

TITLE: ANTIBACTERIAL ACTIVITY OF ESSENTIAL OILS AGAINST FOODBORNE PATHOGENS

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ABSTRACT:

The need to eat safer, healthier foods encourages studies about the application of essential oils as a substitute for synthetic preservatives in the food industry. This work aimed to evaluate an antimicrobial activity of six different essential oils against bacteria that cause foodborne diseases. The antimicrobial activity was tested using the 96-well microplate microdilution method to determine Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC). Were evaluated the commercial essential oils (BySamia) of rosemary (*Rosmarinus officinalis* L.), lemon grass (*Cymbopogon schoenanthus* L.), clove (*Eugenia caryophyllata* T.) extracted from leaves, orange (*Citrus aurantium* L.), lemon Tahiti (*Citrus latifolia* T.) and thyme (*Thymus vulgaris* L.), tested at serial concentrations between 16,384 and 32 $\mu\text{g.mL}^{-1}$, against the bacteria *Bacillus cereus* (ATCC 14579), *Listeria monocytogenes* (ATCC 7644), *Staphylococcus aureus* (ATCC 29213), *Escherichia coli* (ATCC 25922), *Pseudomonas aeruginosa* (ATCC 27853), *Salmonella enterica* subsp. *enterica* sorovar. Typhi (ATCC 19214), *S. enterica* subsp. *enterica* sorovar. Typhimurium (ATCC 13311), and *Shigella flexneri* (ATCC 12022). Highlighted the clove (MIC of 4,096 $\mu\text{g.mL}^{-1}$ against all Gram positive bacteria, *S. Typhimurium*, and *Sh. flexneri*) and thyme (MIC and MBC of 4,096 $\mu\text{g.mL}^{-1}$ against all Gram positive bacteria, and *E. coli*) essential oils. Two other essential oils showed intermediate efficiency, being that of lemon grass (MBC of 16,384 $\mu\text{g.mL}^{-1}$ against *L. monocytogenes*, *S. aureus*, and *E. coli*) and lemon Tahiti (MIC of 16,384 $\mu\text{g.mL}^{-1}$ against *L. monocytogenes* and of 8,192 $\mu\text{g.mL}^{-1}$ against *S. aureus*). The essential oils of orange and rosemary did not present antibacterial activity in the tested concentrations (MIC and MBC $>16,384 \mu\text{g.mL}^{-1}$). The results indicate the cloves and thyme essential oils have potential use as antimicrobial agents, with possible synergism between these oils and the others tested, which showed antibacterial activity with higher concentrations.

Key-words: essential oils, antibacterial, foodborne pathogens