

## Antimicrobial activity of methanol extract of *Origanum majorana* L. (Sweet marjoram)

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**Abstract:** *In-vitro* microbicidal activity of the methanol extract of *Origanum majorana* L. was tested against seven fungi (*Fusarium solani*, *Candida albicans*, *Aspergillus niger*, *A. parasiticus*, *Rhizopus oryzae*, *Rhizoctonia oryzae-sativae* and *Alternaria brassicicola*) and six bacteria (*Bacillus subtilis*, *B. megaterium*, *Escherichia coli*, *Proteus vulgaris*, *Pseudomonas aeruginosa* and *Staphylococcus aureus*). The methanol extract of *O. majorana* can be used as an effective herbal protectant against different pathogenic bacteria and fungi. High toxicity against the growth of *Aspergillus niger* was diagnosed.

**Key words:** Sweet marjoram, *Origanum majorana*, Lamiaceae, Antimicrobial activity, Methanol extract

### Introduction

The genus *Origanum majorana* L. is an aromatic, perennial, herbaceous plant belonging to the family Lamiaceae. The plant has been used as a flavouring and herbal spice from time immemorial. Steam distillation of leaves and flower heads yields a volatile oil, known in the trade as oil of Sweet marjoram, widely used in flavouring food and also in perfumery. Medicinally it is used in both Ayurveda and Yunani system to cure various human ailments. The plant is pungent, bitter, hot, stomachic, anthelmintic, alexipharmic, useful in diseases of the heart and blood, fevers, leucoderma and inflammation (Kirtikar and Basu,

1985). An infusion of the plant is used as a stimulant, sudorific, emmenagogue and galactagogue and also useful in asthma, hysteria and paralysis (Farooqi and Sreeramu, 2004).

The plant is reported to possess antibacterial activity (Ben *et al.*, 2001; Farooqi and Sreeramu, 2004). The interest in microbicidal plants is ever increasing today since herbal pesticides and fungicides are harmless (Faweett and Spencer, 1970) and easily biodegradable (Mahadevan, 1982). Therefore the present study is conducted to determine the microbicidal properties of methanol extract of *O. majorana*.

**Table - 1:** Antimicrobial activity of methanol extract of *Origanum majorana*

Microorganisms	Zone of inhibition in mm*+			Standards
	Extract and dilutions in acetone			
	1: 0	1:1	1:2	
<b>Fungi</b>				Nystatin (50 IU)
<i>Fusarium solani</i>	28	20	16	41
<i>Candida albicans</i>	19	18	16	30
<i>Aspergillus niger</i>	40	32	24	38
<i>A. parasiticus</i>	20	18	17	29
<i>Rhizopus oryzae</i>	18	17	16	31
<i>Rhizoctonia oryzae - sativae</i>	24	22	20	33
<i>Alternaria brassicicola</i>	17	16	16	31
<b>Bacteria</b>				Gentamycin sulphate (40 mg/ml)
<i>Bacillus subtilis</i>	42	30	27	48
<i>B. megaterium</i>	20	19	18	45
<i>Escherichia coli</i>	18	17	16	29
<i>Proteus vulgaris</i>	20	18	16	28
<i>Pseudomonas aeruginosa</i>	18	17	16	40
<i>Staphylococcus aureus</i>	23	20	17	35

\* Including the diameter of the filter paper disk (16 mm)

+ Mean value of three independent experiments

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### Materials and Methods

*Origanum majorana* was collected from Kozhinjampara of Palakkad district of Kerala and authenticated at the herbarium of Botany Department, University of Calicut, where voucher specimens were deposited. Shade dried aerial parts of *O. majorana* were powdered. This powdered plant material was extracted in 100% methanol by stirring overnight and centrifuged at 10,000rpm at 4°C. The supernatant was collected, concentrated and used for the investigation. Both the methanolic extract and its dilutions were used. To test the antimicrobial activity, seven fungi and six bacteria (Origin MTTC Gene Bank, Institute of Microbial Technology, Chandigarh, India) were used.

Antimicrobial activity was studied using filter paper disk diffusion method (Benson, 1990). The degree of growth inhibition was evaluated after 48hr for bacteria and 12hr for fungi and compared with the growth inhibition results obtained from the controls (gentamycin for bacteria and nystatin for fungi).

### Results and Discussion

The results are recorded in Table 1. The methanol extract showed considerable activity against *Aspergillus niger*, *Fusarium solani* and *Bacillus subtilis*. The methanol extract was more active than the standard nystatin against *Aspergillus niger*.

Previous study conducted by Ben et al. (2001) suggests that the essential oil of *O. majorana* possesses antibacterial activity. A more recent work conducted by Farooqi and Sreeramu (2004) reveals that the leaves of marjoram have antimicrobial activity against *Bacillus anthracis*, *Proteus vulgaris*, *Salmonella stanley*, *S. newport*, *Streptococcus agalactiae*, *S. guneus* and *Aspergillus fumigatus*. The methanol extract of *O. majorana* because of its strong microbicidal property and superiority over commercial microbicides, may prove to be an effective herbal protectant against a wide spectrum of pathogenic bacteria and fungi, since herbal microbicides are non-toxic and ecofriendly.

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