

Title Residual activity of fludioxonil and pyrimethanil against *Penicillium expansum* on apple fruit
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Abstract

Blue mold caused by *Penicillium expansum* is a major postharvest disease of apples (*Malus × domestica*). Residual activity of fludioxonil and pyrimethanil in apple fruit against *P. expansum* was investigated during 2005 to 2008. Fruit of the cultivar Delicious harvested from commercial orchards where fungicides were not used were either not treated or drenched with fludioxonil, pyrimethanil, or thiabendazole prior to storage and then stored in controlled atmosphere at 0°C for 5 or 7 months, after which time the fruit were removed from storage and subjected to washing and brushing, practices that are done at the time of packing. Fruit were then wounded and inoculated with conidial suspensions of *P. expansum*. Inoculated fruit were treated with either sterile water or fungicides. Fruit were stored at 0°C for 8 weeks and at room temperature for one additional week after cold storage. To determine distribution of fungicide residues in the fruit flesh, fruit were cut horizontally at the equator, sprayed with the conidial suspension of *P. expansum*, incubated at room temperature, and examined for inhibition of blue mold on the cut fruit 4 days after inoculation. Fungicide residues on/in the fruit were analyzed using a gas chromatograph. Zero to 26% blue mold incidence was observed on fludioxonil-drenched fruit that were inoculated and not treated with fungicides at packing. No decay or <4% blue mold incidence was observed on pyrimethanil-drenched fruit that were inoculated and not treated with fungicides at packing, whereas 65 to 99% blue mold incidence was observed on thiabendazole-drenched fruit that were not treated with fungicides at packing. An average of >32 mm inhibition zone and approximately 5 mm inhibition zone measured from the fruit peel toward the fruit core were observed on pyrimethanil-drenched and fludioxonil-drenched fruit, respectively. Washing and brushing at the time of packing 5 and 7 months after harvest did not remove or only partially removed residues of fludioxonil and pyrimethanil from apple fruit. The results suggest that residues of fludioxonil and pyrimethanil on/in apple fruit are persistent and that residual protection of apple fruit by the two fungicides can last for at least 7 months under apple-storage conditions.