

Efficiency of chemical composition of some essential oils against *Botrytis cinerea*, the pathogen of post-harvest strawberry fruits

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Journal of Food Measurement and Characterization 16: 66–75. (2022)

Abstract

Essential oils (EOs) have drawn growing attention due to an increased risk of chemical contamination upon the application of synthetic fungicides to post-harvest fruits. This experiment investigated the antifungal activity of seven EOs at different concentrations of 0.5, 1, 2, 4, 6, 8, and 10 $\mu\text{L mL}^{-1}$ against the fungus *Botrytis cinerea* in two methods of liquid and vapor phase. Besides the chemical analysis of the EOs by GC–MS, minimum fungicidal concentration, minimum inhibitory concentration, and the release of cellular material were investigated. The dominant compound in rosemary EO is camphene (33.8%), whereas 1–8 cineole (67.61%) was found to be most abundant in Eucalyptus. Cumin contained cumin aldehyde (27.14%), peppermint EO contained menthol (28.27%), and the most common compound in tarragon EO was methyl chavicol (78.74%). Limonene (63.27%) was the predominant compound in lemon EO. The highest percentage of compounds in savory EO was carvacrol (50.33). The results showed that the vapor phase was consistently more effective in fungal growth than the liquid phase effect. Savory and peppermint EOs were very influential on the growth of *B. cinerea* at relatively low concentrations due to the presence of dominant compounds such as menthol (28.27%) and carvacrol (50.34%). According to the comparison of the data on inhibition percentage with the control group, there was a significant enhancement in the entire liquid and vapor phases by increasing EO concentration. Generally, factors such as plant species, application method, and concentration affect EOs antifungal activity. It is concluded that the EO mechanism against *B. cinerea* might be due to its effect on cell membrane permeability according to the electrolytes' leakage. Therefore, these EOs as natural antimicrobial compounds seem to be effective in preventing gray mold contamination instead of synthetic preservatives, which have several established adverse effects.