

A multiple volatile oil blend prolongs the shelf life of peach fruit and suppresses postharvest spoilage

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Abstract

Prolongation of the shelf life of delicate fruit such as peaches without the application of fungicides is a great challenge facing the horticulture sector. This study aimed to apply Thieves oil blend (six oils in one mixture) to protect peach fruit from spoilage during long-term cold storage. *Alternaria alternata*, *Fusarium oxysporum*, *Geotrichum candidum* and *Monilinia laxa* were isolated from naturally infected peach fruit showing symptoms of postharvest rot, and their pathogenicity was confirmed on the same fruit. Pathogens were identified by sequencing of their internal transcribed spacer (ITS). The results showed that Thieves oil blend at a concentration of 2.0 mL L⁻¹ completely suppressed fungal growth *in vitro*. This concentration reduced the disease incidence to 12.0% and the disease severity index to 1.2 after 7 d at 27 °C *in vivo*. The oil blend prolonged the shelf life of peach fruit up to 30 d under cold storage conditions (4 °C). Electron microscopy confirmed the fungitoxicity of Thieves oil blend, which resulted in complete death of the fungal mycelia. Gas chromatography–mass spectroscopy (GC–MS) analysis of the oil blend showed the presence of 25 effective constituents that work synergistically to suppress the disease and its causal pathogens. The study recommends the application of Thieves oil blend for the first time as a safe multiple preparation to protect peaches and other fruit during transportation and cold storage to reduce losses during the marketing process.