Tea tree oil controls brown rot in peaches by damaging the cell membrane of *Monilinia fructicola*

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Postharvest Biology and Technology, Volume 175, May 2021, 111474

Abstract

This study tested the efficacy of plant essential oils (EOs) for controlling rot in post-harvest peaches. Three fungal pathogens from naturally infected peaches were isolated and identified, and their pathogenicity was confirmed on peach fruit. *Monilinia fructicola* was the most pathogenic of the three isolates (*M. fructicola*, *Penicillium expansum* and *P. spinulosum*). The antifungal effects of four EOs (tea tree oil (TTO), thyme oil, rosemary oil, and lemon oil) were then evaluated against *M. fructicola*. TTO had the strongest antifungal activity against *M. fructicola in vitro* and in inoculated peach fruit. Experiments designed to probe the antifungal mechanisms of TTO revealed that the EO affects the composition of the *M. fructicola* cell membrane, leading to changes in mycelial morphology, membrane permeability, and levels of intracellular reactive oxygen species. Based on these results, we conclude that TTO is effective against infection by *M. fructicola* in post-harvest peaches. TTO should be considered as a viable substitute for conventional fungicides that are currently used to control rot in peach.