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Research Article

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Preliminary phytochemical analysis of aerial parts of *Crossandra infundibuliformis*

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ABSTRACT

A large proportion of the world population especially the developing countries rely on traditional system of medicines. The use of herbs in medicine is getting popularised because of its natural origin with no or lesser side effects. The present study deals with the photochemical analysis of one important South Indian horticulture plant, Crossandra infundibuliformis which belongs to the family Acanthaceae. This plant is found abundantly in tropical areas. Phytochemical analysis was performed on extracts of water, ethyl acetate, acetone, chloroform and propane on C. infundibuliformis and results were tabulated. The presence of steroids was observed in all the fractions whereas proteins, triple sugars and amino acids were absent. These results could be used for identifying the medicinal values of this plant.

Key words: *Crossandra infundibuliformis*, Acanthaceae, ethyl acetate, acetone, chloroform, propane .

INTRODUCTION

In India large number of plant species had been screened for their pharmacological properties but still, a vast wealth of plant species is unexplored. Medicinal plants are at interest to the field of therapeutics, as most of the drug industries depend in part of plants for the production of pharmaceutical compounds [1]. India is endowed with a rich wealth of medicinal plants and it is one of the 12 mega bio-diversity centres having 45,000 plant species. In India around 20,000 medicinal plants have been recorded recently, but more than 500 traditional communities use 800 plant species for curing different diseases. Currently 80% of world population depends on plant derived medicines for human alleviation because of its slight side effects, easy availability and cost effectiveness.

Medicinal plant based drugs have the added advantage of being simple effective and offering a broad spectrum of activity with greater emphasis on preventive action [2]. Several phytochemical screening studies have been carried out in different parts of the world [3, 4]. Hence it is of interest to investigate the phytochemical and pharmacological efficacy of the plant is paramount importance it may provide many emerging insights. Therefore aqueous, chloroform, acetone, ethyl acetate and propane extracts of *C. infundibuliformis* have been investigated.

Crossandra infundibuliformis belongs to the family of Acanthaceae. It is a plant which is important in South Indian horticulture industry. This plant is found abundantly in tropical areas such as India and Sri Lanka. It grows 2m in height and can withstand high temperature which makes it to survive in very high humidity. Due to its medicinal value, various parts of this plant are used for many types of treatment [5]. The leaf extract shows significant hepatoprotective effects [6].It is also found that the *C. infundibuliformis* shows very good anti-corrosive properties [7]. Its antibacterial, antioxidant activity was reported by [8]. Very less work has been done regarding *C. infundibuliformis* phytochemical values. Hence, it is of interest to investigate the preliminary phytochemical analysis of aqueous, chloroform, ethyl acetate, acetone and propane extracts of *C. infundibuliformis.*

EXPERIMENTAL SECTION

2.1. Collection of samples

The medicinal plants used for the experiment were leaves of *Crossandra infundibuliformis* which were collected from the local medicinal farms.

2.2. Preparation of extracts

500 grams of aerial parts of dried powder of *Crossandra infundibuliformis* was packed in separate round bottom flask for sample extraction using different solvents namely ethanol, methanol, chloroform, ethyl acetate and water. The extraction was conducted with 750 ml of each solvent for a period of 24 hours. At the end of the extraction the respective solvents were concentrated under reduced pressure and the crude extracts were stored in refrigerator.

2.3 Phytochemical analysis

The extracts prepared were analyzed for the presence of alkaloids, saponin, tannins, steroids, flavonoids, anthraquinone, cardiac glycosides and reducing sugars based on the protocols available in the literature. [9, 10, 11, 12]

2.3 a. Test for alkaloids

The extract of the crude dry powder of each solvent was evaporated to dryness in boiling water bath. The residues were dissolved in 2 N Hydrocholoric acid. The mixture was filtered and the filtrate was divided into three equal portions. One portion was treated with a few drops of Mayer's reagent; one portion was treated with equal amount of Dragondorff's reagent and the third portion was treated with equal amount of Wagner's reagent respectively. The creamish precipitate, the orange precipitate and brown precipitate indicated the presence of respective alkaloids.

2.3 b. Test for saponins

About 0.5 g of the plant extract was shaken with water in a test tube and then heated to boil. Frothing was observed which was taken as a preliminary evidence for the presence of the saponin.

