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Screening for Antibacterial Activity of *Asterella angusta* (Steph.) Kachroo.

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The antibacterial activity of *Asterella angusta* (Steph.) was studied against the two gram negative bacteria namely *Escherichia coli, Pseudomonas aeruginosa* and two gram-positive bacteria *Bacillus subtilis* and *Staphylococcus aureus*. The aqueous and alcoholic extract were tested against the four bacteria. The maximum antibacterial activity was observed in alcoholic (Ethanolic) extract against. *Pseudomonas aeruginosa* and the maximum antibacterial activity in aqueous extract of *Asterella* was observed against *Bacillus subtilis*.

Keywords: *Asterella angusta*, Antibacterial activity, Bacteria.

Asterella angusta of the order marchantiales is widely distributed in Mount Abu district Sirohi, Rajasthan, India. Very little information is available regarding antibacterial activity of *Asterella angusta*. Antibacterial activity have been reported for a wide range of Liverworts (Mc. Cleary, *et al.,* 1960). (Madsen and Pates, 1952; Latiff *et al.,* 1989; Basile *et al.,* 1999). (Van Hoof *et al.,* 1981), (Benergee & Sen 1979). Recently several scientists have reported various compounds such as unsaturated lipids, fatty acids, esters, phenolic etc. involved in antibacterial activity. Present investigation is based on the screening for antibacterial activity of *Asterella angusta* against different gram positive and gram negative bacteria.

The study includes some alcoholic and aqueous extracts of *Asterella angusta* against four bacterial strains out of them two are gram-positive and two are gram-negative.

MATERIALS AND METHODS

Microbial Cultures and Growth Conditions

The test microorganisms used for the antimicrobial activity screening were four bacteria (2 gram positive and 2 gram negative) *Bacillus subtilis* (MTCC-441), *Staphylococcus aureus* (740), *Pseudomonas aeruginosa* (424) and *Escherichia coli* (41). These organisms were procured from Institute of Microbial Technology (IMTECH-CSIR), Chandigarh, India. Cultures of bacteria were grown on nutrient broth (Hi media) at 37ºC for 12h.

Collection of Plant Material

Plant material was collected from Mt. Abu, Rajasthan, India in the month of September, 2006 at an altitude 1350 m. The plant were identified and voucher specimens (LB-86) have been deposited in Bryology Laboratory, Department of Botany, Mohanlal Sukhadia University, Udaipur, Rajasthan for further reference.

Extraction Procedure

The thalli of *Asterella angusta* were dried in shade and powdered. About 20g of powder was percolated with 200 ml of Ethanol, Methanol and water separately. The extracts were decanted, filtered with Whatman No. 1 filter paper and concentrated at reduced pressure below 40ºC through rota vapour (Buchi) and lyophilized (Labconco, US) to obtain dry extract.

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Antibacterial Activity

The agar diffusion method (Murray *et al.,* 1995) was used to evaluate the antimicrobial activity. Bacteria were cultured overnight at 37ºC in nutrient broth and used as inoculum. A final inoculum using 100 µl of suspension was spreaded on nutrient agar medium.

An aliquot of 100 µl of extract (0.1 gm/ml) was added to the seeded agar. The streptomycin disc (6 mm in diameter) was impregnated and used as the positive control for bacteria. The test plates were incubated at 37ºC and 30ºC for 24 h depending on the incubation time required for visible growth.

RESULTS AND DISCUSSION

The antibacterial activity of *Asterella angusta* extract was presented in Table 1. The disc diffusion method was used to determine the inhibition zone of *Asterella angusta* extracts (Organic and aqueous). The plant showed significant antibacterial activity against all the organisms. The maximum antibacterial activity in methanolic extract was observed against *Pseudomonas aeruginosa* (Table 1). In ethanolic extract the maximum diameter of inhibition zone (25 mm) was observed against *P. aeruginosa*. In the aqueous extract of the plant the maximum antibacterial activity was observed against *Bacillus subtilis*. Further it is observed from the table that *P. aeruginosa* was the most sensitive organism in respect to the different extracts tested. Banerjee and Sen (1979) also reported the antibacterial activity of methanolic, Ethanolic, ether, acetone extracts of *Asterella angusta* against *Salmonella typhi, Vibrio cholera, Pseudomonas aeruginosa, Mycobacterium phlei* and *Sarcina lutea*. They found that the methanolic and ethanolic extrac were most sensitive as compared to other organic extracts, however, aqueous extract was found to be inactive.

Table 1. Antibacterial activity of *Asterella angusta* extract

Microorganisms	Inhibition zone in diameter (mm)			Standard antibiotics
	Methanol	Ethanol	Water	(Streptomycin)
1. *Bacillus subtilis*	12	18	15	25
2. *Staphylococcus aureus*	15	15	8	21
3. *Escherichia coli*	10	16	07	20
4. *Pseudomonas aeruginosa*	16	25	10	22

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