



Original Research Article

Phytochemical Investigation of Methanolic Extract of *Icacina trichantha* Tuber

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A B S T R A C T

Keywords

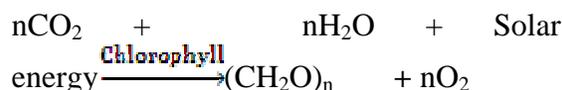
Icacinatrichantha,
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The dried ground sample of *Icacinatrichantha* tuber was extract successively with hexane and methanol to yield the respective extracts. The methanol extract was diluted with distilled water and then partitioned with ethylacetate to obtain ethylacetate fraction. The extracts were subjected to phytochemical analysis. Phytochemical screening of the extract revealed the presence of alkaloids, steroids, reducing sugars and cardiac glycosides. This attests to the fact that *Icacinatrichantha* tuber contains bioactive compounds of potentially therapeutic and prophylactic significance and thus could be a promissory candidate for drug development.

Introduction

Plant has contributed greatly in making the surface of the earth habitable for all living things, most especially man. In the living world, the plant serves as sources of food and medicine because it has the ability to convert the solar energy from the sun to produce metabolites, which are later converted to food and medicine for human consumption (Abdul, 1988).

The conversion of the solar energy and energy poor substance such as carbon dioxide, water and soil minerals into complex energy-rich, organic compounds is done through a process called photosynthesis, represented as follows:



Plants enzymes

(CH₂O)_n stand for a molecular unit is carbohydrate, but plants can use energy of carbohydrate (which comes from the sun) to make other substances such as protein, lipids and many more (John, 1996).

Hence, the plant products or metabolites can be grouped into two:

The primary plant metabolites e.g. sugars, protein, lipids etc. These are necessarily

involved in essential metabolism of the cells. The secondary plant metabolites e.g. alkaloids, steroids, terpenes etc, these are not necessarily involved in the essential metabolism of the cell (Trease, and Evan, 1989).

The primary metabolites are chemical materials that are synthesized by plants and animals and are used in the preparation of secondary metabolites. They are not accumulated by plants and animals while the secondary metabolites are accumulated by the plants and animals because they are the end products of primary metabolite. Most of these secondary metabolites are used for drug development but they are normally waste product to the plant family (Oladosu, 2006).

A medicinal plant is a plant which contains in one or more of its organs, substances that can be used for therapeutic purposes or which are precursors for the synthesis of useful drugs (Sofowora, 1982). In addition to providing the animal kingdom its food, fuel and shelter, these plants also synthesize a large variety of chemical substances. These substances include, phenolic compounds, terpenes, steroids, alkaloids, glycosides and host of other chemical substances which are of no apparent importance to the plants' own life. But many of these compounds have prominent effect on the animals system and some possess important therapeutic properties, which can be and have been utilized in the treatment and cure of human and other animal diseases since time immemorial. This secondary metabolite differs from plant to plant. These plants, which produce and store constituents having medicinal value, are generally designated as medicinal plant (Ole, 1991). The uses of medicinal plants for

controlling disease can be traced to the early man who probably acquires the skill of herbal healing through deliberate selection of plants (Odetola, and Bassir, 1986).

Primitive man found the therapeutic properties of herbs by trial and error, accident, experience or having the knowledge passed on to them by their elders via oral tradition. Equally, pertinent in herbal medicine is the utilization based on the "Doctrine of signature". This is an ancient belief which says that nature has provided a plant for every disease and has indicated this by an obvious sign for each disease or which part of the body each drug plant is to be used (Oliver-Bever, 1986).

The implication is that the shape of a plant or one of its components may suggest a cure. The example often used is the walnut which is used in the treatment of diseases affecting the brain since it has the shape of the brain. Other examples include the use of white latex to promote lactation in nursing mothers and the use of big swollen fruits to favour fertility (Githens, 1949). The subject of phytochemistry or plant chemistry is concerned with enormous variety of organic substances that are accumulated by plants and deals with chemical structures of these substances, their synthesis, turnover and metabolism, their natural distribution and biological functions (Harbone, 1991).

Icacina trichantha is a scandent shrub up to 2m with a very large tuber. Flower cream, ripe fruits red, about 2 ½ cm long with a sweet outer pulp, velvety: found in forest and jungle vegetation of southern Nigeria. Yorubas call it Gbegbe, Igbos call it Ibugo (Burkill, 1985).

The aim of this study was to investigate the phytochemical present in the methanolic extract of *Icacinatrichantha* tuber.

Materials and Methods

Sample Collection, Identification and Preparation

The sample was collected near Ibadan city and identified in Forest Research Institute of Nigeria, Jericho, Ibadan. The tuber was air dried, crushed into pieces in wood extraction laboratory and weighed. The weight was found to be 5.7kg.

Extraction of the Plant

The dried ground tubers of *Icacinatrichantha* (5.7kg) were then extracted extensively with hexane using a soxhlet involving a modified aspirator.

