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Preliminary Phytochemical Analysis of *Calotropis gigantean* and *Thevetia peruviana*

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Abstract: ***Calotropis gigantean Linn is popularly known as the swallow-wort or milkweed is used as one of the most important drug in Traditional System of Medicine to treat various ailments. Thevetia peruviana plant leaves are used as cardiaotonic and diuretic also reported for possess good medicinal value in traditional system of medicine. The aim of this study is to screen the phytochemicals present in the (Methanol, Acetone and Petroleum ether) leaf extract of Calotropis gigantean and phytochemicals present in the (Methanol and Acetone) leaf extract of Thevetia peruviana. Calotropis gigantean and Thevetia peruviana are Indian medicinal plants and widely used in Ayurveda for management of various diseases. Different biochemicals screening have been carried out to identify the important phyto-constituents. A number of biological constituents in good yield and some have been shown to possess useful biological actions belonging mainly to phenolics, flavonoids, terpenoids. This study forms a basis for the biological characterization and importance of the compounds identified and creates a platform to screen many bioactive components to treat many diseases.***

Keywords: *Calotropis gigantean*, *Thevetia peruviana*, Phytochemical Screening

1. Introduction

The Indian subcontinent is rich in medicinal plants and is one of the richest countries in terms of genetic diversity of medicinal plants. It exhibits a wide range in topography and climate. Moreover the agro climatic conditions are conducive for introducing and domesticating new exotic plant varieties. Several plants have been used in folklore medicine. The rational design of novel drugs from traditional medicine offers new prospects in modern healthcare. Medicinal plants are of great importance to the health of individual and communities. The medicinal value of these plants lies in some chemical active substances that produce a definite physiological action on human body. Herbal medicines are promising choice over modern synthetic drugs and they show minimum or no side effects and are considered to be safe. Correct knowledge of such crude drugs is very important aspect in preparation, safety and efficacy of the herbal product. Pharmacognosy is a simple and reliable tool, by which complete information of the crudedrug can be obtained (Gokhale, 1979; Mukherjee, 2002; Raghunathan and Mitra, 1982; Trease and Evans, 2002).The medicinal plants are those that provide people with medicines to treat illness, maintain and promote health. Many of these natural products have vital roles as mediators of ecological interactions; that is, they have functions in ensuring a continued survival of particular organisms in often hostile environments where there is competition with other organisms (Mann, 1978). Medicinal plants are of great importance to the health of individuals and communities (Edeoga *et al*., 2005). Medicinal plants have physiological action on human body which has organic compounds and these bioactive substances include tannins, alkaloids, carbohydrates, terpenoids, steroids and flavonoids (Edoga *et al*., 2005; Mann, 1978). Plants have limitless ability to synthesize aromatic substances, mostly phenols or their oxygen-substituted derivatives (Geisssman, 1963). Most of the natural products are secondary metabolites and about 12, 000 of such products have been isolated so far. These products serve as plant defence mechanisms against predation by microorganisms, insects and herbivores (Fransworth and Morris, 1976). Today there is growing interest in chemical composition of plant based medicines. Several bioactive constituents have been isolated and studied for pharmacological activities. During the last two decades, the pharmaceutical industry has made massive investment in pharmacological and chemical researches all over the world in an effort to discover much more potent drugs, rather than a few new drugs and plants have also successfully passed the tests of commercial screenings. Furthermore, the use of herbal medicine for the treatment of diseases and infections is as old as mankind. The World Health Organization supports the use traditional medicine provided they are proven to be efficacious and safe (WHO, 1985). A large number of plant extracts have been reported to have mosquitocidal or repellent activity against mosquito vectors (Sukumar et al 1991), but very few plant products have shown practical utility for mosquito control. It has been proved that larvicidal measures sustain mosquito population for a short period and require repeated applications of chemicals and eventually develop resistance against that chemical.

Plants are rich source of bioactive organic chemicals and synthesize a number of secondary metabolites to serve as defense chemicals against attack. Numerous plant products have been reported either as insecticides for killing larvae or adult mosquitoes or as repellents for mosquito biting and are one of the best alternatives for mosquito control. These chemicals may serve as insecticides, antifeedants, oviposition deterrents, repellents, growth inhibitors, juvenile hormone mimics, moulting hormones, as well as attractants. The botanicals offer an advantage over synthetic pesticides.

The plant extracts are easy to prepare, inexpensive and safe for mosquito control which might be used directly as larvicidal and mosquitocidal agents in small volume aquatic habitats or breeding sites of around human dwellings. Botanical pesticides are preferred in comparison to synthetic pesticides, as they are eco friendly and bio dragable (Prakash and Rao, 1977).

In developing countries, a huge number of people lives in extreme poverty and some are suffering and dying for want of safe water and medicine, they have no alternative for primary health care. There is therefore, the need to look inwards to search for herbal medicinal plants with the aim of validating the ethno-medicinal use and subsequently the isolation and characterization of compounds which will be added to the potential list of drugs. Substances in luggage or on human beings. However, fewer reports are available with respect to the pharmacological properties of the plant. Keeping this in view, the present study have been undertaken to investigate the phytochemical constituents present in the Methanol extract of *Calotropis gigantean and Thevetia peruviana* leaf

2. Materials and Methods

Extraction of the plant material

The fresh plant materials were of *Calotropis gigantean and Thevetia peruviana* leaves were collected in January 2017, washed with running tap water and shade dried. The leaves were crushed to coarsely powdered by grinder. These coarse powders (25g) were then subjected to successive extraction in 250ml of each solvent (Methanol, Petroleum ether and Acetone) by using Soxhlet apparatus. The collected extracts were stored and then taken up for further investigations.

