



PHYTOCHEMICAL ANALYSIS OF OPERCULINATURPETHUM (LINN.) SILVA MANSO- AN IMPORTANT MEDICINAL PLANT OF INDIA.

Botany

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ABSTRACT

Operculinaturpethum, L. Silva Manso is an important medicinal plant belonging to the family Convolvulaceae. It is commonly known as Trivrit and used in various traditional systems of medicine in India, i.e. Ayurveda, Siddha and Unani. The plant is a perennial aromatic climber with many medicinal properties like antimicrobial, ulcer protective, anti-inflammatory, analgesic activity, anticancer and antioxidant properties etc. Root bark, root, stem, and leaves have high medicinal value. Root bark contains 10% 'turpethin', which is a glycoside, analogue of Jalapine and Convolvulin. Turpethin is mainly responsible for purgative action of *Trivrit* and safer substitute for jalap. In the present study, preliminary phytochemical analysis of root and root bark of *Operculinaturpethum* was done. The roots were shade dried, crushed and powdered. The powder was extracted in Soxhlet apparatus by using four different solvents like Petroleum ether, Ethyl acetate, Chloroform, Methanol. The extract was analyzed for presence of different phytochemicals by using standard methods. Our findings revealed the presence of saponins, steroids, alkaloids, terpenoids, flavonoids and cardiac glycosides. Among the solvents, Ethyl acetate showed the presence of alkaloids, steroids and glycosides compounds. Presence of alkaloids, steroids, tannins and glycosides was observed in Chloroform extract. The methanolic extract showed the presence of alkaloids, flavonoids, saponins and glycosides. Thus, a preliminary screening is essential to understand the nature of the bioactive compounds and their pharmacological action of *Operculinaturpethum*.

KEYWORDS

Operculinaturpethum, phytochemicals, bioactive compounds, turpethin.

INTRODUCTION

Plant kingdom harbours a wide range of bioactive compounds with various therapeutic properties which are valuable in treating many human diseases. A recent research study on phytochemicals is primarily focussed on human health, disease prevention and development of therapeutic inventions. Recently, there has been a major comeback in screening indigenous traditionally used medicinal plants, to study chemical profile. This will help in identifying potent bioactive compounds and contributes to the development of pharmacologically active compounds.

Operculinaturpethum (L.) Silva Manso commonly known as Trivrit, is an important medicinal plant, belongs to the family Convolvulaceae. It is utilized in more than 130 Ayurvedic herbal formulations.^{1,2} Trivrit is used in traditional medical practices of Ayurveda for treatment of various diseases like edema, constipation, hepatosplenomegaly (liver and spleen enlargement), intoxication, haemorrhoids, obesity, abdominal tumors, ulcers and skin disorders.^{3,4}

It possesses many important medicinal properties like antimicrobial, ulcer protective, anti-inflammatory, analgesic activity, anticancer and antioxidant properties etc.^{5,6} It is also an important herb used in Virechana (i.e. therapeutic purgation), one of the procedures of Ayurvedic Panchakarma therapy.

Botanical Description

Operculina turpethum native to South east Asian countries i.e. India, Nepal, Bangladesh, etc and also distributed in parts of Africa & Australia, West Indies. *O. turpethum* is a perennial aromatic climber with long twisting pubescent, angled stem, which becomes very tough latter. The stem exudes milky latex when a cut is made.

The leaves are simple, pubescent and chordate in shape. The flowers are white, campanulate, borne in cymes. Fruits are capsules with 4 black, smooth seeds (Figure 1). Flowering and fruiting occur twice a year.

Root bark, root, stem, and leaves of Trivrit have high medicinal value. It contains 10% 'turpethin', which is a glycoside analogue of Jalapine and Convolvulin. It also contains Turpethinic acids- A, B, C, D, & E, some other soluble resins, volatile oils etc.⁸ Turpethin is mainly responsible for purgative action of Trivrit and is a safer substitute for jalap.⁹



Fig 1a *Operculina turpethum* plant with flowers



Fig 1b *Operculina turpethum* plant with fruits



Fig 1c *Operculina turpethum* plant with seeds



Fig 1d Operculina turpethum roots

O. turpethum is widely utilized in various traditional systems of medicines in India. Hence, the present study of phytochemical investigation of root extraction with various solvents was undertaken.

MATERIALS & METHODS

Collection of plant material: -

The *Operculina turpethum* plants were collected from botanical garden of Konda Laxman Horticultural University, Rajendranagar, Telangana in India. The plant was authenticated by the Department of Botany of Osmania University & voucher specimen has been submitted to the Herbarium, Department of Botany Osmania University, Hyderabad.

Drying & Preparation of root extract:

The roots of *O. turpethum* were thoroughly cleaned and cut into small pieces. The roots were dried in a hot air oven at 40 degrees centigrade to remove the moisture content. The dried roots were powdered by a mechanical grinder. The powder was sieved twice to get the fine powder.

