

Antimicrobial activity of potential essential oils to replace potassium sorbate in fruit preparations

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Introduction: In recent years, the food industry has faced the challenge of producing high-quality products using natural preservative alternatives instead of synthetic ones. Essential oils (EO), naturally present in various plants, have potential as alternatives due to their antimicrobial activity and high food safety (Generally Recognized as Safe, GRAS). This study aimed to investigate the antimicrobial activity of EO against common spoilage and pathogenic microorganisms in fruit preparations, to use as a substitute for potassium sorbate (PS). **Methodology:** The antimicrobial activity of lemongrass and lemon EO was tested using the microdilution method in 96-well plates against *Lactobacillus plantarum*, *Escherichia coli*, *Candida intermedia*, *Pichia fermentans*, *Aspergillus niger* and *Penicillium glabrum*. EO were tested at concentrations ranging from 1.56 to 50% and PS at 0.03 to 4%. The minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) were determined. **Results:** The MICs of lemongrass and lemon EO for *E. coli* were 3.12 and 12.5%, respectively, while for *L. plantarum*, they were 1.56 and 6.25% respectively. Regarding the yeasts, the MIC of lemongrass and lemon EO for *C. intermedia* were 1.56 and 3.12%, respectively, and for *P. fermentans*, they were 1.56 and 1.56%, respectively. Lemongrass EO showed the same MICs value of 6.25% against *A. niger*, and *P. glabrum*. Lemon EO also displayed the same MICs values of 25% for *A. niger*, and *P. glabrum* representing the highest MICs values observed. The MBCs values was similar the MICs values to all microorganisms except to *L. plantarum* that were 6.25 and 25% to lemongrass and lemon EO, respectively. PS showed MICs values of 1 and 2% for *E. coli* and *L. plantarum*, respectively, with MBCs values of 2% for both. For yeasts, the MIC was 0.06% for both with MBC values of 0.06% for *E. coli* and 0.5% for *L. plantarum*. The MIC and MBC values were the same of 0.06% for both fungi. **Conclusion:** The EO tested showed significant antimicrobial potential at low concentrations, particularly lemongrass EO. Future studies will incorporate this oil as substitutes for PS to verify their ability to maintain antimicrobial effectiveness over time when incorporated in fruit preparations.

Keywords: antibacterial activity, antifungal activity, essential oil, food preservative, potassium sorbate.