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Research Article

**PRELIMINARY PHYTOCHEMICAL ANALYSIS OF
ADIANTUM LATIFOLIUM LAM. FROM KOTHIYAR,
KANYAKUMARI DISTRICT, TAMIL NADU, INDIA.****John Peter Paul, J.**

Assistant Professor of Botany & Director, Centre for Advanced Research in Plant Sciences (CARPS), St. Xavier's College (Autonomous), Palayamkottai - 627 002, Tamil Nadu, India.

Abstract:

Preliminary phytochemicals of Adiantum latifolium Lam. were screened with four different solvent extracts such as methanol, acetone, benzene and hexane. The preliminary phytochemical tests were conducted by Harborne method. In the preliminary phytochemical analysis of Adiantum latifolium Lam., the presence of twelve different types of secondary metabolites namely alkaloids, anthocyanin, anthraquinones, cardiac glycosides, coumarin, diterpenes, emodins, flavonoids, saponins, steroids, tannins and triterpenoids were recorded in the various extracts. From the results, it was noted that the four various solvent extracts of Adiantum latifolium Lam. showed the presence of a number of active secondary metabolites.

Key words: Phytochemical, Adiantum, Extracts, Harborne, Kothiyar

Corresponding Author:*Dr. J. John Peter Paul**

Assistant Professor & Director,
Centre for Advanced Research in Plant Sciences (CARPS),
Department of Botany,
St. Xavier's College (Autonomous),
Palayamkottai – 627 002
Tamil Nadu, India.

E-mail: johnarock2008@yahoo.com

Ph: 91-9442955038

QR code



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INTRODUCTION:

Phytoconstituents are the natural bioactive chemical compounds found in plants and phytochemistry is a distinct discipline where in between organic chemistry, plant biochemistry which closely related to natural products. It deals with a variety of organic substances accumulated in plants. The plants may be considered as a biosynthetic laboratory which not only produce chemical compounds like carbohydrates, protein and lipids as food, but also a multitude of compounds like glycosides, alkaloids, flavonoids, etc. which are used as medicines by man in various ways and means. Nowadays these biologically active metabolites from natural products have been in great importance for the scientists working on the phytochemical and pharmaceutical research. As a matter of fact, it has been estimated that today about 25% of all prescribed medicines are substances derived from plants [1, 2]. Recently chemical investigations of more than 285 wild indigenous medicinal plants show unknown compounds with promising biological activity [3]. In most cases, the evaluation of analgesic potential of methanol crude extracts from different plants has been carried out by *in vivo* tests [4, 5]. Plants based compounds have played a vital role in the development of several clinically useful drugs. With this background, the current study was focused on the preliminary phytochemical analysis of *Adiantum latifolium* Lam. which has never been reported.

MATERIALS AND METHODS:**Collection of Plant Sample**

The plant materials used in the present study was *Adiantum latifolium* Lam. belonging to the family Adiantaceae. The plant materials for the present study were collected from Kothiyar, located in Kanyakumari district, Tamil Nadu, India, during the month of December, 2016 and identified and confirmed by Pteridophyte flora of the Western Ghats - South India [6].

Preliminary phytochemical analysis

The different extracts (methanol, acetone, benzene and hexane) of *Adiantum latifolium* Lam. were tested for alkaloids, anthocyanin, anthraquinones, cardiac glycosides, coumarin, diterpenes, emodins, flavonoids, saponins, steroids, tannins and triterpenoids. Phytochemical screening of the extracts was carried out according to the standard methods [7].

Preparation of extracts

For the preparation of different extracts, the plant specimens were washed thoroughly and placed on blotting paper and spread out at room temperature in

the shade condition for drying. The shade dried samples were grounded to fine powder using a tissue blender. The powdered samples were then stored in the refrigerator for further use. 30g powdered samples were packed in Soxhlet apparatus and extracted with methanol, acetone, benzene and hexane for 8h separately [8].

Test for alkaloids

1ml of 1% HCl was added to the 2ml of extract in a test tube and was treated with few drops of Mayer's reagent. A creamy white precipitate indicates the presence of alkaloids.

Test for anthocyanin

2ml of extract was added with 1ml of 2N NaOH and heated for 5min. the formation of bluish green colour indicated the presence of anthocyanin.

Test for anthraquinones

2ml extract was mixed with benzene and 1ml 10% ammonia solution was added. The presence of a pink, red or violet color indicates the anthraquinones.

