



PRELIMINARY PHYTOCHEMICAL SCREENING FOR SECONDARY METABOLITES OF FIVE DIFFERENT EXTRACTS OF *Pterospermum Suberifolium* (L.) Raeusch

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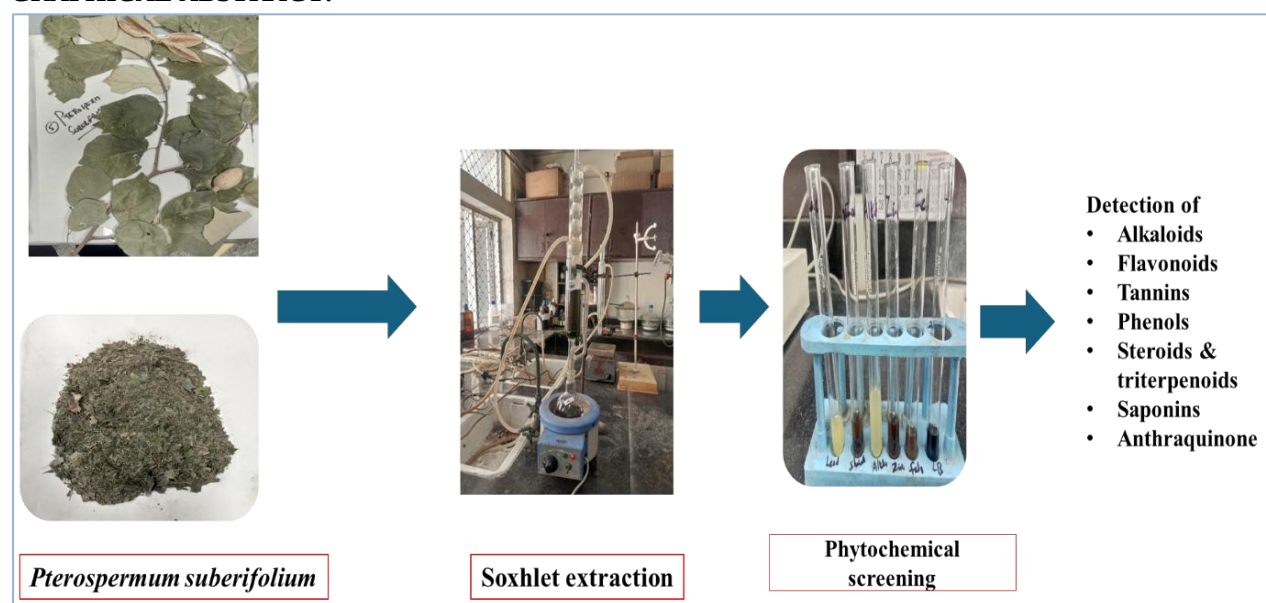
ABSTRACT

Plants of genus *Pterospermum suberifolium* belongs to family Malvaceae and have been widely employed for controlling the various disease. Objective of the present study was to do preliminary phytochemical screening of hexane, toluene, chloroform, ethanol and hydro alcoholic (1:1) extract of leaves of *Pterospermum suberifolium*. Qualitative phytochemical analysis of this plant confirms the presence of various secondary metabolites like alkaloids, flavonoids, tannins and phenols, and glycosides in its ethanolic and hydro alcoholic (1:1) extract. Whereas flavonoids, phenols and saponins were found to be absent in hexane, toluene, and chloroform extracts. This preliminary study draws attention to the need for further studies of the active secondary metabolites identified in the reported species for the treatment of many diseases also to understand their mode of action in controlling various dreadful diseases.

Key words:

Pterospermum suberifolium, Phytochemical screening, Different extracts, Secondary metabolites.

