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Research Article

ANTIMICROBIAL ACTIVITIES OF SOME MEDICINAL TREE SPECIES OF PALI DISTRICT OF RAJASTHAN

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ABSTRACT
Antimicrobial screening of ethyl ether and alcoholic extracts of leaves of three selected medicinal tree species growing in Pali district of Rajasthan was carried out. *Acacia leucophloea, Anogeissus latifolia and Boswellia serrata* showed positive reactions against bacterial pathogens i.e. *Staphylococcus aureus, Escherichia coli* and a fungal pathogen *Candida albicans*.

Keywords: *Antimicrobial Activities, Medicinal Tree Species, Pali District, Rajasthan*

INTRODUCTION
The medicinal tree species growing in Pali district of Rajasthan are a potential source of secondary metabolites of pharmaceutical interest like flavonoids, sterols, steroidal sapogenins, alkaloids, phenolic compounds, sulphides, isothiocynates, anthocynins, terpenoids etc. These are the active principles, which act as antioxidants, anticarcinogenic, antimicrobials and immunity stimulants.
From this region of Rajasthan, three medicinal tree species of *Acacia leucophloea, Anogeissus latifolia and Boswellia serrata* have been selected for antimicrobial screening.
A number of plants have been screened for their antimicrobial activity (Khan *et al.*, 1996; Akhtar *et al.*, 1997; Akhtar *et al.*, 1997; Turkusay and Onogal, 1998; Ahmed *et al.*, 1999; Khan *et al.*, 2001; Ahmed and Beg, 2001). The antimicrobial principles and their distribution in plants have been reported by many workers (Kapoor and Kumar, 2005; Kapoor *et al.*, 2007; Kapoor *et al.*, 2011; Kapoor and Mishra, 2012; Kapoor and Mishra, 2013; Kapoor and Purohit, 2013; Kapoor and Pandita, 2013; Kapoor and Kumar, 2014).

MATERIALS AND METHODS
Present investigation describes the antimicrobial activity of leaf extracts of three selected tree species against Bacterial pathogens *Staphylococcus aureus* (Gram positive), *Escherichia coli* (Gram negative) and *Candida albicans* (Fungal pathogen).
Fresh leaves of all the selected tree species were collected from study area 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, $_{P}$H adjusted to 7.5) and for *Candida albicans* Sabourands liquid medium (1% peptone, 4% glucose, $_{P}$H 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 (Khanna *et al.*, 1971).

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RESULTS AND DISCUSSION

Antimicrobial screening of ethyl ether and alcoholic (50% ethanol) leaf extracts of *Acacia leucophloea, Anogeissus latifolia and Boswellia serrata* showed positive reactions against all the three test organisms (Table-1).

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

Plants	Leaves extracts	Test Organisms				
		E. coli		*S. aureus*		*C. albicans*
		I/C[a]	I/P[a]	I/C[a]	I/S[a]	I/m[a]
Acacia	Ether extract	1.04	1.52	0.66	0.60	0.57
leucophloea	Alcoholic extract	0.54	0.68	0.65	0.68	0.61
Anogeissus	Ether extract	0.60	0.94	1.36	1.11	0.69
latifolia	Alcoholic extract	1.22	1.76	0.82	0.69	0.66
	Ether extract	1.14	0.82	0.93	0.88	0.76
Boswellia serrata.	Alcoholic extract	0.92	0.74	0.82	0.74	0.85

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 *Anogeissus latifolia* against *Escherichia coli* and *Staphylococcus aureus* whereas leaf extracts of *Boswellia serrata* shows maximum activity against *Candida albicans*.

Conclusion

The present study indicates that these medicinal tree species growing in this Pali 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 tree species can be used in pharmaceutical and drug industries.

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