# Evaluation of Antimicrobial Activity of Aqueous Extract of *Marrubium vulgare* L.

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## ABSTRACT

The antimicrobial activity of aqueous extract of *Marrubium vulgare* L. whole plant was tested by disc diffusion method. Zones of Inhibition produced by aqueous extract in a concentration of 200, 400 and 600 mg/ml against selected bacterial and fungal strains was measured and compared with those of standard discs of antibiotic ciprofloxacin (10 µg/ml).

***Key words:*** Antimicrobial activity, Ciprofloxacin, *Marrubium vulgare.*

## INTRODUCTION

From centuries natural products have been used to prevent or cure infectious diseases. Many of these plants have been investigated scientifically for antimicrobial activity and a large number of plant products have been shown to inhibit the growth of pathogenic microorganisms. *Marrubium vulgare* L. (Lamiaceae) commonly known as "horehound" is naturalized in North and South America, the Mediterranean region 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 felt (Robert and Henry, 1880). It possesses expectorant, diaphoretic and diuretic properties. It is helpful for bronchial asthma and non-productive cough. It was formerly much esteemed in various uterine, visceral and hepatic ailments and in phthisis (Chopra *et al*., 1956). The plant is reported to possess hypoglycemic(Roman *et al*., 1992), antihypertensive (El-Bardai *et al*., 2004), analgesic (DeSouza *et al*., 1998), vasorelaxant (El-Bardai *et al*., 2003b), anti-inflammatory (Sahpaz *et al*., 2002a), antioxidant (Weel *et al*., 1999), antioedematogenic (Stulzer *et al*., 2006) and many other reported biological activities. The plant is reported to contain phenylethanoid glycoside, marruboside (Sahpaz *et al*., 2002b), caryophyllene oxide, trans-caryophyllene (Asadipour *et al*., 2005), caffeoyl-l-malic acid, acteoside (Sahpaz *et al*., 2002a), vulgarol, β-sitosterol, lupeol and marrubiin (Amer, 1993) respectively.

The present study was undertaken to demonstrate the antimicrobial activity of aqueous extract of *Marrubium vulgare* whole plant against some bacterial and fungal strains.

## MATERIAL AND METHODS

### Collection of Plant Material

The whole plant of *Marrubium vulgare* was collected in the month of August from Nawhatta, Srinagar, Jammu and Kashmir.

Whole plant of *Marrubium vulgare* was dried in shade and crushed to fine powder. The plant material (100 g) was dried and crushed to coarse powder and then extracted with water by using cold extraction method till completely exhausted. The aqueous extract thus obtained was dried on the water bath to yield 18 gm of extract. Crude extract thus obtained was tested for the anti-microbial activity against various bacterial and fungal strains. These strains were obtained from MTCC Chandigarh, India.

### Screening for Antibacterial Activity

Sterile nutrient agar plates were prepared and incubated at 37°C for 24 hours to check for any sort of contamination. Sterile filter paper discs (Whatman No.1) of 6 mm diameter were soaked in three different dilutions of the aqueous extract and placed in appropriate position on the surface of the plate marked as quadrants at the back of the petri dishes. The *in-vitro* antimicrobial activity of *M. vulgare* in concentration of 200, 400 and 600 mg/ml was studied by disc diffusion method (Pelczar *et al*., 1993) against *Escherichia coli, Bacillus subtilis, Staphylococcus aureus, Staphylococcus epidermidis, Proteus vulgaris* and *Candida albicans*. The petri dishes were incubated at 37°C for 18 hours and the diameter of the zone of inhibition measured in mm. The activity of the aqueous extract was compared with ciprofloxacin (10 µg/ml). The zone of inhibition was calculated by measuring the dimensions of the zone of no microbial growth around the disc. An average of three independent determinations was recorded (Table 1).

## RESULTS AND DISCUSSION

The aqueous extract of *M. vulgare* exhibited moderate to significant and concentration dependent antibacterial activity against tested bacterial strains using ciprofloxacin 10 (µg/ml) as standard. The study revealed that aqueous extract of the crude drug was very much effective against *S. aureus*, *S. epidermidis*, *P. vulgaris* (Gram - positive bacteria) and weakly effective against *E. coli* (Gram - negative bacteria). However, no activity was observed against *C. albicans*. Further phytochemical studies are needed to identify active constituents responsible for the observed activity.

**Table 1. Evaluation of antimicrobial activity of aqueous extract of *Marrubiumvulgare* L**

| Microorganisms | Zones of Inhibition* (mm) (mg/ml) | | | Ciprofloxacin (10 µg/ml) |
|---|---|---|---|---|
| | 200 | 400 | 600 | |
| *Proteus vulgaris* MTCC 426 | 0 | 09 | 15 | 22 |
| *Bacillus subtilis* MTCC 619 | 11 | 15 | 22 | 30 |
| *Staphylococcus epidermidis* MTCC 435 | 09 | 14 | 19 | 25 |
| *Staph. aureus* MTCC 740 | 09 | 14 | 19 | 22 |
| *Escherichia coli* MTCC 443 | 0 | 10 | 15 | 25 |

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

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