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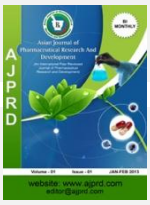

Open Access Research Article

ANTIMICROBIAL ACTIVITY OF NATURAL DYES OBTAINED FROM PTEROCARPUS INDICUS WILLD BARKS

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ABSTRACT

In the present study to evaluate the antimicrobial activity of *Pterocarpus indicus* barks. Many of the plant materials, from which natural dyes are obtained, found to have some medicinal values. During the present study, dying materials were prepared from barks of *Pterocarpus indicus*. The well diffusion method was adopted to examine antimicrobial activity of dying material against test organisms. The result showed that the dying material of *Pterocarpus indicus* was most active for antibacterial (9 mm) and antifungal (6 mm).Results of the present study suggest that the dying material of *Pterocarpus indicus* has significant antibacterial activity against pathogenic bacteria and fungus.

Key words:*Pterocarpus indicus*, Antimicrobial activity, Well diffusion method, Natural dyes,

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INTRODUCTION

Pterocarpus indicus Willd is plant belonging to the family Papilionaceae and is widely distributed over tropical and subtropical south Asia as Malaysia, Philippines, Brunei, Thailand, and Indonesia[1]. *Pterocarpus indicus* or *narra*, a common tree in the Philippines known for its valuable wood, also exhibit pharmacological properties. The leaves, wood, bark and roots, in the form of decoctions and crude extracts, find applications in common diseases like boils, ulcers, prickly heat, stone in the bladder, diarrhoea, dysentery, thrush and syphilitic sores [2,3].It has the status of national tree in the Philippines and has been identified by the Forest Research Institute Malaysia (FRIM) as one of the potential 'millennium tree' species for forest plantation establishment in Peninsular Malaysia because of its fast growth and other desirable characteristics [4].

A number of the plant's constituents have been isolated and studied for their bioactivities. Among them are: angolensin, an antifungal component [5].procycnidin-type tannins having protease inhibitory and antiviral activities [4]; polyphenols with anticancer properties [6,7]. a non-toxic dye as an antibacterial component in shampoos [8]; and loliolide with antimicrobial properties [9].The physicochemical properties, elements, and amino acids have been analysed [10]. The structural analysis shows that the crystal is a macromolecular compound of tannic condensation and glucoside [11]. It was found inactive against Staphylococcusaureus, Bacillus subtilis, and Trichophyton mentagrophytes [12].

MATERIAL AND METHODS

Collection of bark materials

The barks of *Pterocarpus indicus* was collected from Hogenakkal Cauvery River, Dharmapuri District, Tamil Nadu. The botanical identity of the plant of was confirmed by Dr. S. John Britto, Rapinat Herbarium, St. Joseph's College, Tiruchirappalli.

Preparation of Dying Material

The small pieces of *Pterocarpus indicus* bark (5 g) was extracted with 40% ethanol at room temperature for one day. The extract was filtered and concentrated under reduced pressure in a rotary evaporator and extracted dying material was boiled with 68^0 C than cooled. The dying material was subjected to antimicrobial activity.

Fig 1. *Pterocarpus indicus* Willd

Fig 2. Bark piecesof *Pterocarpus indicus* Willd

EXPERIMENTAL WORK

In-vitro antimicrobial activity (Well diffusion method)

The dying material were prepared 100 ppm concentration were used for antimicrobial activity.

Test microorganisms

Pure cultures of Bacillus Pumilus, Bacillus Cereus, Escherichia coli, Salmonella SPS (Gram positive bacteria), Pseudomonas aeruginosa, Staphylococcus aureus (Gram negative bacteria) specie of bacteria's and Candida albicans, Aspergillus flavus specie of fungi's were procured from Rontgen Laboratory, Thanjavur. These microorganisms were identified and confirmed by Microbiologists, Department of Microbiology, Thanjavur Medical College, Thanjavur.

