

## Antimicrobial Activity of *Mollugo cerviana* ser. (Molluginaceae)

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**ABSTRACT:** *The ethanolic extracts of aerial shoots of Mollugo cerviana and its leaf derived callus were tested for antimicrobial activity using the filter paper disk assay method. Both the extracts showed antibacterial activity against Bacillus subtilis and Escherichia Coli. The antifungal activity of the extracts against Aspergillus niger and Aspergillus flavus was nil or negligible.*

### INTRODUCTION

Traditional herbalists in India use a variety of herbal preparations to treat different kinds of ailments including many microbial infections. In fact, the rural dwellers are virtually left with no alternative other than to patronize the herbal practitioners. In addition to these, faced with the mounting adverse drug reactions to synthetic chemical medications, efforts are currently being made to look for the products of natural origin. Foremost among these are medicinal plants and their essences (1). In recent years a number of studies have been reported, dealing with antimicrobial screening of extracts of medicinal plants (2,3,4)

Mollugo cerviana Ser. Is an annual erect, slender herb belonging to the family molluginaceae. The plant is attributed with aperient, uterine stimulant, antiseptic and febrifuge properties. It is used in stomach ache and to promote lochial discharge. Flowers and tender shoots in decoction have a diaphoretic effect. Roots are used in gout and rheumatism (5,6). By the survey, it is found that people in north Karnataka, used the leaves of this plant in curing jaundice.

The literature survey revealed that M.cerviana plant and its *in vitro* derived callus had not been subjected to screening for antimicrobial properties. This work reports on the general antimicrobial activities of 50% ethanolic extracts of aerial shoots of M.cerviana and its leaf derived callus.

### MATERIALS AND METHODS

#### plant and callus materials

The plant material was collected at Mysore and aerial shoots (Leave and stem) were shade-dried and finely powdered.

The callus was obtained by culturing leaf explants on semi-solid Murasige and Skoog's (MS) (7) basal medium supplemented with 2mg/l 6-benzylamino purine and 1 mg/l naphthalene acetic acid after 30 days of incubation. Callus was dried in an oven at 60°C for 4 days and dried callus was finely powdered.

## PREPARATION OF EXTRACTS AND DISKS

finely powdered materials were extracted with 50% ethanol and filtered extracts were lyophilized the dried residues were taken in Dimethyl formamide (DMF) at the concentration of 1 mg/ml. filter paper disks of 6 mm diameter were impregnated with 100 µg of other dried residue in DMF and 0.1 ml of DMF for vehicle control. For comparing anti-bacterial activity, disks were impregnated with 0.1 ml of 100 µg/ml solution of streptomycin sulphate in DMF and for antifungal activity, 0.1 ml of 100 mg/ml of griseofulvin in DMF were used.

## MICROORGANISMS AND CULTURE MEDIA

Two bacteria, Escherichia coli (Gram-negative) and Bacillus subtilis (Gram-positive) and two fungi, Aspergillus niger and Aspergillus flavus were used in the present study. These microorganisms were obtained from the department of microbiology, University of Mysore, Nutrient agar medium for bacteria and potato dextrose agar medium with 1% streptomycin sulphate for fungus were used.

## ANTIMICROBIAL TESTING

A paper disk method was employed for preliminary assay. Test plates were prepared using nutrient agar medium for bacterial culture and potato dextrose agar medium containing 1% streptomycin sulphate for fungus culture. The plates were inoculated with 1 ml of about 10% colony forming units/ml suspension of different bacteria and fungi. Sterile filter paper disks impregnated with ethanolic extracts, DMF and streptomycin sulphate for bacteria and griseofulvin for fungi were placed on the previously inoculated plates.

Bacterial cultures were incubated at 37°C for 24 hours and fungal cultures were incubated at 27°C for 7 days. The diameter of one of inhibition was measured and mean of four replicates was expressed in millimeters (mm) the diameter of more than 7 mm was considered as inhibitor zone.

## RESULTS

The antimicrobial activity of ethanolic extracts of M. cerviana aerial shoot and its leaf callus are presented in table-1. Aerial shoot extract has shown slightly more antibiotic activity than leaf callus extract. B. Subtilis (gram-positive) was inhibited more (>10 mm diameter) than E.coli (gram-negative). However, they were not as effective as the reference drug streptomycin sulphate. The antifungal activity of both the extracts was almost nil. There was no antagonistic effect on A.niger by either of the extracts. The aerial shoot extract had negligible inhibitory effect of A.flavus whereas the leaf callus extract has no growth inhibition. However, both the fungi were inhibited maximum by the reference drug griseofulvin. Where as DMF, used as a vehicle control showed no inhibitor effect in any of the four microorganisms.

## DISCUSSIONS AND CONCLUSION

When the uses of M.cerviana as previously reported (2,3) were compared to the test results, it is observed that extracts are also showing antibiotic effect. Antibacterial activity of plant extracts was supported by many observations (2,3,4,8,9). B. subtilis was more susceptible than E.coli as observed in previous reports (2,10) as in the earlier works (11,12) in the present observation also the antifungal activity of extracts was nil or negligible. However the screening of callus extract for the

antimicrobial activity was attempted for the first time.

Present screening results show a correlation with the antibiotic uses of the plant reported earlier the active compounds present in extracts may be responsible for the antimicrobial activity. Further chemical and pharmacological investigation has to be

done to know the active compound responsible for antimicrobial activity.

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**Table 1: Antimicrobial activity of ethanolic extracts of aerial shoots and leaf callus of Mollugo cerviana**

Test products	*Zone of inhibitions (mm)			
	E.coli	B.subtilis	A.niger	A.flavus
DMF control	-	-	-	-
Streptomycin sulphate	0	23	NT	NT
Griseofulvin	NT	NT	NT	NT
Aerial shoot extract	9	13	-	0
Callus extract	7	12	-	-

\* NT = Not tested

0 = Absence of considerable inhibitor zone (<7mm)

- = No zone of inhibition.

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