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Qualitative Phytochemical Analysis of Medicinal Plants Selected from Temperate, Tropical and Hill Regions

Aswathi Sreenivasan C V[1], Dr. T. Angayarkanni[2]

[1,2]Department of Biochemistry, Biotechnology and Bioinformatics Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore – 641043

ABSTRACT

The current study examines the phytochemical analysis of 15 therapeutic plants that were gathered from various places, including temperate, tropical, and hill/tribal areas. The plants gathered include Tridax procumbans, Achyranthus aspera, Amaranthus spinosus, Clitoria ternatea, Ruellia tuberosa, Euphorbia herta, Bougainvillea spectabilis, Aerva lanata, Zeucas aspera, and Ocimum basilicum. These plants have antioxidant, anti-inflammatory, anti-microbial, and anti-diabetic effects. First, numerous secondary metabolites were subjected to qualitative testing. Alkaloids, Saponins,Tannins, Steroids, Flavonoids, Terpenoids, Phlobitannins, Coumarins, Cycloglycosides, Phenols, and Quinones were all detected in plant extracts of these plants. Finally, the plants with comparable features were compared with the equivalent qualitative results for the quantitative study.

KEYWORDS: Different locations, Phytochemical analysis, Qualitative analysis, Ethanolic extract

ARTICLE DETAILS

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1) INTRODUCTION

The biological diversity of India is well-known, particularly the variety of flora. In recent years, there has been a growing understanding of the significance of medicinal plants. The plant kingdom offers a treasure trove of potential medications. Drugs made from plants are widely available, inexpensive, efficient, and safe, and they seldom ever cause side effects. The most obvious choice for looking at the current quest for therapeutically effective novel medications, such as anticancer drugs [1], antibacterial drugs [2], anti-diabetic, and anti-inflammatory pharmaceuticals, is the plants that have been chosen for medical use over thousands of years. The World Health Organization (WHO) states that the best source for a wide range of medications would be medicinal plants. People from affluent countries employ conventional medications, which contain chemicals, in about 80% of cases. [6,7,8].

In the present study, Qualitative analysis were carried out in different plants collected from various locations which includes Tropical, Temperate and Hills areas.

Tropical plants-*Euphorbia hirta, Ocimum bacilicum, clitoria ternatea,Tridax procumbens, Amaranthus spinosus, Aerva lanata, Ruellia tuberosa, Calotropis gigantea, Abutilon indicum*

Temperate plants-*Bougainvillea spectabilis, Amaranthus viridis, Plassiflora foetida*

Hilly region plants-*Achyranthus aspera,Leucas aspera,Acalypha indica*

And also compared the plants which has same properties with their Secondary metabolites

2) MATERIALS AND METHODS

2.1) Collection of plant materials

Fresh 15 medicinal plants *Ruellia tuberosa, Arena lanata,Abutilon indicum ,Calotropis gigentea, Bougainvillespectabilis, Acalypha indica ,Amaranthus viridis ,Clitoriaternatea, Amaranthus spinosus, Ocimum basilicum,Achyranthus aspera, Pasaiflora foetida ,Leucas aspera,Tridax procumbens* and *Euphorbia hirta* were collected from different locations. The plant materials were taxonomically identifiedand authenticated by Agricultural University campus, Botanical Survey of India(BSI), Coimbatore [9,20].

2.2) Chemicals required

Mayer's reagent, 1% lead acetate, acetic acid, chloroform, Sulfuric acid,1% Hydrochloric acid, 10% Sodium hydroxide, 1% Ferric chloride and3% Ferric chloride.

3) METHODOLOGY

3.1) Preparation of plant extracts

The collected plants were washed thoroughly in tap water to remove dust particles [22]. Then it is washed with distilled water for two times. Then plants were chopped coarsely, using knife and grinded. Then the grinded sample is soaked in ethanol for 24 hours and kept in shaker incubator to prevent growth of microorganisms in the ethanolic extract of plants. After 24 hours, the extract was filtered using No.1Whatman filter paper and stored in air tight container for further analysis [22].

3.2) Qualitative Analysis

3.1) Test for alkaloids (Mayer's test):

To the 1ml of extract, 1 ml of Mayer's reagent (Potassium iodidesolution) was added. Formation of whitish yellow or cream coloured precipitate indicates the presence of alkaloids

3.2) Test for steroids (Libermann Burchard test)

To the 1ml of extract,2ml of chloroform and 2ml of acetic acid and 2mlof concentrated sulphuric acid were added. Formation of violet to blueor green colour indicates the presence of steroids.

3.3) Test for terpenoids

To the 1 ml of extract, 2ml of acetic acid and 1ml of sulphuric acid wereadded. Formation of blue green ring indicates the presence of terpenoids.

3.4) Test for flavonoids

To the 1 ml of extract, 1ml of concentrated sulphuric acid were added.A orange colouration indicates the presence of flavonoids.

3.5) Test for saponins (Froth test)

To the 1 ml of extract, 5 ml of distilled water was added and shaked vigorously. Formation of froth indicates the presence of Saponins.

3.6) Test for phenols (Ferric Chloride test)

To the 1ml of extract, add 5-6 drops of 3% Ferric chloride solution and observe for the formation of deep blue color.

3.7) Test for tannins (Ferric chloride test

To the 1ml of extract, 1ml of 1% ferric chloride solution was added.Formation of blue, black or brownish green colour indicates the presence of tannins.

