

Phytochemical Screening of *Thespesia populanea* Leaf and Flower Extracts

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ABSTRACT: Phytochemicals are the reliable sources in healing of different health problems. Preliminary phytochemical screening is a fundamental step in the detection of bioactive compounds present in plants and it may lead to discovery of novel environmentally friendly natural chemicals and drugs. It is evident from the present study that *Thespesia populnea* leaf and flower extracts recorded good therapeutic efficacy, possessing majority of phytochemical classes of compounds and presence of phyto constituents. This article will exhibit the presence of such secondary metabolites in the selected source which in turn may be used as a potential antimicrobial agent and applied on textiles.

KEYWORDS: Phytochemical, *Thespesia populnea*, Leaf, Flower .

I. INTRODUCTION

Medicinal plants possess diverse active principles and are useful as curative in various human or animal diseases. The continuing use of herbs in medicine reveals the functional value and its necessity in the future. In modern medicine, the importance of medicinal plants is increasing with pharmaceutical and cosmetic industries and progressively uses more plant sources of rural or untainted areas describes Iord and Dumitriu [1]. From the dawn of civilization, medicinal plants have played a significant role throughout the world in healing and preventing an array of diseases views Muniappan and Savarimuthu [2]. Several active compounds are being discovered from plants from the source of ethno botanical information and are used in a straight line as patented drugs say Carney et al., [3].

Since time immemorial, the herbs have occupied a major role by providing lead compounds/components for the separation and production of a number of predictable drugs. A general lack of expectation with conventional medicines, tied with the need for a “natural” life style has resulted in an escalating consumption of alternative or complementary therapies with the natural stuff, in general and phyto medicines in particular views Zahid Zaheer [4]. In recent years, medicinal plant research application relating to the ethno botanical information has gained considerable attention in section of the scientific society opines Heinrich [5].

Alkaloids are very imperative in medicine and are made up of the most parts in vital drugs. They possess physiological variations on animals views Edeoga and Eriata [6]. It has been indicated that phenolic acids are generally occurring natural products renowned for allelopathic activities opine Singh *et al.*, [7]. Phenolic compounds are broadly disseminated in the plant kingdom. Presence of phenols is considered to be potentially toxic to the growth and development of pathogen views Singh and Sawhney [8]. Phytochemical analyses of numerous species of medicinal plants and their allelopathic activities of their basic chemical composite on plants capitulated positive results says Fujii *et al.*, [9]. Due to the significance in the above background, such initial phytochemical screening of plants is the requisite in order to find out and develop new therapeutic agents of enhanced efficacy. It is also reported by many research groups all over the world opines Manjulika Yadav et al [10].

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II. RELATED WORK

Antimicrobial and insecticidal activities are acquired by many plants derived from nature. The awareness in these plants is growing because they seem to be alternate solution of safe microbicides in par with the need of preventing environmental degradation. For centuries, in physiologically active constituents, the mixtures containing flavonoids were used on the road to cure Human Diseases. Gradually, this sector of natural sources has become the focus of anti-infective research and a number of groups have isolated and acknowledged the structures of flavonoids having antimicrobial and cytotoxic activities states Cragg et al., [11].

Taxonomical Classification of *Thespesia populnea*

Kingdom	:	Plantae
Order	:	Malvales
Family	:	Malvaceae
Genus	:	<i>Thespesia</i>
Species	:	<i>populnea</i>
Common name:		Indian Tulip Tree, Portia tree, Tamil - <i>poovarasu</i> or <i>puvarasu</i>
Part used	:	Leaves
Therapeutic use:		Skin diseases. It is used to treat several kinds of skin ailments views Natarajan et al [12]

Thespesia populnea (Malvaceae) is a large tree found in the tropical regions and coastal forests of India opine Arulkumar et al, [13]. Various parts of *T. populnea* are found to possess useful medicinal properties, such as antibacterial, antioxidant, purgative, antifertility, anti-inflammatory and hepatoprotective activity opine Vasudevan and Parle [14]. The leaves and bark of this tree are still used to mix with oil for the treatment of fracture wounds and as an anti-inflammatory wrapping applied to ulcers and boils, as described in folk medicine. Gossypol was found to be the major component of *T. populnea* views Akila and Rani [15]. Another major composition of *T. populnea* is flavonoid which possesses many pharmacological activities, antimicrobial, antioxidant, cytotoxic, and chemoprevention activities besides having a strong antiproliferative effects related to inhibition of cell cycle progression and apoptosis induction.

Moreover, all the parts of the plant have been used in traditional system of medicine. The bark, leaves, flower and fruits are positive in skin infection such as ringworm, eczema, scabies, psoriasis, and guinea worm. Parthasarathy et al [16]. The antibacterial activity of methanolic extract of *T. populnea* flowers was investigated by agar well diffusion method. Saravanakumar et al [17]. Therefore, *T. populnea* (L.) Sol. Ex Correa (Family-Malvaceae) is selected

III. SCOPE OF RESEARCH

- Identification of Potential medical plant
- Phytochemical Screening of *T. populnea* leaf and flower extract
- Exhibiting the presence of secondary metabolites

IV. MATERIALS AND METHODS

1. Plant material

The fresh leaves and flowers of *T. populnea* were collected from Coimbatore situated in the state of Tamil Nadu, India. The freshly collected leaves and flowers were dried under shade, cut in small pieces and made into coarse powder using mechanical grinder and preserved in air tight container until further use.