Preparation of 24 hours' pure culture

A loop full of each of the microorganisms was suspended in about 10 mL of physiological saline in a Roux bottle. Each of these was streaked on to the appropriate culture slants and was incubated at 37 °C for 24 hours except for fungal which was incubated at 25°C for 24 - 48 hours. After completion of incubation period, when growth was observed the tubes were kept into 2-8 °C until use.

Preparation of dying material solutions for the experiment

The dying material was dissolved in sterile distilled to prepare appropriate dilution to get required concentration. Control used as respective solvent (Aqueous). They were kept under refrigerated condition unless they were used for the experiment. Standard solution as Chloramphenicol for bacteria and fluconazole (25 mg/mL distilled water - 30 µL) for fungi used to compare the test solution. They were kept under refrigerated condition unless they were used for the experiment.

The plates were incubated at 5 °C for 1 hour to permit good diffusion and then transferred to incubator at 37 °C for 24 hours. After completion of 24 hours, the plates were inverted and placed in an incubator set to respective temperature for 24 hours.

Antimicrobial assay

Antibiogram was done by disc diffusion method (NCCLS, 1993; Awoyinka et al., 2007) [16] using plant extracts. Petri plates were prepared by pouring 30 mL of NA/PDA medium for bacteria/fungi. The test organism was inoculated on solidified agar plate with the help of micropipette and spread and allowed to dry for 10 minutes.

The surfaces of media were inoculated with bacteria/fungi from a broth culture. A sterile cotton swab is dipped into a standardized bacterial/fungi test suspension and used to evenly inoculate the entire surface of the Nutrient agar/PDA plate. Briefly, inoculums containing

Bacillus Pumilus, Bacillus Cereus, Escherichia coli, (Gram positive bacteria), Salmonella SPS,Pseudomonas aeruginosa, Staphylococcus aureus (Gram negative bacteria) specie of bacteria were spread on Nutrient agar plates for bacteria and Candida albicans, Aspergillus flavus specie of funguses were spread on potato dextrose agar for fungus strains. The plates were incubated at 37 °C for 24 hours for the bacteria and 48 hours for fungus at room temperature (30 ±1) for 24-48 hour for yeasts strains. Each sample was tested in triplicate.

Table 1. Anti-bacterial activity of dying material of *Pterocarpus indicus* bark

S.No	Name of Organism	Diameter in mm
Gram positive bacteria		
1	Bacillus Pumilus	6 mm
2	Bacillus Cereus	5 mm
3	Eschericha coli	5 mm
Gram negative bacteria		
4	Salmonella SPS	6 mm
5	Pseudomonas aeruginosa	9 mm
6	Staphylococcus aureus	Nil

Table 2. Anti-fungal activity of dying material of *Pterocarpus indicus* bark

S.No	Name of Organism	Diameter in mm
1	Aspergillus flavus	6 mm
2	Candida Albicans	Nil

RESULTS AND DISCUSSION

Result obtained in the present study the antimicrobial activity of the *Pterocarpus indicus* bark shown in table 1& 2. The result shows dying material of *Pterocarpus indicus* was effective against both antibacterial and anti-fungal activities. For antibacterial activity was recorded as the Escherichia coli at 5mm, Bacillus Pumilus at 6 mm, Bacillus Cereus 5 mm, Salmonella SPS 6 mm and Pseudomonas aeruginosa9 mm when compared with chloramphenicol as standard. For anti-fungal activity of Aspergillus flavus 6 mm was observed when compared with nystatin as standard. The antimicrobial activity of the *Pterocarpus indicus* bark was effective against both antibacterial and anti-fungal activities.

CONCLUSION

In the present study dying material of *Pterocarpus indicus* bark indicate that maximum activity of both gram positive, negative bacteria and fungi's. Hence the dying material of *Pterocarpus indicus* bark was worthy for further investigation as used as some natural drugs developments.

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