Test for cardiac glycosides

Take 2ml extract, 2ml of glacial acetic acid, 1ml of Conc. sulphuric acid and few drops of 5% ferric chloride. The formation of brown ring indicates the presence of cardiac glycosides.

Test for coumarins

1ml of extract was added with 1ml of 1N NaOH. The test tubes were kept in boiling water bath for few minutes and shaken well. The appearance of yellow colour indicates the presence of coumarins.

Test for diterpenes

1ml of extract was added to 1ml of distilled water and 10 drops of copper acetate solution. A emerald green color indicates the presence of diterpenes.

Test for emodins

1ml of plant extract was added to 2ml of NH₄OH and 3ml of benzene. A red color indicates the presence of emodins.

Test for flavonoids

A few drops of 1% NH₃ solution was added to 2 ml of extract in a test tube. A yellow Coloration indicates the presence of flavonoids.

Test for saponins

2ml of extract was shaken vigorously with 5ml distilled water to obtain stable persistent foam. The formation of emulsion indicates the presence of saponins.

Test for steroids

1ml extract was added with 2ml of chloroform and 1ml of sulphuric acid. The formation of reddish brown ring indicates the presence of steroids.

Test for tannins

To 2ml extract, 1ml of distilled water and 1-2 drops of ferric chloride solution was added and observed for brownish green or a blue black coloration indicates the presence of tannins.

Test for triterpenoids

2ml extract was mixed with 2ml of CHCl_3 in a test tube. 3ml Conc. H_2SO_4 was carefully added along the wall of the test tube to form a layer. An interface with a reddish brown coloration confirms the presence of triterpenoids.

For past few decades, compounds from natural sources have been gaining importance because of the vast clinical diversity that they offer. This had led to phenomenal increase in the demand for herbal medicines in the last two decades and or need has been felt for ensuring the quality, safety and efficacy of herbal drugs. The medicinal value of these plants lies in some chemical substances that produce a definite physiological action on the human body. In the present study, preliminary phytochemical analysis of *Adiantum latifolium* Lam. showed twelve different types of secondary metabolites (alkaloids, anthocyanin, anthraquinones, cardiac glycosides, coumarin, diterpenes, emodins, flavonoids, saponins, steroids, tannins and triterpenoids) in four different extracts namely methanol, acetone, benzene and hexane. Thus, totally (1x4x12) 48 tests were conducted for the presence or absence of the above compounds.

RESULTS AND DISCUSSION:**Table 1: Preliminary phytochemical analysis of different solvents of *Adiantum latifolium* Lam.**

Solvents	Methanol	Acetone	Benzene	Hexane
Alkaloids	+	-	+	+
Anthocyanin	-	-	-	-
Anthraquinones	-	-	-	-
Cardiac glycosides	-	+	+	+
Coumarin	-	+	+	-
Diterpenes	+	+	+	+
Emodins	+	-	-	-
Flavonoids	+	+	-	-
Saponins	+	+	+	+
Steroids	+	+	+	+
Tannins	+	+	+	+
Triterpenoids	+	-	-	-

Out of 48 tests were carried out in the selected extracts of *Adiantum latifolium* Lam., 28 tests gave positive results and the remaining produced negative results. The 28 positive results showed the presence of alkaloids, cardiac glycosides, coumarin, diterpenes, emodins, flavonoids, saponins, steroids, tannins and triterpenoids. *Adiantum latifolium* Lam. was observed with the presence of diterpenes, saponins, steroids and tannins in four different extracts, alkaloids and cardiac glycosides in three extracts, followed by coumarin and flavonoids in two different extracts, emodins and triterpenoids in only one extract and no result were found for anthocyanin and anthraquinones. Among the four different extracts, methanol extract showed the presence of the maximum number of eight compounds. Next to methanol, acetone and benzene extracts showed the presence of seven compounds, followed by hexane

extract showed the presence of six compounds (Table 1).

CONCLUSION:

From the present study, it can be concluded that *Adiantum latifolium* Lam. showed the presence of a number of active secondary metabolites namely alkaloids, cardiac glycosides, coumarin, diterpenes, emodins, flavonoids, saponins, steroids, tannins and triterpenoids. Among the various secondary metabolites studied, diterpenes, saponins, steroids and tannins in four different extracts, alkaloids and cardiac glycosides in three extracts, followed by coumarin and flavonoids in two different extracts, emodins and triterpenoids in only one extract and no result were found for anthocyanin and anthraquinones. Hence the present report may guide to the isolation and characterization of these active

secondary metabolites for the bio-efficacy and bioactivity of *Adiantum latifolium* Lam.

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