



Phytochemical investigation and antimicrobial activity of stem bark extracts of *Thespesia populnea*

Prasoon Kumar Saxena^{1*}, Shanti Bhushan Mishra², Trishna Das³,
Arun Maurya⁴

1 * D.J.College of Pharmacy, Modinagar, (U.P.), India

2 Roorkee college of Pharmacy, Roorkee (UK), India

3 Girijananda Institute of Pharmaceutical Sciences, Guwahati (Assam), India

4 Doon college of Pharmacy, Saharanpur (UP), India

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ABSTRACT

Thespesia populnea are commonly used for herbal preparations in the treatment of toothache, gastrointestinal disorders, dysentery, diarrhoea, sore gums and sore throats. This has, therefore, led to the investigation of the antimicrobial activities of different extracts of *T. populnea*. Different bacterial isolates comprising of both Gram negative and Gram positive organisms were used. The results show that *T. populnea* extracts exhibited antimicrobial activities at a concentration of 20 mg/ml. The zones of inhibition exhibited by *T. populnea* extract ranged between 5 mm and 10 mm. However the zone of inhibition exhibited by the test extracts was found to be less than that of the reference standard drug (Gentamycin).

Key words: *Thespesia populnea*, antimicrobial activity, Zone of inhibition.

Corresponding Author: Prasoon Kumar saxena, D.J.College of Pharmacy, Niwari road, Modinagar, Disst. Ghaziabad, U.P., India.-201204

E-mail: pmpharma24@gmail.com

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INTRODUCTION

Many works have been done which aim at knowing the different antimicrobial and phytochemical constituents of medicinal plants and using them for the treatment of microbial infections (both topical and systemic applications) as possible alternatives to chemically synthetic drugs to which many infectious microorganisms have become resistant. *Thespesia populnea* is also called as Portia tree, belonging to family malvaceae. It is widely distributed in India and Burma. The plant contains glycosides such as quercetin, gossypol, and β -sitosterol[1]. sesquiterpene i.e. Thespesenone and dehydrooxoperezinone-6-methyl ether were

isolated from the red hard wood of *Thespesia populnea*[2]. Alanine, arginine, methionine and tryptophan were isolated from seed of *Thespesia populnea*[3]. *Thespesia populnea* also contain lupenone, lupeol[4]. The ethanolic extract of *Thespesia populnea* bark reported for anti-inflammatory and analgesic activity[5]. Aqueous and methanolic extract of the *Thespesia populnea* showed antioxidant activity against carbon tetrachloride induced liver injury in rats[6]. *Thespesia populnea* also recommended for anti-fertility activity[7], wound healing[8], and anti-fungal[9], and hepatoprotective[10] activity. Since the plant is active against various microorganisms.

So, In the present research work, we have made an attempt to investigate the antimicrobial activity of different extracts of stem bark of *Thespesia populnea*.

MATERIALS AND METHODS

Collection and authentication of plant

Fresh bark of *T. populnea* was collected from Alva's education foundation, Moodbidri (Karnataka) in the month of July 2008 and were identified by botanist Dr. Harish. The bark were later air-dried, powdered and stored in an air-tight container for further use.

Extraction of plant material

The powdered stem bark (150g) were successively extracted with 1.5 litre of each solvents like pet ether, benzene, chloroform, ethanol, methanol and water for 3 days. The extracts was separated and concentrated on rotavapour and then dried in lyophilizer under reduced pressure and thus yield 3.5 %, 0.7%, 0.25%, 0.23%, 3.34% and 4.5% w/w was obtained respectively.

PHYTOCHEMICAL SCREENING OF EXTRACTS

Preliminary Phytochemical tests of the extracts were performed using specific reagents through standard procedures.[11,12]

Preparation of inoculum

Stock cultures were maintained at 4°C on slopes of nutrient agar. Active cultures for experiments were prepared by transferring a

loopful of cells from the stock cultures to test tubes of Nutrient agar broth for bacteria that were incubated without agitation for 24 hrs at 37°C.

