

Title: Antimicrobial activity of essential oil from *Zingiber zerumbet* (L.) Smith rizhomes

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Abstract:

Emerging resistance to conventional antibiotics is a growing global concern that threatens human health and safety. In this regard, the development of new antibiotic therapies is urgent and crucial to provide effective treatment for infection-causing bacteria. Ever since ancient times plants have been used in attempt to cure many diseases, such as bacterial infections. The purpose of this study was to evaluate the antibacterial activity of essential oil produced from the plant specie *Zingiber zerumbet* (L.) Smith (bitter ginger), which possess anti-inflammatory and antinoceptive activities. By using an adaptation of cavity-plate method, different concentrations of essential oil were tested against clinical isolates and standard strains of the following bacteria: *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa* and *Klebsiella pneumonia*. To determine the speed of cidal activity of the essential oil, a time kill-curve was performed. Both bactericidal and bacteriostatic activities were demonstrated by the essential oil. A minimum inhibitory concentration (MIC) of 0,3 mg/mL and minimum bactericidal concentration (MBC) of 0,6mg/mL of essential oil was observed for *S. aureus* strains, whereas concentrations higher than 1 mg/mL showed only bacteriostatic effect on *E. coli* and *P. aeruginosa* strains. No antibacterial activity was verified for *K. pneumoniae*. As the essential oil showed bactericidal activity only on *S. aureus*, the time kill kinetic approach was performed just against these strains. After two hours of bacteria interaction with the essential oil, a significant decrease in viable cell counts in more the 1 log₁₀ UFC/mL was observed and a percentage reduction of $\geq 90\%$ in viable cell count was verified within 24hrs of exposure in 2xMIC concentration of essential oil. These results demonstrate the antimicrobial activity of *Zingiber zerumbet* (L.) Smith, which makes it a potential candidate in bioprospecting for antimicrobial drugs.

Key words: essential oil, *Zingiber zerumbet*, antibactericidal,

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