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Short Communication

Evaluating the antibacterial efficacy of *marrubium vulgare* extract on various microorganisms

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The antibacterial activity of the methanolic extract of *Marrubium vulgare* whole plant was tested by disc diffusion method. Zones of Inhibition produced by methanolic extract in a dose of 50, 100, 200, 400 and 600 mg/ml against selected strains was measured and compared with those of standard discs of antibiotic ciprofloxacin (10 µg/ml).

Key words: Disc diffusion, antibacterial activity, *Marrubium vulgare*.

INTRODUCTION

Marrubium vulgare L. (Lamiaceae) commonly known as “Horehound” is naturalized in North and South America, the Mediterranean district and Western Asia. In India it is found in Kashmir at an altitude of 5,000 - 8,000 ft. It is a tall robust herbaceous perennial herb, 40 - 120 cm high, densely covered, especially when young, with a thick white cottony flower (Robert and Henry, 1880). It posses-ses tonic, aromatic, stimulant, expectorant, diaphoretic and diuretic properties. It is helpful for bronchial asthma and non-productive cough. It was formerly much esteem-ed in various uterine, visceral and hepatic affections and in phthisis (Chopra et al., 1956). The plant is reported to possess hypoglycemic (Roman et al., 1992), vasorelaxant (El-Bardai et al., 2003b), antihypertensive (El-Bardai et al., 2004), analgesic (DeSouza et al., 1998), anti-inflammatory (Sahpaz et al., 2002a), antioxidant activity (Weel et al., 1999), antioedematogenic activity (Stulzer et al., 2006) and many other reported biological activities. Phytochemicals present in the plant include caryophy-llene oxide, trans-caryophyllene (Asadipour et al., 2005), caffeoyl-l-malic acid, acteoside (Sahpaz et al., 2002a), phenylethanoid glycoside, marruboside (Sahpaz et al., 2002b), vulgarol, β-sitosterol, lupeol and marrubiin (Amer, 1993), respectively. The present study was undertaken to demonstrate the antibacterial activity of *Marrubium vulgare* whole plant against some Gram-positive and Gram-negative bacteria.

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MATERIALS AND METHOD

The whole plant of *M. vulgare* was collected from Jammu and Kashmir in August. It was identified and authenticated by taxono-mist Prof. A. R. Naqshi (Dept. of Botany, University of Kashmir, Srinagar, India). The voucher specimen (MV-FP-18) of the plant has been kept in the herbarium of Jamia Hamdard for future reference.

Whole plant of *M. vulgare* was dried in shade and crushed to fine powder. The dried powder of the plant (200 g) was extracted in Soxhlet apparatus with methanol. The extract was evaporated to dryness by evaporation on a water bath. A semisolid brown crude extract of whole plant so obtained was tested for the anti-microbial activity against various bacterial strains. These bacterial strains were obtained from Institute of Microbial Technology (IMTECH), MTCC and Gene Bank, Chandigarh, India.

Sterile nutrient agar plates were prepared and incubated at 37^{o}C for 24 h to check for any contamination. Sterile filter paper discs (Whatman No.1) of 6 mm diameter were soaked in five different dilutions of the methanolic extract and placed in appropriate posi-tion on the surface of the plate with quadrants marked at the back of the petri dishes. The *in vitro* antibacterial activity of different extracts of *M. vulgare* at 50, 100, 200, 400 and 600 mg/ml was studied by disc diffusion method (Pelczar et al., 1993) against *Escherichia coli, Bacillus subtilis, Staphylococcus aureus, S. epide-*

Table 1. Antibacterial activity of methanolic extract of whole plant of *M. vulgare.*

Bacteria	Zones of Inhibition (mm) (mg/ml)					MIC (mg/ml)	Ciprofloxacin (10 µg/ml)
	50	100	200	400	600		
B. subtilis MTCC 619	0	10	13	17	24	100	30
S. epidermidis MTCC 435	0	0	11	15	21	200	25
S. aureus MTCC 740	0	09	11	15	20	100	22
E. coli MTCC 443	0	0	0	10	15	400	25
P. vulgaris MTCC 426	0	0	0	11	16	400	22
P. aeruginosa MTCC 424	0	0	0	0	0	0	23

Zone of inhibition (mm) are average of triplicate experiments. Disc diameter = 6 mm

rmidis, Pseudomonos aeruginosa and *Proteus vulgaris*. The Petri dishes were incubated at 37^{o}C for 18 h and the diameter of the zone of inhibition measured in mm. The activity of the methanolic extract was compared with ciprofloxacin (10 µg/ml). The zone of inhibition was calculated by measuring the minimum dimensions of the zone of no microbial growth around the disc and minimum inhibitory concentrations were determined. An average of three independent determinations was recorded (Table 1).

RESULTS AND DISCUSSION

The methanolic extract of the whole plant of *M. vulgare* exhibited moderate to significant antibacterial activity against five out of six tested bacterial organisms as compared to the standard ciprofloxacin (10 µg/ml). The study revealed that methanolic extract of the crude drug was very much effective against *B. subtilis, S. epidermidis* and *S. aureus* (Gram positive bacteria) and moderately effective against *P. vulgaris* and *E. coli* while ineffective in case of *P. aeruginosa* (Gram negative bacteria).

Thus on the basis of the results it is inferred that the methanolic extract of *M. vulgare* whole plant had *in-vitro* antibacterial. Further phytochemical studies are needed to identify active constituents responsible for the observed activity.

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