



AkiNik

International Journal of Herbal Medicine

Available online at www.florajournal.com

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International
Journal
of
Herbal
Medicine

ISSN 2321-2187

IJHM 2013; 1 (4): 10-11

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Received: 12-09-2013

Accepted: 16-09-2013

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Antimicrobial Screening of Some Medicinal Tree Species of Nagaur District of Rajasthan

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ABSTRACT

Antimicrobial screening of ethyl ether and alcoholic extracts of leaves of four selected medicinal tree species growing in Nagaur district of Rajasthan was carried out. *Acacia tortilis*, *Prosopis cineraria*, *Salvadora persica* and *Tecomella undulata* showed positive reactions against bacterial pathogens i.e. *Staphylococcus aureus*, *Escherichia coli* and a fungal pathogen *Candida albicans*.

Keywords: Antimicrobial screening, Medicinal tree species, Nagaur district, Rajasthan

1. Introduction

The medicinal tree species growing in Nagaur district of Rajasthan are a potential source of phytochemicals of pharmaceuticals like flavonoids, sterols, steroidal sapogenins, alkaloids, phenolic compounds, sulphides, isothiocyanates, anthocynins, terpenoids etc. These are the active principles, which act as antioxidants, anticarcinogenic, antimicrobials and immunity stimulants. From this arid region of Rajasthan, four medicinal tree species of like *Acacia tortilis*, *Prosopis cineraria*, *Salvadora persica* and *Tecomella undulata* have been selected for antimicrobial screening.

A number of plants have been screened for their antimicrobial activity^[1-7]. The antimicrobial principles and their distribution in plants have been reported by many workers^[8-15].

2. Materials and Methods

Present investigation describes the antimicrobial activity of leaf extracts of four selected tree species against *Staphylococcus aureus* (Gram positive), *Escherichia coli* (Gram negative) and *Candida albicans* (Fungal pathogen).

Fresh leaves of all the selected tree species were collected from Nagaur district and pulverized into a paste. Cold extraction was done by blending the paste with ethyl ether and 50% ethanol in the ratio of 1:2, in a Warring Blender at 2500 rpm for 10 min. The mixture was centrifuged at 3000 rpm. The supernatant was evaporated to dryness and the residue was suspended in double distilled water. The micro-organisms used for screening were *Staphylococcus aureus* (Gram positive), *Escherichia coli* (Gram negative) and *Candida albicans* (Fungal pathogen). The growth medium used for *Staphylococcus aureus* and *Escherichia coli* was Nutrient broth (10% peptone, 0.5% labanco and 0.5% NaCl, pH adjusted to 7.5) and for *Candida albicans* Sabourands liquid medium (1% peptone, 4% glucose, pH adjusted to 5.8).

Paper discs of known concentration of standard antibiotics namely chloramphenicol, penicillin and mycostatin were used for comparison. Blank paper discs were used as control. Control discs dipped in ethyl ether and 50% ethanol; plates (5 each for *Staphylococcus aureus*, *Escherichia coli* and *Candida albicans*) were employed for each extract. The ratio of inhibition zone the various test samples was compared with the inhibition zone from the high concentration antibiotic reference discs^[16].

3. Results and Discussion

Antimicrobial screening of ethyl ether and alcoholic (50% ethanol) extracts of leaves of *Acacia tortilis*, *Prosopis cineraria*, *Salvadora persica* and *Tecomella undulata* showed positive reactions against all the three test organisms. (Table 1)

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Table 1: Antimicrobial Screening of Leaf Extracts and Standard Reference Antibiotics

Plants	Leaves extracts	Test Organisms				
		<i>S. aureus</i>		<i>E. coli</i>		<i>C. albicans</i>
		I/C ^a	I/P ^a	I/C ^a	I/S ^a	I/m ^a
<i>Acacia tortilis</i> ,	Ether extract	0.71	0.68	0.64	0.76	0.81
	Alcoholic extract	0.60	0.61	0.63	0.74	0.78
<i>Prosopis cineraria</i>	Ether extract	0.80	0.93	0.97	0.88	0.62
	Alcoholic extract	0.74	0.86	0.89	0.83	0.86
<i>Salvadora persica</i>	Ether extract	0.59	0.55	0.30	0.29	0.46
	Alcoholic extract	0.61	0.67	0.58	0.63	0.53
<i>Tecomella undulata</i>	Ether extract	0.33	0.37	0.51	0.74	0.42
	Alcoholic extract	0.51	0.49	0.63	0.65	0.60

a = Ratio of diameters of the inhibition zone to extracts (10 µg) under observation (I) and diameter of inhibition zone due to standard reference antibiotics

C = Chloramphenicol (30 µg) against *S. aureus* = 30 mm and *E. coli* 32 mm.

P = Penicillin (10 units) against *S. aureus* = 32 mm.

S = Streptomycin (10 µg) against *E. coli* = 20 mm.

M = Mycostatin (100 units) against *C. albicans* = 32 mm.

Maximum antibacterial activity was exhibited by the extracts of leaves (ether extract and alcoholic extract) of *Prosopis cineraria* against *Escherichia coli* and *Staphylococcus aureus* whereas leaf extracts of *Acacia tortilis* shows maximum activity against *Candida albicans*.

4. Conclusion

The present study indicates that these medicinal tree species growing in this arid region of Rajasthan have definitely some antimicrobial principles as secondary products, which are responsible for antibacterial and antifungal activity. Thus, the activity of all these test extracts against both bacterial and fungal pathogens, indicate that these arid plants are more resistant to bacterial and fungal attacks due to the presence of some biologically active substances, So these can be used in pharmaceutical and drug industries.

5. Acknowledgement

We express sincere thanks to Head, Department of Microbiology, S.P. Medical College, and Bikaner for providing research facilities.

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