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Effect of Mentha spicata volatile oil on some virulence factors of Pseudomonas aeruginosa isolated from clinical sample

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Abstract

Mentha spicata volatile oil (Peppermint oil) has been used in traditional medicine because of its therapeutic value, which has antibacterial, antiviral and antioxidant activities resulting from its active compounds. Pseudomonas aeruginosa has several virulence factors including protease, hemolysin and pyocyanin which are important. The ability of isolates to produce protease, hemolysin and pyocyanin before and after treatment with volatile oil was investigated. The use of combinations of peppermint oil and antibiotics by using checkerboard assay is thus new approach to enhance the efficacy of its antimicrobial activity. Therefore, the Minimum Inhibitory Concentrations (MIC) of peppermint oil and antibiotics and Fractional Inhibitory Concentration Index (FICI) of their combination were determined for P. aeruginosa. The volatile oil of these extracts exhibited markedly antibacterial activity and the results showed decrease in the protease activity, hemolysin activity and production of pyocyanin. The MICs of all the antibiotics ranged between 62.5 and 250 µg/ml. Peppermint oil exhibited synergistic effect when in combination with amoxicillin, ampicillin and tetracycline, while additive effect in two instances when combined with cefotaxime and nalidixic acid.

Keywords: Peppermint oil, antibiotics, virulence factors, P. aeruginosa, checkerboard.