



Antibacterial activity of whole plant extract of *Indigofera trita* Linn (Leguminosae)

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ABSTRACT

Plant contains a large numbers of naturally occurring chemicals that have biological activity. Petroleum ether extract, Acetone extract, and Methanol extracts of whole plant of *Indigofera trita* Linn. were prepared and antibacterial activity were studied by disc diffusion method against certain bacterial pathogens such as *Escherichia coli*, *Staphylococcus aureus*, *Enterobacter aerogenes*, *Pseudomonas aeruginosa*, *Salmonella typhimurium*, *Salmonella typhi*, *Staphylococcus epidermidis* and *Proteus vulgaris*. The Methanol extracts had wide range of antibacterial activity on these bacterial pathogens than the Acetone extract. Petroleum ether extract were slightly higher antibacterial activity against bacterial pathogens. © 2009 Trade Science Inc. - INDIA

KEYWORDS

Antibacterial activity;
Indigofera trita;
Bacterial pathogens.

INTRODUCTION

India has been using crude plants as medicine since Vedic period. A major part of the total population in developing countries still uses traditional folk medicine obtained from plant resources^[3,4]. Biologically active compounds present in the medicinal plants have always been of great interest to scientists working in this field. In recent years this interest to evaluate plants possessing antibacterial activity for various diseases is growing^[2]. To promote the proper use of herbal medicine and to determine their potential as sources for new drugs, it is essential to study medicinal plants, which have folklore reputation in a more intensified way^[1].

W.H.O.^[10,11] reported that 80% populations rely mainly on traditional therapies, involving the use of plant extracts or their active constituents. The use of medicinal plants in India contributes significantly in primary

health care and it is interesting to determine whether actual pharmacological effects support the traditional uses or merely based on folklore^[9]. In almost all the herbal medicine, the medicinal plants play a major role and constitute the backbone of the herbal medicine^[8].

Indigofera trita (Leguminosae) is plant that is abundant in India. The plant species is a stiff, grey undersherb, up to 1 meter in height, with oblong or obovate leaves, salmon pink flowers and long tetragenous, or sharply pointed pods. The seeds of plant used as nutritive tonic^[6]. As there is no reference in literature regarding the antibacterial components of the plant *Indigofera trita*, it was, therefore, considered worthwhile to study the isolation and characterization of antibacterial components of *Indigofera trita*. Hence attempt was made to find the Phytochemical constitutes and antibacterial properties of leaves of *Indigofera trita* (L.), against some bacterial pathogens.

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MATERIALS AND METHODS

Plant materials

Fresh plant of *Indigofera trita* were collected in September 2007 from local region of Ahmednagar District in India. The plant was authenticated from Dept of Botany, Sad guru Shri Gangagir Maharaj College of Science, Kopargaon (M.S.) India by comparing morphological features (leaf arrangement, flower/inflorance arrangement, fruit and seed morphology etc.). The herbarium of the plant specimen has been deposited at SSGM college, Kopargaon the voucher specimen No. being BRD1. Fresh plant material were washed under running tap water, air dried for two week and then homogenized to fine powder and stored in airtight bottles.

Preparation of extracts

1.5 kg of the plant material in each batch was exhaustively extracted by soxhlet extraction method using petroleum ether, Acetone and methanol. The solvent used in each batch was recovered under pressure until dry extracts were obtained and then labeled and stored separately at 4°C in amber colored airtight bottles.

Phytochemical screening of plant materials

The presence of saponins, tannins, carbohydrates, alkaloids, flavonoids glycosides, steroids, proteins and alkaloids, were detected by simple qualitative methods^[5].

Bacterial cultures

The standard pathogenic bacterial cultures were procured from IMTECH, Chandigarh, India and used in the present study (TABLE 1). The bacteria rejuvenated in Mueller- Hinton broth (Hi-media laboratories, Mumbai, India) at 37°C for 18 h and then stocked at 4°C in Mueller-Hinton Agar. Subcultures were prepared from the stock for bioassay. A loopful of culture was inoculated in 10 mL of sterile nutrient broth and incubated at 37°C for 3 h. Turbidity of the culture was standardized to 10⁵ CFU with the help of SPC and turbidometer.

Antibacterial activity using disc diffusion method

The modified paper disc diffusion (NCCLS, 2000) was employed to determine the antibacterial activity of solvent extract of *Indigofera trita* (L.). For antibacte-

TABLE 1: Bacterial cultures used in study (IMTECH, Chandigarh, India)

Bacterial Pathogens	MTCC no.
<i>Proteus vulgaris</i>	426
<i>Staphylococcus epidermidis</i>	435
<i>Staphylococcus aureus</i>	96
<i>Escherichia coli</i>	739
<i>Pseudomonas aeruginosa</i>	424
<i>Salmonella typhi</i>	733
<i>Enterobacter aerogenes</i>	111
<i>Salmonella typhimurium</i>	98

TABLE 2 : Phytochemical analysis of *Indigofera trita*.