When the whole process of extraction was completed, the hexane extract was then concentrated by distillation, to give a thick dark brown oil. The extract collected (103g) was kept in weighed sample bottle (80g), which was then weighed again to get the actual mass of the extract to be 23g. The extraction process was repeated using methanol. The methanol extract was then concentrated. The concentrated methanol extract was diluted with distilled water and then partitioned with EtOAc using separatory funnel to get EtOAc fraction. The EtOAc fraction was then concentrated by distillation. The concentrated EtOAc fraction was then dried in a vacuum desiccator and the weight was found to be 35g.

Phytochemical Screening of the Extract

The extract was screened for the different classes of secondary metabolites. The screening tests carried out test for

alkaloids, saponins, tannins anthraquinones, steroid, reducing sugar, cardiac glycosides, phenols and flavonoids (Harbone, 1991).

Test for Alkaloids

The solution of the extract in EtOAc was warmed with 1% HCl for two minutes. The mixture was filtered and few drops of Dragendorff's reagent were added. A reddish-brown colour and turbidity with the reagent indicated the presence of alkaloids.

Test for Saponins

The solution of the extract in EtOAc was shaken with about 5 ml of distilled water and then heated to boil.

There was not formation of frothing, which indicated saponins was absent.

Test for Anthraquinones

The solution of the extract in EtOAc was shaken with 10ml of benzene, filtered and 5ml of 10% ammonium hydroxide (NH₄OH) was added to the filtrate. No formation of a pink red or violet colour in the phase of the ammoniacal solution which showed that anthraquinone is absent (Bornrager tests).

Test for Steroids

The solution of the extract in EtOAc was shaken with sulphuric acid, a reddish brown colour at the inter-phase indicates the presence of steroids also. A violet ring was formed just above the ring and gradually spread throughout the layer.

Test for Reducing Sugar

The solution of the extract in EtOAc was shaken with few drops of Fehling solution

A and B and boiled for 2 minutes, an oranges precipitate on boiling with Fehling's solution indicates the presence of reducing sugars (Fehling Test).

Test for Cardiac Glycosides

The solution of the extract in EtOAc was dissolved in some glacial acetic acid containing one drop of FeCl₃. The solution was underplayed with concentrated H₂SO₄. A brown ring at the inter-phase between the acetic layer and H₂SO₄ layer was observed, which indicates the presence of cardiac glycosides (Keller – Killanis's test).

Test for Phenols

Solution of the extract in EtOAc was mixed with two drops of aqueous Ferric chloride. There was no formation of blue-black colouration or intense colouration, which indicates absence of phenol.

Test for Flavonoids

The solution of the extract in EtOAc was mixed with two drops of ammonia does not give yellow-brown colour signifying the absence of flavonol glycosides.

Test for Phytlobatannins

The solution of the extract in EtOAc of the plant samples were boiled with 1% HCl. The absence of phytlobatannin was indicated by none deposition of a red precipitate.

Test for Tannins

The solution of the extract in EtOAc was shaken with small quantity of Ferric chloride. A blue-black, green or blue-green precipitate was not formed, which shows that tannin is absent.

Results and Discussion

The percentage yields of the extracts of the plant weres hown in table 1.

Table.1 Weight of Extracts and their Percentage Yield

Extract	Weight (g)	%Yield
Hexane	23	0.4
Methanol	305	5.4
ethylacetate fraction	35	0.6

The result obtained for the phytochemical screening is presented in table 2. The results showed that the extract does not contain tannins, anthraquinones, saponins, phenol, flavonoids and phytobatannins. Alkaloids, steroids, reducing sugars and cardiac glycosides were present. It has been reported that some family of Icacinaceae contain cyanogenic alkaloids, iridoids, verbascoside, proanthocyanidinas, flavonol (quercetin), saponins/sapogenins(Watson and Dallwitz, 2007).

Table.2 Result of the phytochemical screening of the extract

Compound	EtOAc Extract
Alkaloids	+
Reducing Sugars	+
Steroids	+
Cardiac glycosides	+
Saponins	-
Tannin	-
Anthraquinones	-
Flavonoids	-
Phenol	-
Phlobatannins	-

Key: + = present, - =absent

Phytochemical screening of the extracts varies from one plant part to another as revealed in the results. It could also vary from place to place due to geographical location, climatic conditions and soil

condition of a particular area. This may explain why it could be possible to have differences in chemical composition of the same plant of study in other areas. This assertion is also confirmed as their extracts indicate a relatively moderate number of phytochemicals. Clinical and toxicity studies should be carried out on the extract to ascertain its safety when used.

The result of the phytochemical screening of the tuber of *Icacina trichantha* table 2 revealed the absence of saponins, tannins, anthraquinones, phenols, flavonoids and phlovetannins while presence in the extract are alkaloids, reducing sugars, steroids and cardiac glycosides.

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