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ORIGINAL RESEARCH ARTICLE

Ethnobotanical Significance and Antimicrobial Activity of *Blumea lacera* (Roxb.) DC

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ABSTRACT

The ethnobotanical significance and antimicrobial potential of various extracts of *Blumea lacera* was investigated. The plant was found to be used in many folk preparations. Antimicrobial potential of the plant was evaluated against three bacterial and one fungal species. Two different solvents - water and methanol were used for extraction purposes. Among the different extracts investigated, water extract of *Blumea lacera* was found to possess a broad spectrum of antimicrobial activity against studied bacterial strains. For the antifungal activity, both extracts of *Blumea lacera* showed promising results.

Key words: *Blumea lacera*, Antimicrobial Activity, Aqueous Extract, Methanol Extract.

INTRODUCTION

Various folk medicinal practices use medicinal herbs and many forest products. These comprise the largest part of primary health care in Asian region. A review of literature indicates that many medicinal plants are known in folk medicine of different cultures in India and abroad [1]. Information on folk medicinal uses of plants have recently become of renewed interest in the search for new phytochemicals of therapeutic value. Over 7500 plant species have been reported to be used in the Indian traditional medicinal systems including ethno medicines [2]. Traditionally used medicinal plants produce a variety of compounds of known therapeutic properties. Many plants have been screened for their antimicrobial activities and drugs have been formulated worldwide [3-4] and in India [5-7]. A need is also felt always in the pharma sector to search for new antimicrobial compounds due to increased cases of development of resistance by microorganisms to the currently used antibiotics [8]. So many studies focus on determining the antimicrobial activity of plant extracts have been found in folk medicine.

Blumea lacera commonly called as Janglimulli, Kakaronda, Siyalmutra, and Susksampatra is a camphoraceous smelling, tall stem, corymbosely branched herb. It is found growing wildly in wastelands, roadside areas. It is described in *Ayurveda* as bitter, astringent, acrid, thermogenic, errhine, anti-inflammatory, styptic, opthalmic, digestive, antihelminthic, liver tonic, expectorant, febrifuge, antipyretic, diuretic, deobstruant, and stimulant [9]. Ethnobotanically this plant is very important. Many ethnobotanical uses of this plant are already known and some were recorded by the authors in the present study [10-12]. Almost all the parts of plant (stem and leaves) are known to have active principles. The reported constituents includes beta-caryophyllene, thymol hydroquinone, dimethylether, caryophyllene oxide, alpha-humulene, E-beta - farnesene, 19 α - hydroxy-12-ene-24,28-dioate-3-*O*-β-D-xylopyrinoside, 2-isoprenyl-5-isopropylphenol– 4 – *O* – β - D-xylopyrinoside, 5 – hydroxyl - 3, 6, 7, 3', 4'-pentamethoxy flavone, 5, 3',4'- trihydroxy -3, 6,7 - trimethoxy flavone, campesterol and a coniferyl alcohol derivative [13].

Although a little work on antibacterial activity of this plant has been done by some workers [13-14], lot has to be done. Present study was undertaken to record the some new ethnobotanical importance and study of the antimicrobial activity using microbes not covered under previous studies.

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MATERIALS AND METHODS

Plant Material: Disease free fresh plant materials (whole aerial portion) were collected from various localities of Panipat district (Haryana) randomly in November 2009. The taxonomic identities of the used plants were confirmed with the help of standard floras. Collected plant materials were thoroughly cleaned and subjected to dryness in an oven at maintained temperature of about 40^0C upto complete dryness and then homogenized to fine powder.

Preparation of Crude Extracts: Two different solvents namely water and methanol were used for extraction from the fine powder using the method of Quiroga et al.[15] with minor modifications. All the extracts obtained were kept in oven at 45 ^{0}C upto dryness. Extracts were then re-dissolved in their respective solvents to obtain final concentrations of 5, 10, 25 and 50 mg/ml for each plant.

ANTIMICROBIAL ASSAY

Cultures of the fungi and bacteria were obtained from MTCC, Chandigarh and Division of Microbiology, IARI, New Delhi. Bacterial cultures used were *Bacillus subtilis, Staphylococcus aureus* (both gram positive) and *Serratia marcescens* (Gram negative). Culture of fungi used was *Candida albicans.* Bacteria were grown in Nutrient Agar slants for sub-culturing. The fungal culture was further sub-cultured in Potato Dextrose Agar (PDA) media.

