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Antibacterial effect of cinnamon essential oil in combination with traditional antibiotics

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Abstract

Drug-resistant microorganisms are on the rise, posing a danger to successful bacterial illness treatment and increasing the demand for new antibacterial drugs. Natural products are currently and will continue to be the principal source of antibacterial therapeutic agents. This study's aim was to assess the antibacterial effects of Cinnamon essential oil (EO) alone and in combination with several traditional antibiotics against multi-drug resistant *Staphylococcus* sp. The antibacterial efficacy was determined using the disc diffusion method. As a result, cinnamon oil possesses antibacterial properties with MICs were 1.25 mgml^{-1} and 2.5 mgml^{-1} for *S. epidermidis* and *S. aureus*, respectively. Commercial antimicrobials and essential oil work together most effectively when combined. Scanning electron microscopy revealed morphological alterations in *Staphylococcus* cells, indicating cell membrane damage. Cinnamon essential oil composition was assessed using GC/MS with polonicumtoxin B (14.71%), linalool (5.36%), cinnamaldehyde (3.37%), 5, 5-dimethyl-4-hydroxy-1-phenyl-1-hexen-3-one (6.47%), 2-methyl benzofuran (5.79%), and 1,2-propanediol (6.32%). This study presented a natural product as a substitute for chemical therapeutics, addressing the problem of antibiotic resistance.

Keywords: MDR *Staphylococcus*, cinnamon oil, antimicrobials, synergy, SEM, GC/MS