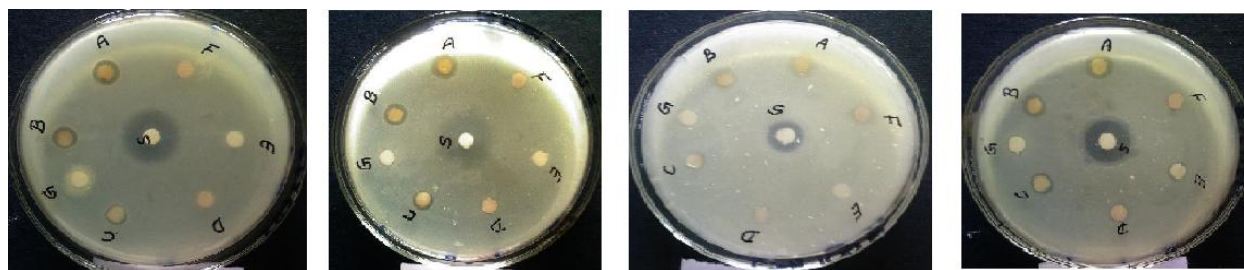
Antimicrobial susceptibility test

The disc diffusion method was used to screen the antimicrobial activity. *In vitro* antimicrobial activity was screened by using nutrient agar media obtained from Himedia (Mumbai). The nutrient agar plates were prepared by pouring 15 ml of molten media into sterile petriplates. The plates were allowed to solidify for 5 minutes and 0.1 % inoculum suspension was mixed uniformly and the inoculum was allowed to dry for 5 minutes. The different extracts were loaded on 3mm sterile disc till saturation. The loaded disc was placed on the surface of medium and the compound was allowed to diffuse for 5 minutes and the plates were kept for incubation at 37°C for 24 hrs. At the end of incubation, inhibition zones formed around the disc were measured with transparent ruler in millimeter. These studies were performed in triplicate by using standard drugs.[13,14]

RESULT AND DISCUSSION

The phytochemical analysis of the petroleum ether, Benzene and chloroform extract of stem bark of *T. populnea* revealed the presence of phytosterols whereas methanolic and aqueous extract shows the presence of tannins, flavonoids, carbohydrates and phenols. The results are shown in table no. 1. The different extracts from the stem bark of *T. populnea* possess antimicrobial activities against some of the tested organisms at a concentration of 20 mg/ml. The extracts compared favourably with the standard antibiotic Gentamycin. The results are given in table no. 2.

Figure: 1 Zone of inhibition of different extracts of stem bark of *T. populnea*



Abbreviations: PLATES: A – *B. subtilis*, B – *E.coli*, C – *P. aeruginosa*, D – *S.aureus*. DISCS: A – Pet ether extract, B– Benzene extract, C – Chloroform extract, D –Acetone, E– Ethanol extract, F– Methanolic extract, G- Aqueous extract.

Table: 1 Preliminary phytochemical screening of different extracts of stem bark of *T. populnea*

Chemical Constituent	Tests	Pet. ether Ext.	Benzene Ext.	Chlor. Ext.	Meth. Ext.	Aqu. Ext.
Carbohydrates	1. Molisch's test	-	-	-	+	+
	2. Benedict's test	-	-	-	-	-
	3. Fehling's test	-	-	-	+	-
Alkaloids	1. Dragendorff's test	-	-	-	-	-
	2. Wagners test	-	-	-	-	-
	3. Hagers test	-	-	-	-	-
Anthracene Glycosides	1. Borntragers test	-	-	-	-	-
	2. Modified Borntragers test	-	-	-	-	-
Cardiac glycosides	1. Legal test	-	-	-	-	-
	2. Keller killiani test	-	-	-	-	-
	3. Baljet test	-	-	-	-	-
Coumarin glycoside	1. Made alkaline	-	-	-	-	-

Saponins	1. Foam test	-	-	-	-	+
	1. Gelatin test	-	-	-	+	+
Flavanoids	2. Lead acetate test	-	-	-	+	+
	3. Shinoda test	-	-		+	
Phytosterols	1. Salkowski test	+	+	+	-	-
	2. Libermann Burchard test	+	+	+	-	-
Fats & Oil	1. Stain test	-	-	-	-	-
Resins	1. Acetone water test	-	-	-	-	-
Phenols	1. Ferric Chloride test	-	-	-	+	+
Tannins	1. Alkaline Reagent	-	-	-	+	+
Proteins	1. Ninhydrin test	-	-	-	-	-

Table: 2 Zone of different extracts of stem bark of *T. populnea*

Micro-organisms	Zone of inhibition of extracts in mm							STD
	A	B	C	D	E	F	G	
<i>S. aureus</i>	9	7	6	NI	NI	NI	8	18
<i>P. aeruginosa</i>	9	7	6	NI	NI	NI	NI	19
<i>B. subtilis</i>	8	8	NI	NI	NI	6	NI	17
<i>E. coli</i>	9	7	8	NI	6	NI	NI	16

Abbreviations: NI=No Inhibition, A= Petroleum ether extract, B= Benzene extract, C= Chloroform extract, D= Acetone extract, E= Ethanol extract, F= Methanolic extract, G= Aqueous extract, STD =Standard Gentamycin.

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