

Assessing the control of postharvest gray mold disease on tomato fruit using mixtures of essential oils and their respective hydrolates

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Abstract

Gray mold disease, which is caused by *Botrytis cinerea* Pers ex. Fr., results in serious economic losses to *Lycopersicon esculentum* (tomato) crop productivity. In this study, we explored the possibility that mixtures of essential oils (EOs) and their respective hydrolates (HYSs) could be used to control this disease. Thus, EOs and HYSs were obtained from *Origanum vulgare*, *Thymus vulgaris*, *Citrus limon*, and *Citrus sinensis* by hydrodistillation. In vitro antifungal activities were evaluated, and EC₅₀ values of 15.9 and 19.8 µg/mL were obtained for EOs of thyme and oregano, respectively. These activities are due mainly to volatile compounds, thymol and carvacrol. Results from in vivo assays show that although most tomatoes were infested five days after inoculation, the damage was considerably reduced by the application of an EO/HYS mixture of thyme. The disease incidence indexes of *B. cinerea* tomato rot, percentage and severity, measured four days after inoculation, were reduced by 70% and 76%, respectively, as compared with the inoculum control. These results suggest that a combination of HYSs and EOs enhances antifungal activity, and that optimization of relative concentrations, volumes, and the nature of the compounds, could design a formulation able to control *B. cinerea* inoculum on tomato fruits. © 2021 by the authors. Licensee MDPI, Basel, Switzerland.

Author keywords

Antifungal activity; Aromatic plants; *Botrytis cinerea*; Natural products; Tomato