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Phytochemical Analysis of *Raphidophora tetrasperma*

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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, *Raphidophora tetrasperma* 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 *Raphidophora tetrasperma* 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: *Raphidophora tetrasperma* , ethyl acetate, acetone, chloroform, propane.

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INTRODUCTION

Medicinal plants are of interest to the field of therapeutics, as most of the drug industries depend in part on plants for the production of pharmaceutical compounds.

Rhaphidophora is a genus in the family Araceae, occurring from tropical Africa eastwards through Malaysia, India and Australasia to the Western Pacific. The genus consists of approximately 100 species [2]. This is a genus of evergreen, robust, climbing plants. The flowers are bisexual, lacking a perigone. The spathe is shed after flowering. The ovules number eight or more and are superposed on two (rarely 3) parietal placentas of the ovary. The flowers produce many, ellipsoid, straight seeds with a brittle and smooth outer coat (testa).

These are hemiepiphytes, plants capable of beginning life as a seed and sending roots to the soil, or beginning as a terrestrial plant that climbs a tree and then sends roots back to the soil. In rare cases they are rheophytic (flood-resisting) terrestrial plants [3]. In 2001, researchers identified 122 compounds used in modern medicine which were derived from "ethno medical" plant sources; 80% of these have had an ethno medical use identical or related to the current use of the active elements of the plant. Many of the pharmaceuticals currently available to physicians have a long history of use as herbal remedies, including aspirin, digitalis, quinine, and opium.

Therefore aqueous, chloroform, acetone, ethyl acetate and propane extracts of *Rhaphidophora tetrasperma* have been investigated.

Rhaphidophora tetrasperma 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 *Rhaphidophora tetrasperma* shows very good anti-corrosive properties [7, 9]. Its antibacterial, antioxidant activity was reported by Sharmila *et al*, [8].

Very little work has been done regarding *Rhaphidophora tetrasperma* phytochemical values. Hence, it is of interest to investigate the preliminary phytochemical analysis of aqueous, chloroform, ethyl acetate, acetone and propane extracts of *Rhaphidophora tetrasperma*.

MATERIALS AND METHODS

Collection of samples

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

Preparation of extracts

500 grams of aerial parts of dried powder of *Rhaphidophora tetrasperma* 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.

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].



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 Hydrochloric 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 Dragendorff'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.

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.

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.

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.

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.

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.

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 cardiac glycosoids.

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.

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.

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 showed to form positive result for the terpenoids.

Test for Triple Sugar

To 2 ml of extract 2drops of Molisch’s reagent was added and shaken well. 2ml of con. of con. H₂SO₄ 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.

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. Therefore, the present study was aimed to focus the various phytochemical constituents from various extracts of have been investigated.

Table shows the phytochemical analysis of aqueous, ethyl acetate, ethanol, acetone, chloroform and propane extracts of *Raphidophora tetrasperma*. Phytochemical screening of the crude extracts revealed the presence steriods 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. Tanins are present in all the extracts. 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 and ethanolic. chloroform ethanol and propane extracts. This knowledge could be used identifying the various medicinal potentials of this plant. Saponins were present in all the extract where as amino acid were present only the chloroform extract but remaining extracts shown negative results.

Table 1: Shows The Phytochemical Analysis Of *Raphidophora tetrasperma*

S.No.	PHYTOCHEMICAL CONSTITUENTS	AQUEOUS + ETHANOL 1:1	ETHYL ACETATE	ACETONE +ETHANOL	CHLOROFORM +ETHANOL	PROPANE
01	FLAVINOIDS	+	+	+	+	+
02	ALKALOIDS	+	+	+	+	+
03	TRI TEREPENOIDS	-	-	+	+	+
04	SAPONINS	+	+	+	+	+
05	TANNINS	+	+	+	+	+
06	TRIPLE SUGAR	-	-	-	-	-
07	AMINO ACID	-	-	+	+	-
08	ANTHROQUINONES	+	-	-	-	-
09	STEROIDS	+	+	+	+	+
10	PROTEINS	-	-	-	-	-
11	CARDIAC GLYCOSIDES	-	-	+	+	+

“+” – Presence, “-” – Absence.

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