Preparation of plant extract

Fresh leaves of *T. populnea* was washed thoroughly, shade dried and powdered. The plant powder was subsequently kept in contact with petroleum ether, methanol and distilled water separately in a stoppered container for a definite

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period with constant agitation. The extract is then filtered, condensed and stored for further use of phytochemical studies.

2. Phytochemical Screening of *T. populnea* leaf and flower extract

2.1. Test for alkaloids

Dragendroff's test - *T. populnea* leaf and flower extract was treated separately with Dragendroff's reagent and the presence of alkaloids is indicated by the formation of red precipitate.

Mayer's test - *T. populnea* leaf and flower extract was treated with 2ml of Mayer's reagent independently and the resultant yellow coloured precipitate indicated the presence of alkaloids.

2.2. Test for phenols

2% ferric chloride solution of 2ml was added to *T. populnea* leaf and flower extract individually and the resultant blue green or purple colouration indicated the presence of phenols.

2.3. Test for flavonoids

Alkaline reagent test - *T. populnea* leaf and flower extract was mixed with 2ml of 2% NaOH solution separately resulted in the formation of intense yellow colouration which turned colourless on addition of few drops on dilute acid indicating the presence of flavonoids.

2.4. Test for saponins

Foam test – Both the *T. populnea* leaf and flower extract were individually mixed with 5ml of distilled water. The conical flasks containing the extracts were shaken vigorously. Stable foam formation show the presence of saponins.

Froth test - Both the *T. populnea* leaf and flower extract was separately diluted with 20ml of distilled water in a conical flask and shaken for 15 minutes. Formation of one centimeter layer of foam indicated the presence of saponins.

2.5. Test for steroids

Both the leaf and flower extracts were mixed with 2ml of chloroform along with concentrated sulphuric acid. In the chloroform layer, red colour is formed which notified the presence of steroids.

2.6. Test for terpenoids

2ml of chloroform was added to each of leaf and flower extract and mixed well. 3 ml of concentrated sulphuric acid was added to each tube. Formation of reddish brown colour indicated the presence of terpenoids.

2.7. Test for tannins

Gelatin test - 1% gelatine containing sodium chloride was added to *T. populnea* leaf and flower extract separately. Formation of white precipitate indicated the presence of tannins.

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TABLE 1. Phytochemical screening of *Thespesia populnea* leaf and flower

Solvents Phytochemicals	Leaf extract			Flower extract		
	Petroleum ether	Methanol	Aqueous	Petroleum ether	Methanol	Aqueous
Alkaloids	+	-	-	+	+	-
Tannins	-	-	-	+	-	-
Saponins	-	+	+	-	+	-
Steroids	-	+	-	-	+	-
Terpenoids	+		-	-	+	+
Flavonoids	+	+	+	+	-	+
Phenolics	-	+	+	+	-	+
Anthroquinones	-	+	-	-	-	-

+ Presence, - Absence

The above table 1 shows the preliminary phytochemical screening of *Thespesia populnea* leaf and flower using Petroleum ether, Methanol and Aqueous extracts.

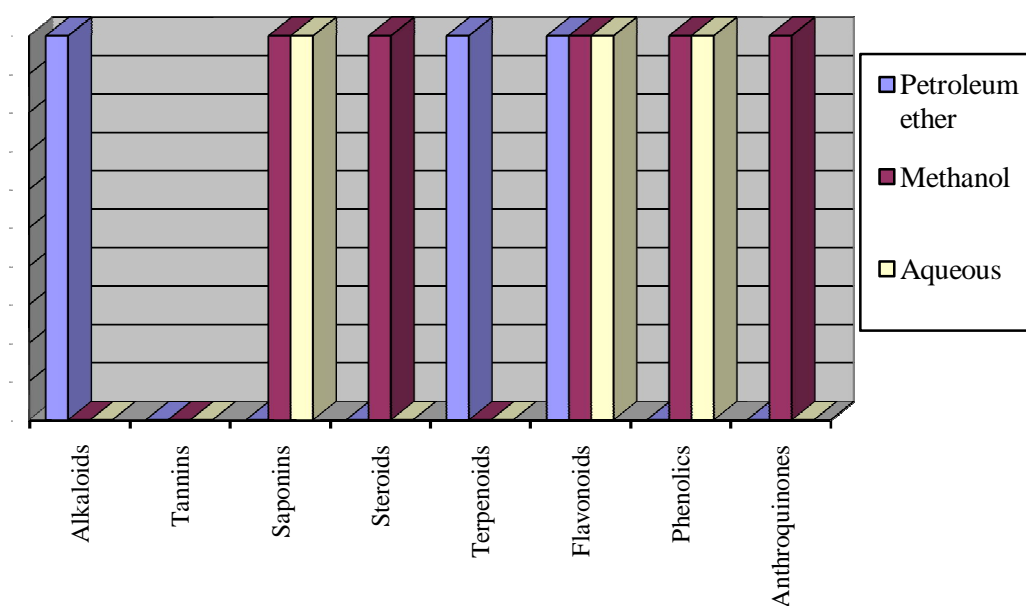


Fig. 1 Presence of Phytochemical constituents in *Thespesia populnea* leaf extracts

