Canarium schweinfurthii* leaves could be harness for industrial and medical sciences utilization.

REFERENCES

Agbo, N.G., K.O. Chatigre and R.E. Simard, 1992. *Canarium schweinfurthii* Engl: Chemical composition of the fruit pulp. J.A.O.C.S., 69: 4317-4318.

Ake-Assi, L. and S. Guinko, 1991. Plants used in traditional medicine in West Africa Editor Roche, Suisse, pp: 151.

Alade, R.I. and O.N. Irobi, 1993. Antimicrobial activities of crude leaf extract of *Acalypha wilkesiana*. J. Ethnopharmacol., 39: 171-174.

Banso, A. and J.E. Ngbede, 2006. Phytochemical screening and *in vitro* antifungal properties of *Fagara zanthoxyloides*. JFA and E, 4 (3 and 4): 8-9.

Callow, R.K., 1936. Steroids. Proc. Royal, Soc London Series A., 157: 194.

De-Lucca, A., T. Cleveland, K. Rajasekara, S. Boue and R. Brown, 2005. Fungal properties of CAY-1, a plant saponin, for emerging fungal pathogens. 45th interscience conference in antimicrobial agents and chemotherapy Abstract, F-490, pp: 180.

Haslem, E., 1989. Plant polyphenols: Vegetable tannins revisited-chemistry and pharmacology of natural products. Cambridge University Press, 169.

Keary, R.W.J., 1989. Trees of Nigeria: A revised version of Nigeria trees. Lavendon Press Oxford, pp: 476-478.

Koudou, J., A.A. Abena, P. Ngaissona and J.M. Bessiere, 2005. Chemical composition and pharmacological activity of essential oil of *Canarium schweinfurtheii*. Fitoterapia. 76: 700-703.

Odebiyi, A. and E.A. Sofowora, 1978. Phytochemical screening of Nigeria medicinal plants. Part II Lioydia, 403: 234-246.

Sofowora, A., 1982. Medicinal plants and traditional `medicine in Africa. John Wiley and Sons., pp: 142-146.

Williamson, E.M., D.G. Okpako and F.J. Evan, 1996. Pharmacological methods in phytotherapy research. Vol. 1 selection. Preparation and pharmacological evaluation of plant material. John Wiley and Sons Ltd. Chichester. England, pp: 9-13.