

Research Article



Phytochemical Evaluation of the Ethanolic and Aqueous Extracts of *Ormocarpum Sennoides* (Willd) Dc. Prodr. (Leaf), *Zehneria Scabra* (L. F.) Sond. (Tuber) and *Bauhinia Tomentosa* Linn. (Leaf)

Thamacin AM, Britto JS, Sinjumol T, Mariat G, Immanuel SM, Krishnakumar J, Raphael RM

The Rapinat Herbarium and Centre for Molecular Systematics, St. Joseph's college (Autonomous), Tiruchirappalli, affiliated to Bharathidasan University, India.

*Corresponding author's E-mail: thama2u@gmail.com

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ABSTRACT

Ormocarpum sennoides (Willd) DC. Prodr. (leaf), *Zehneria scabra* (L. f.) Sond. (tuber) and *Bauhinia tomentosa* Linn. (leaf) are most commonly used medicinal plants to cure human illness. Qualitative phytochemical screening was carried out in these plants using aqueous and ethanolic extracts. The various extracts revealed the presence of flavonoids, alkaloids, Saponins and several secondary metabolites.

Keywords: Medicinal plants, Phytochemical, Secondary metabolites.

INTRODUCTION

Knowledge of the chemical constituents of plants is desirable because such information will be a value for synthesis of complex chemical substances. The medicinal value of these plants lies in the chemical substances that produce a definite physiological action in the human body. Phytochemicals are chemical compounds formed during the plants' normal metabolic processes.¹ They are often referred to as secondary metabolites of which there are several classes including alkaloids, flavonoids, coumarins, glycosides, gums, polysaccharides, phenols, tannins, terpenes and terpenoids.² In modern medicine, plants are used as sources of direct therapeutic agents, as models for new synthetic compounds, and as a taxonomic marker for discovery of new compounds. They serve as a raw material base for the elaboration of more complex semi synthetic chemical compounds.³ Plants, especially the higher ones have been described as the sleeping giants of drug and development and they have been screened for their chemicals that are potentially potent.⁴ The importance of medicinal plants, and the contribution of phytomedicines to the well-being of a significant number of the world's population, has attracted interest from a variety of disciplines. Our approach involved the collection, identification, extraction and phytochemical of selected medicinal plants found in Gingee taluk of Villupuram district, Tamilnadu.

Ormocarpum sennoides (Papilionoideae) is a shrub which is extremely efficacious in mending bone fractures. Once predominantly present all over Tamilnadu, it is now reported only few northern districts of Eastern Ghats.⁵⁻⁷ *Zehneria scabra* (Cucurbitaceae) is a tuberous herbaceous perennial a wild yam type seen in scrub jungles. *Bauhinia tomentosa* (Caesalpinaceae) is a shrub with downy branches, leaves broader than long, curvaceous and pubescent below. It prefers full sun and

needs a moderate amount of water. It produces bright yellow flowers; fruits are pea likes, slender and velvety.⁸ The present study seeks the preliminary screening of various phytochemical present in these medicinal plants.

MATERIALS AND METHODS

Plant Collection and Identification

Fresh leaves of *Ormocarpum sennoides* and *Bauhinia tomentosa* and tuber of *Zehneria scabra* were collected from Pakkamalai hills (2263.81 ha) and Thandavasamuthiram hills (318.49 ha) of Gingee, Villupuram during February – March, 2014. Villupuram district lies between 11 38' 25" N and 12 20' 44" S: 78 15' 00" W and 79 42' 55" E with an area of 7222.03 Hec and between 11 – 8' latitudes and 78 – 38' longitudes [9]. Taxonomic identification of these plants was carried out by John Britto, Director, The Rapinant Herbarium, St. Joseph's College, Tiruchirappalli. A voucher specimen of each experimental plant was deposited at The Rapinant Herbarium.

