INDIAN JOURNAL OF ARID HORTICULTURE
2013 Vol. 8 (1-2): 86-87

SHORT COMMUNICATION

Antimicrobial activities of some arid medicinal plants of Rajasthan

B.B.S. Kapoor, S. Lakhera, V. Arora and V. Purohit
Herbal Research Laboratory, Govt. Dungar College, Bikaner- 334001 (India)
(Received: 20.01.2014; Accepted 7.03.2014)

Arid region of Rajasthan is a potential source of medicinal plants, covers most of the north-western part of Rajasthan state. Most of the medicinal plants of Rajasthan Desert belong to the families such as Apiaceae, Asclepiadaceae, Asteraceae, Cactaceae, Casalpiniaceae, Capparidaceae, Chenopodiaceae, Convolvulaceae, Cucurbitaceae, Cyperaceae, Euphorbiaceae, Fabaceae, Mimosaceae, Molluginaceae, Solanaceae and Zygophyllaceae etc.

These medicinal plants are a good source of phytochemicals of pharmaceutical interest such as flavonoids, sterols, alkaloids, phenolic compounds, sulphides, isothiocynates, anthocyanins, terpenoids etc. These are the active principles which act as antioxidants, anticarcinogenic, antimicrobials and immunity stimulants. A number of herbal plants have been screened for antimicrobial activities and their principles by several workers like Ahmed and Beg-Arina, 2001, Ahmed-El-Sawi *et al.*,1999, Akhtar *et al.*,1997, Khan *et al.*,1996, Kapoor and Kumar,2005, Kapoor *et al.*,2007, Kapoor and Mishra,2013, Kapoor *et al.*,2011, Kapoor *et al.*,2012, Kapoor and Lakhera, 2013, Kapoor and Pandita, 2013.

From the arid region of Rajasthan five medicinal plants like *Crotalaria burhia, Euphorbia caducifolia, Leptadenia pyrotechnica, Clitoria ternatea* and *Tephrosia purpurea* were screened for their antimicrobial activities.

Fresh leaves of all the selected medicinal plant species were collected from Bikaner and Jaisalmer districts 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 Waring Blender at 2500 rpm for 10 minutes. 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),

Table 1. Antimicrobial activity of leaf extracts of selected medicinal plant species and standard reference antibiotics.

Plants	Leaf Extract	Test Organisms				
		S.aureus		*E. Coli*		*C. albicans*
		I/C[a]	I/P[a]	I/C[a]	I/S[a]	I/M[a]
Crotalaria burhia	Ether	1.04	1.60	0.60	0.60	0.50
	Alcoholic	0.43	0.66	0.64	0.64	0.68
Euphorbia caducifolia	Ether	0.50	0.93	1.50	1.14	0.65
	Alcoholic	1.00	1.86	0.75	0.57	0.60
Leptadenia pyrotechnica	Ether	1.10	0.88	0.95	0.86	0.75
	Alcoholic	0.80	0.64	0.85	0.78	0.90
Clitoria ternatea	Ether	0.38	0.36	0.92	0.88	0.54
	Alcoholic	0.64	0.51	0.82	0.80	0.66
Tephrosia purpurea	Ether	0.86	0.80	0.64	0.68	0.61
	Alcoholic	0.75	0.72	0.58	0.61	0.80

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

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

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

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

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

Escherichia coli (Gram negative) (Bacterial pathogens) 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* was 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 papers 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 of the various test samples was compared with the inhibition zone from the high concentration antibiotic reference discs by method as given by Khanna *et al.*, 1971. Antimicrobial screening of all the five selected medicinal plant species is given in Table 1.

The present investigation indicates that ethyl ether and alcoholic leaf extracts of all the selected medicinal plants showed positive reactions against all the three test organisms i.e. *Staphylococcus aureus* & *Escherichia coli* (Bacterial pathogens) and *Candida albicans* (Fungal pathogen).

The medicinal plants of the arid region of the Rajasthan are a potential source of antimicrobial principles. These medicinal plants are more resistant to bacterial and fungal attacks due to presence of biologically active substances like flavonoids. Due to presence of some secondary products which are responsible for antimicrobial activities, these medicinal plant species can be used in drug and pharmaceutical industries.

References

Ahmed, I. and Beg-Arina, Z. 2001 Antimicrobial and Phytochemical studies on 45 Indian medicinal plants against multi-drug resistant human pathogens. *Journal of Ethnopharmacology,* 74 (2): 113-123.

Ahmed-El-Sawi, S., Abd-El-Megeed, H.F and Ali, A.M. 1999. Flavonoids and antimicrobial volatiles from *Adhatoda vasica* Nees. *Pharmaceutical* and *Pharmacological Letters*, 9 (2): 52-56.

Akhtar, M., Rahber, A., Bhati, M. H. and Aslam, M. 1997 Antimicrobial activity of plant decoctions against *Xanthomonas campestris* pv. Citri. Int. *Journal of Pest Management*, 43(2):149-153.

Kapoor, B. B. S. and Kumar, S. 2005. Herbal plants of Rajasthan desert: A potential source of antimicrobial principles. *Journal of Arid Land Studies*, Japan. 16: 425- 426.

Kapoor, B. B. S. and Mishra, R. 2013. Antimicrobial screening of some capparidaceous medicinal plants of North-west Rajasthan. *Indian Journal of Pharmaceutical and Biological Research*, 1(2): 20 22.

Kapoor, B. B. S., Acharya, S., Mishra, R. and Swami, S. 2011. Antimicrobial screening of some arid Tiliaceous plants. *Journal of Phytological Research, 24***(**2): 255 256.

Kapoor, B.B.S., Acharya, S. and Mishra, R. 2012. Antimicrobial screening of some medicinal plants of the Rajasthan desert: *International Proceedings* of Chemical, Biological and Environmental Engineering, ICBEC, 2012 held at Bangkok, Thailand on 24-25 Nov, 2012; 46: 105-109.

Kapoor, B. B. S., Bhumika and Khatri, J. S. 2007. Antimicrobial activities of medicinal tree species of Hanumangargh District of Rajasthan. *Journal of Phytological Research*, 20(2): 325- 326.

Kapoor, B. B. S. and Lakhera, S. 2013. Antimicrobial screening of some medicinal plant species of the Jodhpur district of Rajasthan: *International* Journal *of Universal Pharmacy and Biosciences*, 2 (4): 118-122.

Kapoor, B. B. S. and Pandita, S. 2013. Antimicrobial screening of some exotic tree species of Rajasthan desert. *Indian Journal of Pharmaceutical and Biological Research*, 1(3): 8-11.

Khan, A. J., Zouba, A. A. and Seapy, D. G. 1996.Antifungal activity from leaves of *Acacia nilotica* against *Pythium aphanidermatum*. *Journal for Scientific Research, Agricultural Sciences*, 1: 7-11.

Khanna, P., Mohan, S. and Nag, T. N. 1971.Antimicrobials from plant tissue cultures. *Lioydia*, 34: 168-170.