For assaying antimicrobial activity, the agar well diffusion method of Perez et al. [16] and Rojas et al. [17] was used with minor modifications. Ampicillin was used as positive control. Similarly a negative control was also tested using the different solvents. The test was carried out in triplicates. The plates were incubated at 32.5 ± 2.5ºC for 24 – 48 hrs. Zone of inhibition was then measured using a scale. The antimicrobial activity in terms of percentage relative inhibition zone diameter (RIZD) was also calculated by applying the expression:

$$\%RIZD = \frac{\text{IZD sample} - \text{IZD negative control}}{\text{IZD antibiotic standard}} \times 100$$

Where, RIZD is the relative inhibition zone diameter (mm).

The MIC was determined for the various extracts by an agar well diffusion technique using serial dilutions. The least concentration of each extract showing a clear zone of inhibition was taken as the MIC.

RESULTS AND DISCUSSION

Ethnobotanical information collected shows that it is an important medicinal plant and mainly leaves are used. Leaves of this plant are used to get rid from the worms of the anal region, particularly in children of upto age of 3 years. Leaves are applied externally by local people on cuts etc during routine agriculture work. Water extract of leaves was also reported to be taken orally as antihelminthic.

Scientific evaluation of the antimicrobial activity of widely distributed plants against various types of microbes still remains an area of intensive investigation. In the present study, it has been tried to work out the ethnobotanical and antimicrobial potential of the *Blumea lacera*.

Table 1: Antimicrobial Activity of *Blumea Lacera*, (shown by zone of inhibition in mm)

Conc mg/ ml	*B. subtilis*		*S. aureus*		*S. marcescens*		*C. albicans*		Control	
	Aq	Me	Aq	Me	Aq	Me	Aq	Me	Aq	Me
5	10	-	13	22	9	-	10	25	-	-
10	10	-	29	29	11	-	12	34	-	-
25	11	-	29	37	12	-	12	35	-	-
50	13	-	32	37	16	-	20	38	-	-

** All the values are mean of triplicates. No inhibition zone is denoted by (-). Aq and Me stands for aqueous and methanol respectively.*

Table 2: Percentage of Relative Inhibition Zone Diameter for Different Solvents

Conc mg/ml	*B. subtilis*		*S. aureus*		*S. marcescens*		Control	
	Aq	Me	Aq	Me	Aq	Me	Aq	Me
5	26	-	50	85	25	-	-	-
10	26	-	111	111	31	-	-	-
25	28	-	111	111	33	-	-	-
50	33	-	123	142	44	-	-	-

Table 3.MIC (mg/ml) for extracts used against various microbes

Microorganism used	Aq	Me
Bacillus subtilis	5	-
Staphylococcus aureus	5	5
Serratia marcescens	5	-
Candida albicans	5	5

Results of our studies indicate the fair antimicrobial potential of *Blumea lacera*. As vivid from the **tables 1,2 and 3 and Fig. 1A and 1B,** aqueous extract of the plant have shown good results against all microbes used in the present study. Methanolic extracts however fail to produce any results in case of *Bacillus subtilis* and *Serratia marcescens*, this extract showed good activity against *Staphylococcus aureus* and *Candida albicans*. %RIZD values shows that

extracts were more effective against *Staphylococcus aureus* than other two bacterium species. In all, *S. aureus* was found to show maximum succeptibility. This finding confirms the results of earlier study by Mahida and Mohan[14]. For *Serratia marcescens* , no reports are available for comparison. All microbes studied showed results at lowest concentration used in the study i.e. 5mg/ml (MIC).

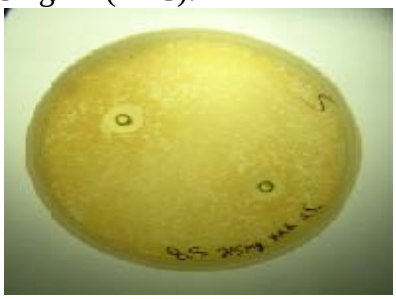

Fig. 1A. *Blumea lacera* 25mg/ml against ***B. subtilis***

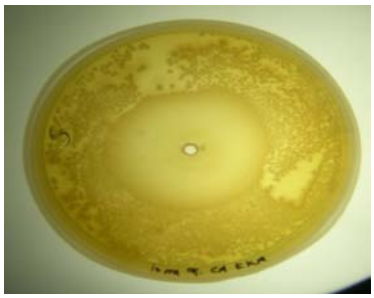

Fig. 1B. *Blumea lacera* 10mg/ml against ***C. albicans***

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