Plant Extraction

The leaves and tubers of selected species were washed thoroughly with normal tap water. The tuber was sliced into smaller pieces and the leaves were dried in shade at room temperature. They were crushed to powder using grinding machine. Powders were stored in air tight container bottle with proper labeling of the experimental samples. The powdered materials of 10 gm weighed using electronic balance and were soaked in ethanol and distilled water using separate conical flasks. The mouths of the conical flasks were closed with aluminium foil to reduce the volatilization of the solvent. The flasks were kept in rotary shaker for 5 days. After 5 days, the solvent along with solubilized components were collected and filtered through Whatman No. 1 filter paper.



Preliminary Phytochemical Analysis

Qualitative phytochemical tests for the identification of alkaloids, flavonoids, steroids and terpenoids were carried out for all the extracts by the method described by Mukherjee.¹⁰

Test for Phenol (Ferric chloride test)

To 1ml of the leaf extract and 1ml of tuber extract 2ml of distilled water was added followed by few drops of 10% ferric chloride. Formation of blue or black colour indicates the presence of phenols.

Test for Sterols (Liebermann-Burchard test)

To the test solution, 3-4 drops of acetic anhydride was added, the solution was boiled cooled and conc. Sulphuric acid (3 drops) was added. A brown ring appears at the junction of the two layers. The upper layer turns green showing the presence of sterols.

Test for Tannins

(a) Gelatin test: To 2ml test solution, 1% Gelatin solution containing 10% sodium chloride was added to obtain a white precipitate.

Test for Flavonoids

- (a) Zinc chloride reduction test: To 2ml test solution, a mixture of zinc dust (Merck, India) and conc. HCl (Qualigens, India) was added. A red colour is obtained after few minutes.
- (b) Alkaline reagent test: To 2ml test solution, sodium hydroxide (Qualigens, India) solution was added to give a yellow or red colour.

Test for Alkaloids

(a) Mayer's test: To 2ml test solution, 2N HCl was added. The aqueous layer formed was decanted and Mayer's reagent (Qualigens, India) was added to it. A cream coloured precipitate indicates the presence of alkaloids.

Test for fats and fixed oils

- (a) Stain test: Small amount of the extract was pressed between two filter papers; the stain on the filter paper indicates the presence of fixed oils.
- (b) Saponification test: Few drops of 0.5N alcoholic potassium hydroxide was added in small quantity to the extract solution with a drop of phenolphthalein and heated on a water bath for 1-2h. The formation of soap or partial neutralization for the alkali indicates the presence of fats and fixed oils.

Test for Glycosides

To 2ml test solution, equal quantity of Fehling's solution A and B was added and solution was heated. A brick red precipitate indicates the presence of glycosides.

Test for proteins and amino acids

- (a) Millon's test: To 2ml test solution, Millon's reagent is added which gives a white precipitate, which on heating changes to red.
- (b) Ninhydrin test: To 2ml test solution, Ninhydrin solution was added and the solution was boiled. Amino acids and proteins when boiled with 0.2% Ninhydrin reagent show a violet colour.

RESULTS AND DISCUSSION

Pakkamalai and Thandavasamuthiram hills of Gingee Range have a rich diversity of medicinal plants. The inhabitants and herbal practitioners in the study area are aware of the uses of many medicinal plants. The selected experimental plants as shown in Table 1 are some of the commonly exploited plants for medicinal purposes by local people. The usages of such plants are mentioned in the same table.

The extracts were examined for their physical characterization like colour, odor and consistency. The color of the aqueous extracts of the experimental samples were yellowish brown and while ethanolic extracts showed the colour of yellow and dark yellow. The consistency level of all the extracts were semi-solids and the odors were characteristics in two samples and sample tuber was odorless. Presence of odor showed the presence of desired phytochemicals. The result of the above study is compiled in Table 2. Different chemical tests were performed to determine the nature of the chemical constituents.