2.3 c. Test for tannins

About 0.5 g of extract was added was in 10 ml of water in a test tube and filtered. A few drops of 0.1% ferric chloride was added and observed for brownish green or blue-black coloration.

2.3 d. Test for steroids

2 ml of acetic anhydride was added to 0.5 g of methanol extract of each sample with 2 ml sulphuric acid. The colour changed from violet to blue or green in some samples indicating the presence of steroids.

2.3 e. Test for flavonoids

2 ml of extract solution was treated with 1.5 ml of 50% methanol solution. The solution was warmed and metal magnesium was added. To this solution few drops of conc. Hydrochloric acid was added and the red colour was observed for flavonoides and orange colour for flavonoids.

2.3 f. Test for anthraquinones

About 0.5 g of extract was taken in 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 equal volume of 10% of ammonia solution. A pink violet or red colour in the ammonical layer indicates the presence of anthraquinones.

2.3 g. Test for cardiac glycosides

0.2 g of extract was dissolved in 1 ml of glacial acetic acid containing 1 drop of ferric chloride solution. This was then under layered with 1ml of concentrated sulphuric acid. A brown ring obtained at the interface indicated the presence of a deoxy sugar characteristic of cardic glycosoids.

2.3 h. Test for Proteins

To 2ml of protein solution 1ml of 40% NaOH solution and 1 to 2 drops of 1% $CuSO_4$ solution was added. A violet color indicated the presence of peptide linkage of the molecule.

2.3 i. Test for Amino Acids

To 2ml of sample was added to 2ml of Ninhydrin reagent and kept in water bath for 20 minutes. Appearance of purple color indicated the presence of amino acids in the sample.

2.3 j. Test for Tri-Terpenoids

5ml of each extract was added to 2ml of chloroform and 3ml of con. H_2SO_4 to form a monolayer of reddish brown coloration of the interface was showen to form positive result for the terpenoids.

2.3 k. Test for Triple Sugar

To 2 ml of extract 2drops of Molisch's reagent was added and shaken well. 2ml of con. of con. H_2SO_4 was added on the sides of the test tube. A reddish violet ring appeared at the junction of two layers immediately indicated the presence of carbohydrates.

Table 1: Shows the Phytochemical analysis of Crossandra infundibuliformis

S.No.	Phytochemical Constituents	Aqueous	Ethyl acetate	Acetone	Chloroform	Propane
01	Flavinoids	+	-	+	-	+
02	Alkaloids	-	+	+	+	-
03	Triterepenoids	-	-	+	-	+
04	Saponins	+	+	+	-	-
05	Tannins	+	-	-	-	+
06	Triple Sugar	-	-	-	-	-
07	Amino Acid	-	-	-	-	-
08	Anthroquinones	+	-	-	-	-
09	Steroids	+	+	+	+	+
10	Proteins	-	-	-	-	-
11	Cardiac Glycosides	-	-	+	+	+

"+" = Present, "-" = Absent.

RESULTS AND DISCUSSION

Plants are valuable source of new natural products. Despite the availability of different approaches, the discovery of therapeutically natural products still remains the best reservoirs of new structural types. About 25% of all prescriptions sold in the United States are from natural products, while another 25% are for structural modifications of a natural product and 119 characterize drugs are still obtained commercially from higher plants and of which 74% were found from enthnobotanical sources. Of the several hundred thousand plant species around the world, only a small proportion has been investigated both phytochemically and pharmacologically. Therefore, the present study was aimed to focus the various phytochemical constituents from various extracts of *Crossandra infudifuliformis* have been investigated.[13].

Table 1 shows the phytochemical analysis of aqueous, ethyl acetate, acetone, chloroform and propane extracts of *C. infundibuliformis.* Phytochemical screening of the crude extracts revealed the presence steroids in all the extracts. In case of tri-terpenoids, they were present only in acetone and propane extracts and absent in rest of the extracts. Tannins are present in aqueous and propane extract whereas tannins were absent other extracts. Proteins, amino acids and triple sugar are absent in all the five extracts. Anthraquinones were present in aqueous extract only whereas they were absent in rest of the extracts. Cardiac glycosides are present in acetone, chloroform and propane extracts. This knowledge could be used identifying the various medicinal potentials of this plant.

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