

Title Optimizing efficacy of new postharvest fungicides and evaluation of sanitizing agents for managing citrus green mold

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Citation Plant Disease 92 (2): 261-269. 2008.

Keywords sanitation; fungicide

Abstract

Three new fungicides, azoxystrobin, fludioxonil, and pyrimethanil, that belong to different chemical classes are highly effective in managing citrus green mold and are being registered for postharvest use in the United States. Recirculating in-line drenches provided a significantly improved efficacy compared with standard low-volume spray applications. To prevent pathogen contamination of drench solutions, two oxidizing disinfectants, sodium hypochlorite and hydrogen peroxide/peroxyacetic acid (HPPA) solutions, were evaluated. Inhibition of conidial germination of *Penicillium digitatum* was dependent on the pH of the solution and the exposure time for each sanitizing agent. Chlorine (50 mg/liter) and HPPA (2,700 mg/liter) effectively inhibited germination in 40- and 240-s exposures, respectively, at pH 7. All fungicides tested were compatible and effective with HPPA, whereas fludioxonil, azoxystrobin, and thiabendazole, but not imazalil and pyrimethanil, were compatible with chlorine. In laboratory studies, sodium bicarbonate (SBC, 3%) significantly increased the efficacy of the three fungicides (250 mg/liter) and had no adverse effect on their stability in aqueous solutions. Fludioxonil (300 mg/liter)-SBC mixtures were still highly effective when applied 24 h after fruit inoculation. In experimental packingline studies, SBC or SBC-chlorine improved the efficacy of fludioxonil, whereas azoxystrobin was effective with and without these additives. Heating of drench solutions of fludioxonil (300 mg/liter) to 50°C did not improve decay control. In conclusion, in-line recirculating drench applications and fungicide-sanitizer-SBC mixtures significantly increased fungicide efficacy and provide an integrated approach for optimizing fungicide efficacy. These strategies also should minimize the selection for resistant isolates of the pathogen.