Research Article

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QUALITATIVE PHYTOCHEMICAL ANALYSIS OF *BARLERIA PRATTENSIS* SANT (ACANTHACEAE)

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Received on: 12/01/17 Accepted on: 18/02/17

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DOI: 10.7897/2277-4343.08147

ABSTRACT

The present study was undertaken to assess the phytochemical constituents present in the leaf, stem and root extract of *Barleria prattensis* Sant (Acanthaceae). Leaf, stem and root extracts were prepared from Aqueous and organic solvents like Petroleum ether, Chloroform, Ethyl acetate and Ethanol. The preliminary phytochemical screening of all the extracts was done. The leaf, stem and root of the plants showed the presence of alkaloids, flavonoids, phenol, tannin, steroids, terpenoidsand cardiac glycosides. The constituents reported from the present study gives further idea for detailed studies on clinical and therapeutic aspects.

Key words: Acanthaceae, *Barleria prattensis* Sant , Leaf, stem and root extract, Phytochemical screening.

INTRODUCTION

Plants have played a significant role in maintaining human health and improving the quality of human life for thousands of years[1]. Around 70% of Indian medicinal plants are found in the tropical zone such as Western and Eastern Ghats. The Western Ghats region of Kerala is great emporium and a treasure of ethnobotanical wealth[2]. In India, almost 95% of the prescriptions are plant-based in the traditional systems of Unani, Ayurveda and Siddha[3]. Currently, the global demand of herbal medicines is increasing rapidly because of their higher safety margin and low cost[4].

The Acanthaceae is a large dicotyledonous flowering plant family in the order Lamiales, which comprises approximately 220 genera and 4,000 species[5].It is composed of mainly annual and perennial herbs, shrubs climbers, and some large trees. The leaves are simple, opposite, estipulate and usually entire-margined, with round to quadrangular stems. The leaf margins are entire, serrated or dentate and they have solitary or racemose inflorescence[6]. A number of plant species in Acanthaceae has significant medicinal values[7]. Several Acanthaceae members are widely used by many ethnic communities as traditional medicine throughout the world[8].Acanthaceae family possess antifungal, cytotoxic, anti-inflammatory, anti-pyretic, antioxidant, insecticidal, hepatoprotective, immunomodulatory, anti-platelet aggregation and anti-viral potential[9].*Barleria prattensis*is an endemic medicinal plant belongs to the family Acanthaceae and distributed in Western Ghats region of Kerala.This is traditionally used as medicinal plant for curing fever, energy tonic and increasing lactation level by the tribal people. Hence *B.prattensis* was selected to analyse its potential efficiency.

MATERIALS AND METHODS

Collection of plant Materials

Plant materials (leaf, stem and root) was collected from the Western Ghat regions of Malappuram District, Kerala, India. The plant was authenticated by the Taxonomist Dr. Binu Thomas, Department of Botany St. Joseph's College, Devagiri, Kozhikode – 673008, Kerala, India. The Specimen voucher is maintained in the Institute.

Preparation of extract

Collected plant materials like leaf, stem and root are washed with distilled water and shade dried for a week. The dried sample were manually ground to fine powder using pulverizer and passed through 40 mesh sieve and stored in air tight containers. The coarsely powdered plant material was weighed to 25g and Soxhlet extracted with petroleum ether, chloroform, ethyl acetate and ethanol separately for 12 hours. The filtrate was evaporated to dryness under reduced pressure using rotary vaccum evaporator and the solid mass obtained was stored at 4ºC until further use. The stored filtrate was used for the phytochemical studies.

Preliminary phytochemical

The qualitative tests were done to find out the presence of the active phytochemical constituents in the defatted extracts.

Alkaloids test (Mayer's test)

The plant extract was evaporated to dryness and the residue was heated on a boiling water bath with 2% hydrochloric acid. After cooling, the mixture was filtered and treated with a few drops of Mayer's reagent. Formation of turbidity or yellow precipitation showed the presence of alkaloid.

Glycosides

Glycosides are compounds which upon hydrolysis give rise to one or more sugars (glycone) and a compound which is not a sugar (aglycone or genine). To the solution of the extract, few drops of sodium hydroxide was added, and observed for yellow colour which shows the presence of glycosides.

Terpenoids and steroids (Salkowski's test)
1 ml of extract was taken in a boiling tube and 2 ml of concentrated sulphuric acid was added slowly and red violet color was observed for terpenoid and green bluish color for steroids.

Flavonoids (Ferric chloride test)
In a test tube containing 1ml of extract, 5-6 drops of dilute hydrochloric acid was added and small pieces of magnesium were added. Red color was observed for flavonoids and orange color for flavones.

Saponins (Foam test)
1 gm of extracts was added to 5ml of distilled water in a test tube. The solution was shaken vigorously and observed for a stable persistent froth which indicate the presence of saponin.

Phenols (Ferric chloride test)
1 ml of extract was taken in a test tubet to this few drops of neutral 5% ferric chloride solution are added. A dark green color indicates the presence of phenolic compounds.

Tannins (Braemer's test)
To 1ml of extract solution 1-2 drops of lead acetate solution was added. Red precipitate was formed indicating the presence of tannins.

Cardiac glycosides (Keller-killani's test)
5ml of extract was taken in a boiling tube to which 2ml of glacial acetic acid containing one drop of ferric chloride solution was added and 1ml of concentrated sulphuric acid was added slowly. Appearance of brown ring indicates the presence of cardiac glycosides.

