

Title Alternatives to fungicides for pear postharvest decay control
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Abstract

The objective of this study was to evaluate and compare integrated postharvest decay control programs for winter pears as alternatives to conventional fungicides and with potential for use in organic systems. Experimental programs combined orchard, postharvest, and storage treatments in a factorial design. In the orchard, five randomized replicate 'Bosc' pear trees per treatment received either calcium chloride, Messenger (harpin protein), or were untreated. After harvest, fruit from each replicate of each orchard treatment were artificially wounded, then divided among six postharvest treatments: water, sodium bicarbonate, chitosan, BioSave 110 (*Pseudomonas syringae*), StorOx (peroxyacetic acid) or Mertect 340F (thiabendazole) as a fungicide standard. Postharvest treatments were applied as in-line sprays, except StorOx, which was applied as a dip. Fruit from each postharvest treatment were subsequently divided between two storage treatments: standard perforated polyethylene box-liner or LifeSpan modified atmosphere packaging. Incidence of fungal decay from natural inoculum was evaluated after four months of storage at 0°C. Orchard, postharvest, and storage treatments were all significant factors in reducing decay. The predominant decay observed was blue mold (*Penicillium expansum*), with minor incidence of gray mold (*Botrytis cinerea*) and Cladosporium rot (*Cladosporium herbarum*). The most effective orchard treatment was calcium chloride. The most effective postharvest treatments were sodium bicarbonate and BioSave 110, resulting in decay control comparable to or better than that provided by the standard fungicide. However, sodium bicarbonate caused the pears to darken unacceptably. Chitosan also injured the fruit, resulting in an increase in decay. The most effective sequence of treatments without phytotoxicity was calcium chloride in the orchard, followed by BioSave 110 postharvest, followed by storage in LifeSpan modified atmosphere packaging.