GRAPHICAL ABSTRACT:



I. INTRODUCTION:

Medicinal plants have long served as an invaluable source of therapeutic agents, owing to the presence of diverse bioactive secondary metabolites [1]. These naturally occurring compounds such as alkaloids, flavonoids, phenolics, tannins, saponins, terpenoids, and glycosides play a crucial role in plant defense mechanisms and exhibit a wide range of pharmacological activities, including antioxidant, anti-inflammatory, antimicrobial, anticancer, and immunomodulatory effects [2-5]. Consequently, systematic phytochemical investigations form the foundation for the discovery and development of novel drugs of plant origin.

Pterospermum suberifolium (L.) Raeusch., belonging to the family Malvaceae, is a traditionally important medicinal plant widely distributed in tropical regions of India. Various parts of the plant have been employed in traditional systems of medicine for the management of ailments such as inflammation, wounds, ulcers, fever, and skin disorders. Despite its ethnomedicinal relevance, comprehensive scientific documentation on its phytochemical profile remains limited, particularly with respect to solvent-based extraction approaches [6-9].

Preliminary phytochemical screening serves as an essential qualitative tool to identify major classes of secondary metabolites present in plant extracts. The use of different solvents with varying polarities enhances the extraction efficiency of chemically diverse constituents and provides valuable insights into the distribution of phytochemicals across extracts. Such information is vital for correlating chemical composition with biological activity and for guiding further isolation and characterization studies [10-12].

In this context, the present study aims to carry out a preliminary phytochemical screening of secondary metabolites in five different extracts of *Pterospermum suberifolium* (L.) Raeusch. The findings of this investigation are expected to provide baseline data on the phytochemical constituents of the plant and support its potential for future pharmacological and phytochemical research [13-15].

II. MATERIAL AND METHODS:

II. a. Collection and identification of plant material

Pterospermum suberifolium (L.) Raeusch., used for the investigation was obtained from Tirupati, Andhra Pradesh, India. The plant was authenticated by Dr. Sankararao Mudadla, Botanical Survey of India, Hyderabad. The voucher number is BSI/DRC/2021-22/Tech./Identification/522. The plant material of *Pterospermum suberifolium* (L.) Raeusch., was washed under running tap water and air-dried for further studies [16].

II. a. i. Botanical Description

Pterospermum suberifolium (L.) Raeusch. (Synonyms: *Pterospermum canescens* Roxb.; *P. suberifolium* (L.) Lam.; *Pentapetes suberifolia* L.) is a medium-sized tree belonging to the family Malvaceae. The plant is commonly known by various vernacular names such as Lolugu chettu, Pothadi chettu, Narudu chettu, Peddha thada, and Muchukundamu.

The leaves are prominently nerved, coriaceous, obovate to oblong in shape, glabrous on the upper surface, and covered with a cream-colored tomentum on the lower surface. The leaf margins are entire, with the apex showing irregular lobing. Bracteoles are linear and entire. The flowers are yellowish-white, fragrant, and solitary. The calyx consists of five oblong sepals, while the corolla comprises five petals. The androecium consists of fifteen stamens. The ovary is superior, five-locular with axile placentation, and bears numerous ovules per locule. The fruit is an ovoid to oblong capsule, five-valved, covered with a greyish velvety tomentum. The seeds are brown in color and shown in figure no.1 [17-19].

II. a. ii. Distribution:

The plant is commonly found in moist deciduous forests, particularly in areas close to streams and waterfalls. It is distributed in regions such as Talakona, Old Papavinasanam Road (Tirumala), Kambakkam, and Brahmadevuni Gudem.

II. a. iii. Flowering and Fruiting:

Flowering and fruiting occur from June to April.

II. a. iv. Ethnomedicinal Uses

Traditionally, the flowers of *Pterospermum suberifolium* are used in the treatment of hemicrania, smallpox, bronchitis, skin diseases, sores, and inflammatory conditions.

