

Title Efficacy and application strategies for propiconazole as a new postharvest fungicide for managing sour rot and green mold of citrus fruit

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Abstract

Few postharvest treatments are available for managing sour rot of citrus caused by *Galactomyces citri-aurantii* and they are generally not very effective. The demethylation inhibiting (DMI) triazole fungicides propiconazole and cyproconazole were found to be highly effective and more efficacious than other DMIs evaluated such as metconazole and tebuconazole in reducing postharvest sour rot of citrus. Additional studies were conducted with propiconazole as a postharvest treatment because it has favorable toxicological characteristics for food crop registration in the United States and the registrant supports a worldwide registration. Regression and covariance analyses were performed to determine optimal time of application after inoculation and fungicide rate. In laboratory studies, decay incidence increased when propiconazole applications were delayed from 8 to 24 h (lemons) or 18 to 42 h (grapefruit) after inoculation. Effective rates of the fungicide ranged from 64 to 512 µg/ml and were dependent on inoculum concentration of the sour rot pathogen and on the type of citrus fruit. Propiconazole was found to be compatible with 100 µg/ml sodium hypochlorite and 1 to 3% sodium bicarbonate without loss of efficacy for decay control on lemons. The addition of 80 µg/ml hydrogen peroxide/ peroxyacetic acid slightly decreased the effectiveness of propiconazole. Heated (48°C) solutions of propiconazole did not significantly improve the efficacy as compared to solutions at 22°C. In experimental packingline studies, aqueous in-line drenches applied alone or followed by applications of the fungicide in storage or packing fruit coatings were highly effective, reducing sour rot to between 0% and 1.2% as compared to 83.8% decay incidence in the control when treatments were made up to 16 h after inoculation. When the fungicide was applied alone in either fruit coating, decay was only reduced to 49.1% to 57.1% incidence. Tank mixtures of propiconazole with the citrus postharvest fungicides fludioxonil and azoxystrobin were highly effective in reducing green mold caused by isolates of *Penicillium digitatum* sensitive or moderately resistant to imazalil and sour rot. Propiconazole will be an

important postharvest fungicide for managing sour rot of citrus and potentially can be integrated into current management practices to reduce postharvest crop losses caused by DMI-sensitive isolates of *P. digitatum*.