The extraction process was carried using different solvents successively in the order of increasing polarity. The root powder was extracted successively in the Soxhlet apparatus by using four different solvents like Petroleum ether, Ethyl acetate, Chloroform, Methanol. The solvent was removed and root extract was isolated. The extracts from various solvents were used for analysis of presence of different phytochemicals Alkaloids, Flavonoids, Saponin, Steroids, Phenols, Tannins, Glycosides etc.

Screening the root extract for presence of phytochemicals:

Various tests have been conducted qualitatively to find out the presence or absence of bioactive compounds, using standard procedures.^{10,11}

1. Detection of Alkaloids:

Extracts were dissolved in dilute Hydrochloric acid and filtered

Mayer's Test:

To 2.0 ml extract, two to three drops of Mayer's reagent were added by the sides of test tube. Appearance of white creamy precipitate indicates the presence of alkaloids.

2. Test for Flavonoids :

To 2.0 ml of test solution, add few fragments of magnesium ribbon magnesium turnings. A few drops of concentrated HCl was added and Boiled for five minutes. A red colour (Tomato red color) indicates the presence of flavonoids.

3. Test for Saponins: (frothing test).

About 0.5g of the powdered drug was boiled gently for 2 min with 20mL of water and filtered while hot and allowed to cool. 5mL of the filtrate was then diluted with water and shaken vigorously. A frothing persistence indicates the presence of saponins.

4. Detection of Steroids & Terpenoids:

Liebermann-Burchardt test:

To 1ml of extract, 1ml of chloroform, 2 to 3ml of acetic anhydride, and 1 to 2 drops of concentrated sulphuric acid were added. Appearance of the dark green color showed the presence of steroids.

5. Test for Phenolic compounds:

Small quantity of powdered sample was tested with the following

reagents and the colour produced indicates the presence of phenolic compounds.

a. Ferric Chloride test

The extract (50 mg) is dissolved in 5 ml of distilled water. To this few drops of neutral 5% ferric chloride solution are added. A dark green colour indicates the presence of phenolic compound.

a. Lead acetate test

The extract (50 mg) is dissolved in distilled water and to this 3 ml of 10% lead acetate solution is added. A bulky white precipitate indicates the presence of phenolic compounds

6. Test for Tannins:

A small quantity of the powdered drug was extracted with solvents. To the 2 ml of filtered extract, few drops of ferric chloride solutions were added. A bluish black color indicates the presence of tannins.

7. Test for Glycosides:

2 ml of extract was mixed with a little anthrone on a watch glass. One drop of concentrated sulphuric acid was added, made into a paste and warmed gently over a water bath. A dark green-blue coloration indicates the presence of glycosides.

RESULTS AND DISCUSSION

In the present work, qualitative assay of phytochemicals present in *Operculina turpethum* root extract in different solvents was done. The study revealed the presence of a diverse group of phytochemicals, which were presented in tables (Table-1 and Fig. 2A & B).

Among different solvents, none of the above compounds were observed in petroleum ether extract of plant. The alkaloids were noticed in medium amount in ethyl acetate, and high amount in methanolic extract and less in Chloroform solvent extract. Flavonoids were present only in methanolic solvent extract. Saponins were present observed only in negligible amounts methanolic extract of plant. Steroids were present in small amounts in ethyl acetate, chloroform and methanolic extract of plant. Phenols were not observed in any of the solvent extract. Glycosides were present in ethyl acetate, chloroform and methanolic extract, of plant of which high amounts are present in chloroform extract.

Presence of Tannins were noticed only in chloroform solvent extract. Similarly, previous studies on preliminary phytochemical analysis revealed the presence of steroids, reducing sugars, terpenoids, flavonoids, cardiac glycosides and saponins and tannins in different extracts of *O. turpethum*.¹² Another study revealed the presence of total alkaloid content, bitters, saponins and Tannins in different parts such as root, stem, leaf extracts. These studies highlighted the importance of *O. turpethum* root in ethnomedicine.¹³

In the present study, a qualitative assay for various phytochemicals of *O. turpethum* was done using a range of solvents. The results showed the presence of alkaloids, flavonoids, Steroids, phenols, Tannins, Glycosides in the root extract.

CONCLUSION

The preliminary screening of phytochemical is a valuable step in the detection of the bio-active principles of medicinally important plants. The outcome of the present analysis will facilitate the quantitative estimation of phytochemicals and to study the pharmacological active principles of *O. turpethum*.





Fig. 2-A& B. Extraction of Operculina turpethum root for phytochemical analysis.

Table 1. Preliminary phytochemical analysis of O. turpethum roots in different solvents

Sl No.	Phytochemical Name	Petroleum ether	Chloroform	Ethyl acetate	Methanol
1	Alkaloids	-	+++	++	+++
2	Flavonoids	-	-	-	+++
3	Saponins	-	-	-	+
4	Steroids	-	++	+	-
5	Phenols	-	-	-	-
6	Tannins	-	++	-	-
7	Glycosides	-	+++	+	+

(+)=Present, (-)=Absent (+)= less amount, (++)= medium, (+++)= more

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