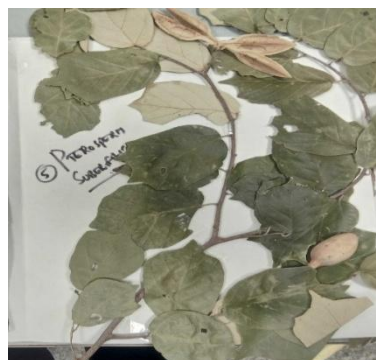


Fig.1. *Pterospermum suberifolium* plant leaves

II. b. Chemicals and equipments:

Laboratory reagent grade solvents of hexane, toluene, chloroform, ethanol and hydro alcoholic (1:1) were used for the extraction.

II. c. Soxhlet extraction of the plant material:

The sample was dried and pulverized to powder in a mechanical grinder. The required quantity of the leaf plant powder of *Pterospermum suberifolium* was weighed, performed the sequential extraction with hexane, toluene, chloroform, ethanol and hydro alcoholic (1:1) for 72 hr, and filtered through a Whatman No.41 filter paper. The extracts were collected and concentrated by evaporation under reduced pressure using a rotary evaporator. The concentrated extracts were stored at 4°C in an air-tight container before phytochemical screening.

II. d. Identification of secondary metabolites through phytochemical screening:

Each extracts were screened for the secondary metabolites like alkaloids, flavonoids, tannins & phenols, steroids & triterpenoids, glycosides, saponins, and anthroquinones using standard methods [20-22].

III. Results and Discussion:

In our study we found that the ethanolic and hydro alcoholic (1:1) extracts of *Pterospermum suberifolium* possess alkaloids, flavonoids, tannins & phenols and steroids (Table 1) whereas, alkaloids, flavonoids, tannins & phenols and steroids were absent in hexane, toluene and chloroform extracts.

TABLE 1: Qualitative analysis of the phytochemical components of the *Pterospermum suberifolium*.

Extract Method	Hexane extract	Toulene extract	Chloroform extract	Ethanol extract	Hydro alcoholic (1:1) extract
Alkaloids					
Mayer's test	-	-	-	+	+
Wagner's test	-	-	-	+	+
Hager's test	-	-	-	+	+
Dragendorff's test	-	-	-	+	+
Flavonoids					
Lead acetate test	-	-	-	+	+
Shinoda test	-	-	-	+	+
Alkaline test	-	-	-	+	+
Zinc Hcl test	-	-	-	+	+
Tannins & Phenols					
FeCl ₃ test	-	-	-	+	+
Lead acetate test	-	-	-	+	+
Steroids & tritepnoids					
Liebermann-Buchard test	-	-	-	+	+
Salkowski test	-	-	-	+	+
Anthocyanins	-	-	-	+	+
Glycosides	-	-	-	+	+
Saponins					

Honeycomb test	-	-	-	+	+
Foam test	-	-	-	+	+
Anthroquinones	-	-	-	+	+

Note: +, - indicates (+) Present, (-) Absent.

IV. CONCLUSION:

Secondary metabolite studies have shown that the Alkaloids, Flavonoids, Tannins, Steroids, Phenol are of great importance in the field of drug research. These classes, Alkaloids, Saponin, Tannins, Flavonoids are known to have activity against pathogens and therefore aid the antimicrobial activities of medicinal plants [18-19]. In our preliminary phytochemical screening, we found that the the ethanolic and hydroalcoholic (1:1) extract of *Pterospermum suberifolium* possess phenols, sterols, terpenoids, alkaloids, glycoside, and tannins. This suggests that leaves of *Pterospermum suberifolium* may possess antiinflammatory, analgesic, antidiarrhoeal, antimicrobial, antioxidant, immunomodulatory, anthelmintic, antitumour and insecticidal activities. However further studies are required in this direction for its comprehensive analysis including quantitative / semi quantitative analysis, which characterize its chemical structure and assess its biological activities.

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VI. CONFLICT OF INTEREST:

The authors declare that there are no conflicts of interest regarding the publication of this manuscript.

VII. REFERENCES:

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