The above Figure 1 depicts the preliminary phytochemical screening of *Thespesia populnea* leaf using Petroleum ether, Methanol and Aqueous extracts. The bars in diagram portray the presence of phytochemical constituents.

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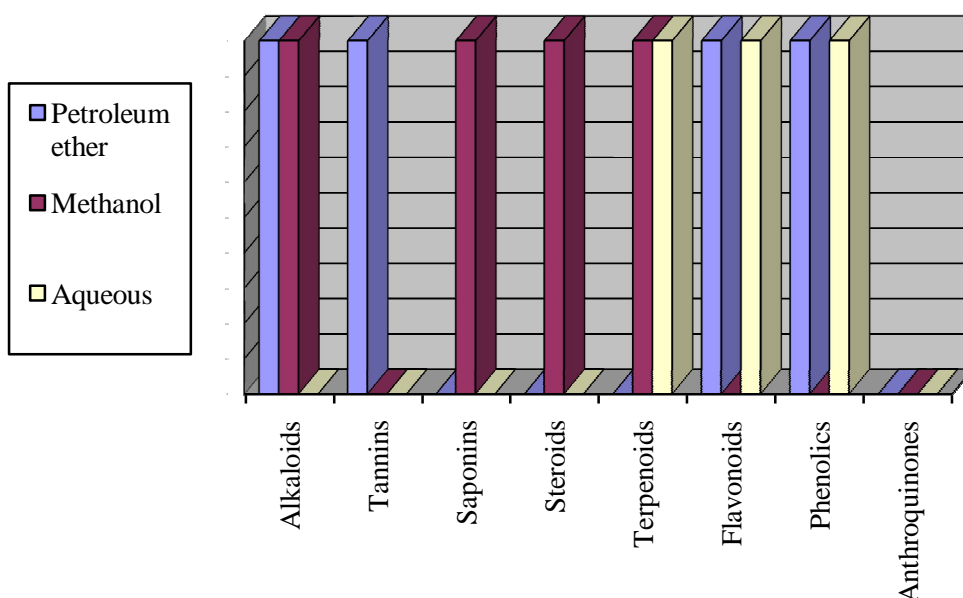


Fig. 2 Presence of Phytochemical constituents in *Thespesia populnea* flower extract

The above Figure 1 represents the preliminary phytochemical screening of *Thespesia populnea* flower source using Petroleum ether, Methanol and Aqueous extracts. The bars in diagram portray the presence of phytochemical constituents.

V. RESULTS & DISCUSSION

From the Table 1 , Figure 1 and Figure 2 it can be concluded that the Petroleum ether extracts of *Thespesia populnea* leaf show the presence of the alkaloids, terpenoids and flavonoids whereas the Petroleum ether extracts of *Thespesia populnea* flower exhibit alkaloids, tannins, terpenoids and flavonoids presence.

The methanolic extracts of *Thespesia populnea* leaf displayed the occurrence of saponins, steroids, flavonoids, phenolics and anthroquinones while the methanolic extracts of *Thespesia populnea* flower displayed the presence of alkaloids, saponins, steroids and terpenoids.

Saponins, flavonoids and phenolic compounds are present in the aqueous extracts of *Thespesia populnea* leaf extract and on the other hand, terpenoids, flavonoids and phenolics are present in the aqueous extracts of *Thespesia populnea* flower extract and other constituents did not make obvious presence in the petroleum ether, methanolic and aqueous extracts of *Thespesia populnea* ..

VI. CONCLUSION

The antimicrobial activity of *Thespesia populnea* leaf and flower may be due to one/more group of above phyto-constituents. Phytochemical screening of petroleum ether, methanol and aqueous extracts shows the presence of Alkaloids, Tannins, Saponins, Steroids, Terpenoids, Flavonoids, Phenolics and Anthroquinones by positive reaction with the respective test reagent. From the results, it can be concluded that the Petroleum ether, Methanol and Aqueous Leaf and flower extracts of *Thespesia populnea* may be used as broad-spectrum antimicrobial, bioactive agent after extensive investigation.

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Further studies are necessary with these plants to estimate their allelopathic possibility, isolate, describe and reveal the structures of the bioactive compounds accountable for their antimicrobial activity, allelopathic activity, and erstwhile medicinal values. It is the call for the hour to discover antibacterial possibility of herbal products based on diseases and their application in textiles.

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