Resin (Sulphuric acid test)
5ml of extract was taken in a boiling tube to which 2-3ml of acetic anhydride was added, dissolved by gentle heating and 0.5ml of sulphuric acid was added. Bright purple colour was produced it indicates the presence of resin.

Triterpenoids
2ml of extract was added with 1 ml of acetic anhydride followed by the addition of 2ml concentrated sulphuric acid. Formation of reddish violet colour indicates the presence of triterpenoids.

Reducing sugar
The crude extract was shaken with 5 ml of distilled water and filtered. The filtrate was boiled with drops of Fehling's solution A and B for 2 minutes. An orange red precipitate indicates the presence of reducing sugar.

Figure 1: Image of *Barleria pratensis* Sant (Acanthaceae)

Table 1: Preliminary phytochemical analysis of different solvent leaf extracts of *B.pratensis*

Phytochemical constituents	Petroleum ether	Chloroform	Ethyl acetate	Ethanol	Aqueous
Alkaloid	_	+ +	++	++	-
Flavonoid	_	+	++	+++	+
Phenol	_	++	++	+++	+
Tannin	_	++	++	++	+
Glycoside	_	_	_	_	_
Saponin	_	_	_	_	_
Resin	_	_	_	_	_
Steroids	_	++	++	++	+
Terpenoids	_	_	+	++	+
Cardiacglycosides	+++	++	++	+++	+
Triterpenoids	_	_	_	_	_
Reducing sugar	_	_	_	_	_

(+) → Present (-) → Absent.

Table 2: Preliminary phytochemical analysis of different solvent stem extracts of *B.pratensis.*

Phytochemical constituents	Petroleum ether	Chloroform	Ethyl acetate	Ethanol	Aqueous
Alkaloid	_	+	+	++	+
Flavonoid	_	+	+	++	+
Phenol	_	++	+	+++	+
Tannin	+	++	+	++	+
Glycoside	_	_	_	_	_
Saponin	_	_	_	_	_
Resin	_	_	_	_	_
Steroids	+	+	+	++	+
Terpenoids	_	_	+	+++	+
Cardiac glycosides	++	+++	++	+++	++
Triterpenoids	_	_	_	_	_
Reducing sugar	_	_	_	_	_

(+) → Present (-) → Absent.

Table 3: Preliminary phytochemical analysis of different solvent root extracts of *B.pratensis*

Phytochemical constituents	Petroleum ether	Chloroform	Ethyl acetate	Ethanol	Aqueous
Alkaloid	+	+	+	++	+
Flavonoid	_	+	+	+	+
Phenol	_	++	+	+	+
Tannin	+	++	++	+++	+
Glycoside	_	_	_	+	_
Saponin	_	_	_	_	_
Resin	_	_	_	_	_
Steroids	+	++	+	++	+
Terpenoids	_	_	+	+++	+
Cardiac glycosides	++	+++	++	+++	++
Triterpenoids	_	_	_	_	_
Reducing sugar	_	_	_	_	_

(+) → Present (-) → Absent.

RESULT AND DISSCUSSION

Phytochemical are organic chemicals that are produced by plants. They may be nutritive or non-nutritive in nature. These can be regarded as naturally occurring non-nutritive chemicals of plant origin. In the present study the phytochemical compounds present in *B.pratensis* leaf, stem and root illustrated in (Table 1-3). This plant is highly medicinal and endemic to Western Ghats region, which belong to the family Acanthaceae. The various solvent systems like petroleum ether, chloroform, ethyl acetate and ethanol were employed to extract the various phytochemical constituents in shade dried plant parts. The qualitative test of extracts confirmed in the presence of alkaloid, flavonoid, phenol, tannin, steroids, terpenoids and cardiac glycosides in leaf, stem and root extracts. Leaf extract showed the better result when compared to stem and root extracts. The presence of these secondary metabolites may vary with solvents. This might be due to various degrees of solubility of different solvents for different phytoconstituents and the phytochemical constituent Cardiac glycoside is indicated in high degree in all extracts like leaf, stem and root extract. They have been used traditionally as arrow poisons, abortifacients, emetics, diuretics, and heart tonics and recent findings on cellular pharmacology of cardiac glycosides as they relate to treatment of human cancer[10]. Therefore the plant *B.pratensis*is highly medicinal and needed wide research.

CONCLUSION

The present investigation proved that the presence of Alkaloid, Flavonoid, Phenol, Tannin, Steroids, Terpenoids and Cardiac glycosides in leaf, stem and root extracts. The phytochemical constituent Cardiac glycoside is indicated in high content in all extracts like leaf, stem and root extract. The results are proved that plant *B.pratensis* is highly medicinal and effective for the treatment of various ailments. A more comprehensive research is needed to isolate the essential compounds in this medicinal plant. More over this study also highlights the importance of conservation and sustainable utilization of such potential medicinal herbs to future generation.

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Cite this article as:

Renjini Haridas, Sumathi P, Sangeeth Thekkan and Binu Thomas. Qualitative phytochemical analysis of *Barleria prattensis* Sant (Acanthaceae). Int. J. Res. Ayurveda Pharm. 2017;8(Suppl 1):97-100 http://dx.doi.org/10.7897/2277-4343.08147

Source of support: Nil, Conflict of interest: None Declared