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Antimicrobial Efficacy of Lemongrass (*Cymbopogon citratus*) and Fingerroot (*Boesenbergia pandurata*) Essential Oils against Foodborne Pathogens

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Abstract

The consumption of ready-to-eat meat products such as sausages, meatloaf, dried meat and cakes is increasing mainly in developing countries. Meat is still one of the most important components of human diet due to its high protein content. However, the risk of contamination with foodborne pathogens from poorly processed and stored meat products, such as salmonellosis, Escherichia coli and other pathogens pose a great health hazard that needs to be controlled. Presently, these pathogens are being controlled with the aid of synthetic or natural preservatives. However, concerns about the safety of chemical additives (such as chlorides, nitrites, sulphites, etc.) have been on the rise at an alarming rate in recent years. As a consequence, consumers are progressively demanding the use of natural products as alternative for synthetic preservatives. Thus, this study investigates the potential of essential oils of Lemongrass (*Cymbopogon citratus*) and Fingerroot (*Boesenbergia pandurata*) as a natural preservative to control four common foodborne pathogens (*Listeria monocytogenes*, *Staphylococcus aureus*, *Escherichia coli* and *Salmonella Enteretidis*) *in vitro*. Firstly, the minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) was measured using the multiple tube dilution method and colony-forming assay, respectively. Secondly, a storage assay was conducted, wherein different concentrations (MIC, 2xMIC, 4xMIC) of the essential oils were tested for their effectiveness at two different storage temperatures; refrigerated temperature (4°C) and room temperature (25°C) for five days. Results indicated that both essential oils manifested antibacterial activity against all tested pathogens at both storage conditions mentioned above. The MIC at 4°C varied from 0.03 to 0.25 % and at 25°C varied from 0.06 to 0.50 %. Lemongrass EO showed lower MIC and MBC than fingerroot EO against all tested bacteria. This study suggests the potential usage of natural essential oils as antimicrobial preservatives, which could be used as alternative additives in foods.

Keywords: Antibacterial, essential oil, fingerroot, lemongrass, natural preservatives

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