

**TITLE:** DETERMINATION OF THE MINIMUM INHIBITORY CONCENTRATION OF ESSENTIAL OILS OF GINGER AND BLACK PEPPER AGAINST ISOLATES OF *Salmonella* Typhimurium, *Listeria monocytogenes* AND *Pseudomonas aeruginosa* INDIVIDUALS AND IN ASSOCIATION

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**ABSTRACT:**

The essential oils (EO) of Ginger (*Zingiber officinale*) and Black Pepper (*Piper nigrum*) are aromatic substances extracted from dried fruits and roots, have antimicrobial potential and are used in food preservation due to their bactericidal and biodegradable characteristics. Thus, the aim of this study was to determine the minimum inhibitory concentration (MIC) of Ginger (GB) and Black Pepper (PP) EOs against *Salmonella* Typhimurium, *Listeria monocytogenes* and *Pseudomonas aeruginosa* isolates individually and in combination. The EOs were solubilized in DMSO 5% for the preparation of the test solutions. The isolates of *Salmonella* sp. (S), *L. monocytogenes* (L) and *P. aeruginosa* (P) isolates were grown in TSB-YE broth and aliquots of these broths were standardized at 0.5 on the Mc Farland scale and prepared individually and in combination L+S, P+L, P+S, S+L+P. MIC determination was performed using 96-well microplates in triplicates with two repetitions according to the standard method described by CLSI, evaluating concentrations from 3.12 to 400 mg/ml. After incubation, the MIC was determined as the lowest concentration of EO without bacterial growth. The absence of bacterial growth was confirmed by inoculating aliquots from the selected wells onto Muller-Hinton agar for total population evaluation and onto XLD, OXA, and Cetrimide agar for individual evaluation of *S. Typhimurium*, *L. monocytogenes*, and *P. aeruginosa*, respectively. In the individual evaluation *L. monocytogenes* and *Salmonella* sp. showed the same MIC for the two EOs, being 25 and 200 mg/ml respectively. *P. aeruginosa* presented MIC of 100 mg/ml for GB and 200 mg/ml for PP. When evaluated in combination, L+S and L+P had MICs of 50 and 100 mg/ml for both EOs, respectively. For P+S it was 200 mg/ml for PP and 100 mg/ml for GB. In the combination of S+L+P the MIC was 100 mg/ml for both EOs. Thus, it is concluded that there was a better efficacy of EOs against gram-positive microorganisms compared to gram-negative ones, as well as a better action of EOs in combined microbial cultures. These results demonstrate the possible use of natural bioactive compounds to control pathogens in the food industry.

**Keywords:** antibacterial activity, phytochemicals, alternative methods

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