The dual phytochemical screening (aqueous and ethanolic) of the extracts of *Ormocarpum sennoides* (leaf) revealed that phenol, tannins, alkaloids, Saponins, proteins and amino acids were present in both the extracts and while flavonoids was present only in aqueous extract. Tests showed that steroids and glycosides were totally absent in the dual phytochemical screening of the extracts (Table 3).

Table 1: Various medicinal uses of the experimental plants

Name of the plant	Part used	Uses
<i>Ormocarpum sennoides</i>	leaf	Leaf powder is taken along with honey or milk to strengthen bone and when its paste is tied on the fracture it heals the bone.
<i>Bauhinia tomentosa</i>	leaf	Leaf is taken with honey to stop vomiting; it is cooked and eaten as green vegetable to increase appetite.
<i>Zehneria scabra</i>	tuber	Tuber is consumed for the snakebites; the tuberous herbaceous perennial plant is grown at home to keep away snakes; it is also used for diabetes.



Bauhinia tomentosa (leaf) in the dual phytochemical screening revealed the presence of phenol, tannins, flavonoids, alkaloids, Saponins, amino acids and proteins in both extracts. Steroids and glycosides were present only in aqueous extracts and while the ethanolic extract showed the absence of them. The presence of steroids was observed only in ethanolic extract (Table 3).

Zehneria scabra (tuber) showed the presence of relatively very less amount of the secondary metabolites in the dual

phytochemical screening of the extracts. Phenol, steroids, glycosides, proteins and amino acids were present in both the extracts and while tannins, flavonoids, alkaloids, Saponins were completely absent in them (Table 3).

Therefore, the dual phytochemical screening of 3 medicinal plant extracts revealed the presence of secondary metabolites more in the leaf than the tuber or root as because leaf is involved in more metabolic activities as compared to the root or tuber.

Table 2: Physical characteristics of the extracts

Name of the Extracts	Name of plant	Part used	Consistency	Colour	Odor
Ethanolic extract Aqueous extract	<i>Ormocarpum sennoides</i>	leaf	Semi-solid Semi-solid	dark green greenish brown	characteristic characteristic
Ethanolic extract Aqueous extract	<i>Bauhinia tomentosa</i>	leaf	Semi-solid Semi-solid	dark green greenish brown	characteristic characteristic
Ethanolic extract Aqueous extract	<i>Zehneria scabra</i>	tuber	Semi-solid Semi-solid	yellow Yellowish brown	no odor no odor

Table 3: Chemical tests in the aqueous and ethanolic extracts

Name of the plants	Part used	Phytoconstituents	Aqueous extract	Ethanolic extract
<i>Ormocarpum sennoides</i>	leaf	Phenol	+	+
		Steroids	-	-
		Tannins	+	+
		Flavonoids	+	-
		Alkaloids	+	+
		Saponins	+	+
		Glycosides	-	-
		Proteins	+	+
		Amino acids	+	+
<i>Bauhinia tomentosa</i>	leaf	Phenol	+	+
		Steroids	+	-
		Tannins	+	+
		Flavonoids	+	+
		Alkaloids	+	+
		Saponins	+	-
		Glycosides	+	-
		Proteins	+	+
		Amino acids	+	-
<i>Zehneria scabra</i>	tuber	Phenol	+	+
		Steroids	+	+
		Tannins	-	-
		Flavonoids	-	-
		Alkaloids	-	-
		Saponins	-	-
		Glycosides	+	+
		Proteins	+	+
		Amino acids	+	+

(+) = Present, (-) = Absent



CONCLUSION

The presence of phytoconstituents justify the use of selected species for treating different ailments and have a potential of providing useful drugs of human use. In the present study, it is seen that most of the biologically active phytochemicals were present in both ethanolic and aqueous extracts of *Ormocarpum sennoides* (leaf) *Bauhinia tomentosa* (leaf) and *Zehneria scabra* (tuber). Since both the extracts revealed more phytoconstituents, they can be considered beneficial for further investigation. And also a proper documentation of such medicinal plants along with their conservation is a dire need in the study area.

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