

# Chemical profiling, biostatic and biocidal dynamics of *Origanum vulgare* L. essential oil

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## Abstract

*Origanum vulgare* L. (Lamiaceae) is a widespread flavoring culinary and medicinal herb. The present study aimed at investigating the antimicrobial activity of *Origanum vulgare* (OV) essential oil (EO) through illustrating its biostatic, biocidal and the dynamics of the biocidal activity against 11 different microorganisms. GC/MS of OV EO allowed the identification of 32 compounds representing 99.94% of the oil. The two major identified compounds were terpinen-4-ol (38.35%) and trans-sabinene hydrate (10.06%). Different methods were employed to illustrate the biostatic activity of OV EO. Results of the biostatic studies on OV EO using agar and broth dilution methods showed that *Staphylococcus aureus* (*S. aureus*) was the most sensitive organism; with a Minimum inhibitor concentration (MIC) 1.18 mg/ml. Agar diffusion method showed that the highest activity was observed against *Bordetella bronchiseptica* (*Br. bronchiseptica*), *Saccharomyces cerevisiae* (*S. cerevisiae*), *Bacillus subtilis* (*B. subtilis*) and *Staphylococcus epidermidis* (*S. epidermidis*) with inhibition zones  $38 \pm 1.5$ ,  $29.5 \pm 0.8$ ,  $26.9 \pm 0.9$  and  $26.9 \pm 1.1$  mm, respectively. Studying the dynamics of 1% v/v OV essential oil emulsion over a period of 6 h revealed that *Escherichia coli* (*E. coli*), *B. subtilis*, *S. epidermidis* and *S. cerevisiae* had the fastest response. Also increasing concentrations of OV oil emulsion increased the rate of cell killing and the duration of growth lag phase increased correspondingly. These data indicated that OV EO produces a concentration and time-dependent antimicrobial activity.

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