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Screening for phytochemical activity of *Urechites lutea* plant

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ABSTRACT

To examine the phyto-constituents present in ornamental plant Urechites lutea leaf and flower extracts of various solvents. 100 grams of dried leaf and flower material was powdered and was extracted with various solvents in a soxhlet for 72 hours. The qualitative analysis of the phyto-constituents in the extract was done employing standard procedures. Different phyto-constituents such as alkaloids, phenolic compounds, flavonoids, saponins, cardio-glycosides, terpenoids, steroids, coumarins, quinones, phyto-steroids, proteins and carbohydrates were identified in the extracts. The presence or absence of the phyto-constituents depended upon the solvent medium used for extraction and the physiological property of the flowers and leaves. The findings of this study reveal that ornamental flowering plants like Urechites lutea have potential phytochemical compounds that may be also used as mosquito control agent. But these have no medicinal value and not used for the edible purpose. To the best of our knowledge, this may be the first report on phytochemical screening observed for the first time from the extracts of Urechites lutea.

Key words: *Urechites Lutea*, Phytochemical constituents, Leaves, flower, Solvents.

INTRODUCTION

Plants of the family *Apocynaceae* commonly known with about 200 genera and 2,000 species are most commonly found in tropical and sub-tropical regions and have ornamental value. These plants are also well known for the alkaloids they contain many of which are poisonous. A number of which have since found their way into modern medicine [1]. There are a range of garden plants that are considered poisonous. Poisonings and deaths from garden plants are rare as most poisonous plants taste unpleasant and are seldom swallowed. However, it is best to know which plants are potentially toxic [2, 3].

Linnaeus called these climber *Vinca lutea*. Then, for many decades, they were called *Urechites lutea*. A genus established in 1860 by the swiss botanist Johannes Muller of Aargau. However, Bruce Hansen realized that *Pentalinon*, described from plants grown in the Calcutta botanical garden in 1845, was on earlier and valid generic name *Pentalinon* now contains two species both native of Florida, central America [4, 5].

In the Dominican Republic pentalinon is used to treat heart disease (Cardio-tonic), edema, fever and colic and as a purgative [6]. Plants are used to treat headache in Guatemala. However doing so is dangerous because the latex is poisonous, having been used to poison arrows in tropical countries [7]. It is poisonous to cattle, people powder the leaves to kill destructive insects and animals (Ants, Mosquitoes, Rats) [8].

Among the poisonous compounds are the cardenolides, Oleandria, urechitin and urechitoxin. The word poison should suggest a warning rather than create fear. Left alone, certain plants are harmless; however, if crushed or

ingested by humans, they may produce upsetting, painful or even fatal results. Certain chemicals on leaf surfaces or in plant juices may be skin irritants and induce reddening, swelling or blistering. Some chemicals effect changes leading to discoloration or light sensitivity. Potentially irritating chemicals often accumulate in plant storage organs such as seeds and roots. Thus, a small amount of this type of tissue can contain a relatively large amount of toxin [9].

There are more than 4000 species of medicinal plants growing as herbs, shrubs, and trees in India, many of which are poisonous when administered in large doses. The toxic principles belong to alkaloids, glycosides, toxalbumins, resine, cannabinoides and polypeptides, many poisonous plants grow wild. eg. Datura, Oleanders, Aconite, Nux-vomica etc. The poisonous parts of the majority of plants species were seeds, latex and root or root bark. Besides these poisonous parts of some plants were fruits, stem bark, tubers or bulbs and sometimes whole plant also. Some plants causes poisoning to both human beings as well as livestock populations, while some causes poisoning to human being only. There are many plants which have no medicinal value and not used for the edible purpose but which are at times ingested through oversight, particularly by children. Many of these are responsible for poisoning in cattle [10].

MATERIALS AND METHODS

Plant Collection and Authentication

Leaves & flower of urechites lutea (L.) Britt of Apocynaceae family were collected from the local areas of Vellore, Tamilnadu, India authenticated by professor P. Jayaraman, Botanist, Director, Plant anatomy research centre, Tambaram, Chennai, India in the month of May 2014 and registered Number of the Specimen is PARC/2014/2281.

Phytochemical Analysis

Aqueous, Acetone, Ethyl acetate and Ethanol extracts were prepared by adding 100 g of dried leaves and flowers of *Urechites lutea* to 500 ml of these solvents. The powdered material was extracted with various solvents in a soxhlet apparatus for 72 h. The extract was then concentrated in a vacuum rotary evaporator and qualitative analysis of the phyto-constituents in the extract was done employing standard procedures [11, 12].

Test for carbohydrates:

To 2ml of plant extract, 1ml of Molisch's reagent and few drops of concentrated sulphuric acid were added. Presence of purple or reddish color indicates the presence of carbohydrates.

Test for tannins:

To 1ml of plant extract, 2ml of 5% ferric chloride was added. Formation of dark blue or greenish black indicates the presence of tannins.

Test for saponins:

To 2ml of plant extract, 2ml of distilled water was added and shaken in a graduated cylinder for 15minutes lengthwise. Formation of 1cm layer of foam indicates the presence of saponins.

Test for Flavonoids:
To 2ml of plant extract, 1ml of 2N sodium hydroxide was added. Presence of yellow color indicates the presence of flavonoids.

Test for alkaloids:
To 2ml of plant extract, 2ml of concentrated hydrochloric acid was added. Then few drops of Mayer's reagent were added. Presence of green color or white precipitate indicates the presence of alkaloids.

Test for quinones:
To 1ml of extract, 1ml of concentrated sulphuric acid was added. Formation of red color indicates presence of quinones.

Test for glycosides:
To 2ml of plant extract, 3ml of choloroform and 10% ammonia solution was added. Formation of pink color indicates presence of glycosides.

