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Effect of Mentha spicata and Rosmarinus officinales volatile oils on proteases activity of Pseudomonas aeruginosa

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Abstract:

Evaluation the ability of volatile oils to inhibit protease activity and some virulence factors of *Pseudomonas Aeruginosa* isolated from different clinical sources and studying the prevalence of proteases gene among isolates. Investigate the effects of volatile oils in combination with antibiotics to treat the infections of P. *aeruginosa*. PCR assay was used to detection proteases genes. Protease, pyocyanin and hemolysin activity before and after treated with volatile oils was estimated. Checkerboard assay was used to determine the combined effects of volatile oils and antibiotics in P. *aeruginosa*. About 50 clinical isolates of P. *aeruginosa* were identified using genetic test and phenotypic test. Antibiotic susceptibility test showed high resistance against nalidixic acid, tetracycline, ampicillin, cefotaxime, amoxicillin, moderate resistance against ceftazidime, amikacin, vancomycin, augmentin, chloramphenicol, gentamicin while recorded low resistance towards imipenem. Detection of protease genes revealed that 96% of isolates were harbor lasB gene while 90% were positive for aprA and TC gene was found in 86% of isolate. The isolates showed variability in their activity of protease which ranged between 51.7- 236 U/mL. Those isolates showed differences in their ability to hemolysin production where ranged between 0-64. The results showed variance in the pyocyanin production, ranged between 0.08-0.91 at 400 nm. The volatile oils exhibited markedly antibacterial activity where showed decreased in the protease, hemolysin, pyocyanin activity. *Mentha spicata* volatile oil exhibited synergistic effect when combined with amoxicillin, ampicillin, tetracycline and additive effect with cefotaxime nalidixic acid. *Rosmarinus officinales* volatile oil showed synergistic effect with amoxicillin, tetracycline and additive effect with cefotaxime, ampicillin, nalidixic acid. We conclude that the volatile oils showed high efficiency in inhibiting the production of protease and other virulence factors. Volatile oils exhibited synergistic effect when combined with antibiotic to treat the infections resulted from drug-resistant bacteria

Keywords: Mentha spicata, Rosmarinus officinales, volatile oils, Pseudomonas aeruginosa