

## Abstract

# The Antibiofilm Potential of Vapor Fractions of Selected Essential Oils against *Pseudomonas aeruginosa* †

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**Abstract:** Biofilm is a major causative factor of persistent, hard-to-heal infections. Due to the biofilm's persistence, even high-dose, systemic antibiotic therapy displays low antimicrobial efficacy. Therefore, there is an urgent need to search for novel bactericidal agents. Essential oils [EOs] are of great interest in this matter because of their broad spectrum of antimicrobial activity and non-specific mechanism of action. This study aimed to evaluate the antimicrobial activity of vapor fractions of three commercially available essential oils: menthol mint (*Mentha arvensis*, L.), lavender (*Lavandula angustifolia*, Mill.), and eucalyptus (*Eucalyptus globulus*, Labill.) against *Pseudomonas aeruginosa* biofilm. For the research purposes, fourteen clinical multidrug-resistant strains and one reference bacterial strain from American Type Culture Collection (ATCC 15441) were used. The self-developed evaluation method was applied, based on the optimized resazurin staining protocol, to determine the biofilm survival after the exposure to volatile agents. The results indicated that the EOs' antibiofilm activity depends on the pseudomonal strains' intraspecies variability. The lavender oil was active against five clinical strains, with the reduction rate ranging from 33% to 44%. The highest reduction level obtained for eucalyptus oil was 20%. The results for menthol mint oil were differentiated among the tested strains and ranged from 5% to 53%. The obtained outcomes indicate that the tested volatile fractions of EOs possess the potential to be applied in the treatment of infections caused by *Pseudomonas aeruginosa* biofilm. Further research is required to determine if they can be used in monotherapy or as adjuvants of other antimicrobial agents.

**Keywords:** biofilm; antimicrobial; eucalyptus oil; menthol mint oil; lavender oil



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