Test for cardiac glycosides:
To 0.5ml of extract, 2ml of glacial acetic acid and few drops of 5% ferric chloride were added. This was under layered with 1 ml of concentrated sulphuric acid. Formation of brown ring at the interface indicates presence of cardiac glycosides.

Test for Terpenoids:
To 0.5ml of extract, 2ml of chloroform was added and concentrated sulphuric acid was added carefully. Formation of red brown color at the interface indicates presence of terpenoids.

Test for phenols:
To 1ml of the extract, 2ml of distilled water followed by few drops of 10% ferric chloride was added. Formation of blue or green color indicates presence of phenols.

Test for coumarins:
To 1 ml of extract, 1ml of 10% NaOH was added. Formation of yellow color indicates presence of coumarins.

Test for steroids and phytosteroids:
To 1ml of plant extract equal volume of chloroform is added and subjected with few drops of concentrated sulphuric acid appearance of brown ring indicates the presence of steroids and appearance of bluish brown ring indicates the presence of phytosteroids.

Test for phlobatannins:
To 1ml of plant extract few drops of 2% HCL was added appearance of red color precipitate indicates the presence of phlobatannins.

Test for anthraquinones:
To 1ml of plant extract few drops of 10% ammonia solution was added, appearance pink color precipitate indicates the presence of anthraquinones.

RESULTS AND DISCUSSION

Qualitative phytochemical Analysis
The Urechites Lutea Leaves extract in different solvents were screened for the presence of various bioactive phytochemical compounds. The analysis revealed the presence of Tannins, Alkaloids, quinones, Cardio-glycosides, Terpenoids, phenolic compounds and phyto-steroids. The qualitative phytochemical Analysis of the leaf extract of Urechites lutea is documented in Table 1.0. Whereas, the Urechites Lutea flower extract analysis revealed the presence of Tannins, Flavonoids, quinones, Cardio-glycosides, Terpenoids, phenolic compounds, Coumarins and Steroids. The qualitative phytochemical Analysis of the flower extract of Urechites lutea is documented in Table 2.0.

The phytochemical analysis of the promising Acetone and ethanol extract of Urechites lutea leaves were positive for Tannins, Flavonoids, Alkaloids, Quinones, Terpenoids, phenolic compounds and phyto-steroids. Whereas Aqueous, Ethyl Acetate and Hexane depicted moderately compounds presence compared to other solvents.

The phytochemical analysis of the promising Acetone and ethanol extract of Urechites lutea flowers were positive for tannins, flavonoids, quinones, cardio-glycosides, terpenoids, phenolic compounds, coumarins and steroids. Whereas Aqueous, Ethyl Acetate and Hexane depicted moderately compounds presence compared to other solvents.

The plant contains three cardio toxic steroidal glycosides characterized by an unsaturated lactone ring at C17 and a hydroxyl group (OR) at C3. This compound is structurally related to cardio tonics of the digitalis family. Ag1ycones identified in the plant extract were gitoxigenin (pM = 390), oleandrogenin (PM = 432) and gitoxigenin monoanhydride (pM = 372). Biosynthesis of these products by the plant is highest from December to May, which is in agreement with the occurrence of disease. Consumption of U. lutea results in two different clinical forms of the disease: one acute, characterized by sudden death that appears in cattle on pasture under a system of intensive exploitation management; and the other a haemorrhagic syndrome episode, called by the fanners haemorrhagic diarrhoea that occurs in forage-fed stabled animals [13]. An acetone extract of the leaves was too toxic to mosquito larvae [14].

Table 1.0 Qualitative phytochemical analysis of U. lutea leaf extract

Test	Hexane	Ethyl acetate	Acetone	Ethanol	Aqueous
Carbohydrates	-	-	+	-	-
Tannins	-	+	+	+	+
Saponin	-	-	-	-	-
Flavonoid	-	-	+	+	-
Alkaloid	-	+	+	+	+
Quinones	-	+	+	+	-
Glycosides	-	-	-	-	-
Cardiac glycosides	+	+	-	-	-
Terpenoids	+	-	+	+	-
Phenols	+	+	+	+	+
Coumarins	-	-	-	-	-
Steroids and Phytosteroids	-	-	Phyto steroids	Phyto steroids	-
Phlobatannins	-	-	-	-	-
Anthraquinones	-	-	-	-	-

Table 2.0 Qualitative phytochemical analysis of U. lutea flower extract

Test	Hexane	Ethyl acetate	Acetone	Ethanol	Aqueous
Carbohydrates	-	-	-	+	-
Tannins	-	-	+	+	+
Saponins	-	-	-	-	-
Flavonoids	-	-	+	+	-
Alkaloid	-	-	-	-	-
Quinones	+	-	+	+	-
Glycosides	-	-	-	-	-
Cardiac glycosides	+	+	+	+	+
Terpenoids	+	-	+	+	-
Phenols	+	+	+	+	+
Coumarins	-	-	+	+	+
Steroids and Phytosteroids	-	-	Steroids	Steroids	Steroids
Phlobatannins	-	-	-	-	-
Anthraquinones	-	-	-	-	-

'+' indicates presence and '-' indicates absence

CONCLUSION

The present work reports the first phytochemical screening activity of urechites lutea. Ornamental Flowering plants could be sources of bioactive constituents which might be useful against larvicides and insecticides. The fluid extract in doses of from 2 to 10 drops, has been used in the treatment of sthenic fevers. The leaf and flower extracts were too toxic to mosquito larvae. Although the nature and number of active components involved in each extract

are not clear, these findings are promising and further studies about the toxicity of plant extracts and the isolation of active compounds are important for further studies.

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