S. no.	Phytochemical Constitutes	Result
1	Alkaloid	Present
2	Flavonoids	Present
3	Carbohydrates	Present
4	Glycosides	Present
5	Saponins	Absent
6	Proteins	Absent
7	Steroids	Present
8	Tannins	Present
9	Starch	Absent

rial properties, 0.1 ml bacterial suspension of 10⁵CFU ml⁻¹ was uniformly spread on Nutrient Agar plate to form lawn cultures. The Petroleum ether, Acetone and Methanol extracts were prepared in their respective solvents in such a manner that ultimate amount (in dry form) in each disc came to 10mg, 8mg, 6mg, 4mg and 2mg. The blotting paper discs (10mm diameter) were soaked in various diluted extract, dried in oven at 60°C to remove excess of solvent and tested for their antibacterial activity against bacterial pathogens by disc diffusion technique. After incubation of 24 h at 37°C, zone of inhibition of growth was measured in mm. Ampicillin 10mcg (Hi-Media disc) was used as positive control while discs soaked in various organic solvents and dried were placed on lawns as negative control.

RESULTS AND DISCUSSION

The photochemical investigation (TABLE 2) of the various solvent extract of *Indigofera trita* showed presence of Phytochemical viz. carbohydrates, alkaloids, flavonoids, glycosides, steroids, tannins and saponins.

According to antibacterial profile shown (TABLE 3). Acetone extract inhibited the growth of *Staphylococcus aureus* and *Staphylococcus epidermidis*, but mild or slightly antibacterial effect on *Proteus vulgaris*, *Pseudomonas aeruginosa*, *Salmonella typhimurium* and *Salmonella typhi*, but no antibacterial effect on

TABLE 3: Antibacterial activity of whole plant of *Indigofera trita* .extracts against bacterial pathogens (Zone of inhibition in mm, average of 3 readings)

Bacterial pathogens	Acetone extract					Petroleum ether extract					Methanol extract					Negative controls			
	10mg/disc	8mg/disc	6mg/disc	4mg/disc	2mg/disc	10mg/disc	8mg/disc	6mg/disc	4mg/disc	2mg/disc	10mg/disc	8mg/disc	6mg/disc	4mg/disc	2mg/disc	Acetone	Petroleum ether	Methanol	Ampicillin (10mcg)
<i>P.vulgaris</i>	18	17	15	14	12	12	11	-	-	-	25	24	23	21	20	-	-	-	16
<i>S.epidermidis</i>	19	17	15	14	13	13	12	11	-	-	18	17	15	14	12	-	-	-	25
<i>S.aureus</i>	21	20	18	17	16	15	14	13	12	11	20	18	17	16	14	-	-	-	24
<i>E.coli</i>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11
<i>P.aeruginosa</i>	14	13	12	11	-	15	14	13	12	11	15	14	13	12	11	-	-	-	16
<i>S.typhi</i>	14	13	12	11	-	-	-	-	-	-	16	15	14	13	12	-	-	-	18
<i>E.aerogenes</i>	-	-	-	-	-	-	-	-	-	-	16	15	14	13	12	-	-	-	14
<i>S.typhimurium</i>	15	14	13	12	-	-	-	-	-	-	16	14	13	12	11	-	-	-	19

Escherichia coli and *Enterobacter aerogenes*.

The petroleum ether extract exhibited maximum antibacterial activity against *Staphylococcus aureus* *Pseudomonas aeruginosa*, but mild inhibitory effect on *Proteus vulgaris*, *Staphylococcus epidermidis* and no antibacterial activity against *Escherichia coli* and *Enterobacter aerogenes* *Salmonella typhimurium* *Salmonella typhi*.

Methanol extract shows showed maximum inhibitory effect on *Staphylococcus aureus*, *Proteus vulgaris*, *Staphylococcus epidermidis*, but mild or slightly inhibitory effect on *Pseudomonas aeruginosa*, *Salmonella typhimurium*, *Salmonella typhi* and *Enterobacter aerogenes*, but no antibacterial effect on *Escherichia coli*.

CONCLUSION

The result of the antibacterial assay showed promising evidence for the antibacterial effect of *Indigofera trita* (L). From the above evidence, it is clear that plant extracts have great potential as antibacterial compounds against bacterial pathogens; this plant can be used to discover bioactive natural products that may serve as leads for the development of new pharmaceuticals drugs from natural origin.

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