3.8) Test for cardiac glycosides (Keller killiani test)

To the 1ml of extract, add 5ml of distilled water and evaporate it to dryness. Then to the Sample add 2ml of glacial acetic acid containing trace amount of ferric chloride solution. Then add 1ml of concentrated sulphuric acid to the sides of the tube. Formation of brown ring underlayed with blue colour indicates presence of cardiac glycosides.

3.9) Test for Coumarins

Take 1ml of extract and add 1.5ml of 10% NaOH, then observe for theformation of yellow colour which indicates the presence of coumarins.

3.10) Test for Quinones

A small amount of extract was treated with concentrated Hcland observed for the formation of yellow precipitate(orcolouration).

3.11) Test for phlobatannins (Hcl test):

To 2ml of extract, added dilute HCl and observed for red precipitatethat indicates the presence of phlobatannins.

4) RESULT AND DISCUSSION

The qualitative phytochemical analysis of collected plants are summarized in Table1, Table 2 and Table 3 respectively. The phytocompounds of those plants are compared with their medicinal properties and the common phytoconstituents for the specific medicinal property were identified which is collectively summarized in Table 4.

 Corresponding Author: Aswathi Sreenivasan C V

TABLE 1

TESTS	*Achyranthus aspera*	*Passiflora foetida*	*Leucas aspera*	*Tridax porcumbens*	*Euphobia hirta*
Alkaloids	++	++	++	++	++
Saponins	++	++	++	++	-
Tannin	++	++	++	++	++
Steroid	++	+(Trace)	++	++	++
Flavonoids	++	-	++	++	++
Terpenoid	++	+(Trace)	++	++	++
Phlobitannins	-	-	++	+(Trace)	-
Coumarins	-	-	-	-	-
Cycloglycosides	++	++	++	+(Trace)	-
Phenols	-	++	-	++	++
Quinone	-	-	-	-	-

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TABLE 2

TESTS	*Amaranthus viridis*	*Amaranthus spinosus*	*Clitoria ternatea*	*Aacalypha indica*	*Ocimum basilicum*
Alkaloids	++	+	-	++	+
Saponins	++	++	++	++	+
Tannin	++	+	++	+	+
Steroid	++	-	+	++	++
Flavonoids	+	+	++	++	+
Terpenoid	+	-	+	-	++
Phlobitannins	-	++	++	-	-
Coumarins	++	-	+	-	++
Cycloglycosides	+	++	++	++	++
Phenols	++	-	++	++	+
Quinone	-	-	-	-	-

 Corresponding Author: Aswathi Sreenivasan C V

TABLE 3

PLANTS	PROPERTY	COMMON PHYTOCONSTITUENTS
Euphorbia hirta, *Tridax procumbens,* *Acalypha indica,* *Clitoria ternatea,* *Aerva lanata,* *Bougainvillea spectabilis.*	Anti-diabetic	Flavonoid Phenol Tannin
Amaranthus viridis, *Tridax procumbens,* *Amaranthus spinosis,* *Clitoria ternatea,* *Acalypha indica,* *Ocimum basilicum,* *Plassiflora foetida,* *Achyranthus aspera,* *Euphorbia hirta,* *Aerva lanata,* *Bougainvillea spectabilis,* *Calotropis gigantea,* *Abutilon indicum,* *Ruellia tuberosa.*	Anti-inflammatory	Tannin Flavonoid Cycloglycoside steroid
Leucas aspera, *Achyranthus aspera,* *Clitoria ternatea,* *Amaranthus spinosus,* *Tridax procumbens,* *Abutilon indicum,* *Bougainvillea spectabilis.*	Anti-microbial	Saponin Cycloglycoside Tannin
Amaranthus viridis, *Tridax procumbens,* *Amaranthus spinosus,* *Ocimum basilicum,* *Plassiflora foetida,* *Achyranthus aspera, Leucas aspera.*	Anti-oxidative	Saponin Steroid Cycloglycoside Tannin

TABLE 4

TESTS	*Abutilon indicum*	*Calotropis giganbea*	*Ruellia tuberosa*	*Bougainvillae spectabilis*	*Aerva lanata*
Alkaloids	+	+	++	+	-
Saponins	++	-	-	++	-
Tannin	+	+	++	++	++
Steroid	+	++	++	+	-
Flavonoids	+	++	++	++	++
Terpenoid	++	-	++	+	-
Phlobitannins	+	-	-	-	-
Coumarins	-	-	++	-	-
Cycloglycosides	++	+	+	++	++
Phenols	++	+	++	-	++
Quinone	-	++	-	-	++

5) CONCLUSION

The phytochemical analysis of various plants collected from different locations which contain diverse medicinal properties such as Anti-inflammatory, Anti-diabetic, Anti-microbial, Anti-oxidant properties etc.., contain several phytoconstituents in common according to the properties which the pant possess. The plants that possess Anti-diabetic property contain phytoconstituents like Flavonoid, phenol and tannin in common in plenty or trace amounts. Similarly, Anti-inflammatory plants contain constituents such as tannin, flavonoid, cycloglycosides and steroid. Anti-microbial plants contain saponin, cyclo glycosides, tannin and Anti-oxidant plants contain saponin, steroid, cycloglycosides and tannin. This comparative study reveals that the common phytoconstituents may contribute to the specific properties of the plants analysed.

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