Phytochemical Screening

Preliminary phytochemicals analysis was carried out for all the extracts as per standard methods described by Brain and Turner 1975 and Evans 1996.

Detection of alkaloids

Mayer's test: Filtrates were treated with Mayer's reagent. Formation of a yellow cream precipitate indicates the presence of alkaloids.

a) **Wagner's test**: Filtrates were treated with wagner's reagent. Formation of brown/ reddish brown precipitate indicates the presence of alkaloids.

Detection of Flavonoids

a) **Lead acetate test**: Extracts were treated with few drops of lead acetate solution.
Formation of yellow color precipitate
Indicates the presence of flavonoids.

b) **H_2SO_4 test**: Extracts were treated with few drops of H_2SO_4. Formation of orange color indicates the presence of flavonoids.

Detection of Steroids

2ml of acetic anhydride was added to 0.5g of the extracts, each with 2ml of H_2SO_4. The colour changed from violet to blue or green in some samples indicate the presence of steroids.

Detection of Terpenoids

Salkowski's test

0.2g of the extract of the whole plant sample was mixed with 2ml of chloroform andconcentrated H_2SO_4 (3ml) was carefully added to form a layer. A reddish brown coloration of the inner face was indicates the presence of terpenoids.

Detection of Anthraquinones

Borntrager's test

About 0.2g of the extract was boiled with 10% HCl for few minutes in a water bath. It was filtered and allowed to cool. Equal volume of $CHCl_3$ was added to the filtrate. Few drops of 10% NH_3 were added to the mixture and heated. Formation of/ pink colour indicates the presence anthraquinones.

Detection of Phenols

a) **Ferric chloride test**: Extracts were treated with few drops of ferric chloride solution. Formation of bluish black color indicates the presence of phenol.

b) **Lead acetate test**: Extract was treated with few drops of lead acetate solution. Formation of yellow color precipitate indicates the presence of phenol.

Detection of Saponins

About 0.2g of the extract was shaken with 5ml of distilled water. Formation of frothing (appearance of creamy miss of small bubbles) shows the presence of saponins.

Detection of Tannins

A small quantity of extract was mixed with water and heated on water bath. The mixture was filtered and ferric chloride was added to the filtrate. A dark green colour formation indicates the presence of tannins.

Detection of Carbohydrates:

Extracts were dissolved individually in 5ml distilled water and filtered. The filtrate was used to test the presence of carbohydrates. Test solution was applied on filter paper. It develops a transparent appearance on the filter paper. It indicates the presence of oils and resins.

Test for cardiac glycosides

Five milliliters of each extract was treated with 2 ml of glacial acetic acid containing one drop of ferric chloride solution. This was underplayed with 1 ml of conc. Sulphuric acid. A brown ring of the interface indicates a deoxysugar characteristic of cardenolides. A violet ring appeared below the brown ring, while in the acetic layer, a greenish ring formed just gradually throughout thin layer

Table 1: Qualitative phytochemical analysis of *Calotropis gigantean* linn

Phytochemicals	Extracts		
	Methanol	Acetone	Petroleum Ether
Alkaloids	+	+	+
Mayer's test			
Wagner's test	+	+	-
Flavonoids	+	+	+
Lead acetate test			
H_2SO_4 test	+	+	-
Steroids			
Liebermann-Burchard test	-	+	-
Terpenoids			
Salkowski test	+	-	-
Anthroquinone			
Borntrager's test	+	-	-
Phenols	+	+	-
Ferric chloridetest			
Lead acetate test	-	+	-

Saponin	+	-	-
Tannin	+	-	+

(+) Indicate present (-) Indicate absent

Table 2: Qualitative Phytochemical screening of *Thevetia peruviana* leaves

Phytochemicals Observed	Test performed	Methanol	Acetone
Alkaloids	Dragendorff's test	-	+
Flavinoids	Shinoda test	+	-
Terpinoids	Noller's test	+	+
Tannins	Neutral $FeCl_3$	-	+
Saponins	Chloroform and H_2SO_4	+	+
Cardiac glycosides	Keller – Killani test	+	+
Phlobatannins	Hydrochloric acid test	+	+
Steriods	Acetic anhydride and H_2SO_4	+	–

(+) Indicate present (-) Indicate absent

3. Discussion and Results

The three extracts (Methanol, Petroleum Ether and Acetone) were performed for the plants *Calotropis gigantean and Two* extracts *(*Methonal, Acetone) *of Thevetia peruviana* In the plants methanol extracts showed positive results like presence of flavonoid, alkaloids, steroids, terpenoids, phenols, saponins, tanins and Cardiac glycosides . The methanol extracts showed highest amount of phytochemicals when compared with other solvent extracts.

4. Conclusion

From the present study the phytochemical constituents were analysed and identified using standard methods. From the results obtained it can be concluded that the plants *Calotropis gigantean* and *Thevetia peruviana* possess significant phytochemicals such as alkaloids, Terpenoids etc. Highest quantity of the phytochemicals were seen in the methanol extract. The identified phytochemicals also have properties such as antioxidant, antimicrobial, antidiabetic, anticancer etc.

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