

Title Baseline sensitivities for new postharvest fungicides against *Penicillium* spp. on citrus and multiple resistance evaluations in *P. digitatum*

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Abstract

For the first time in over 25 years, three new fungicides (azoxystrobin, fludioxonil, and pyrimethanil), all belonging to different chemical classes, are being registered for postharvest use against *Penicillium* decays of citrus fruit in the United States. Baseline sensitivities of *Penicillium digitatum* and *P. italicum* were developed using isolates collected before the commercial use of these new fungicides. In a comparison of methods, EC₅₀ values obtained using the spiral gradient dilution method were very similar to those obtained using traditional agar dilutions of fungicides. For azoxystrobin, the addition of salicylhydroxamic acid (SHAM) did not significantly affect EC₅₀ values for mycelial growth of both species. In additional studies on conidial germination of *P. digitatum*, SHAM significantly reduced EC₅₀ values for azoxystrobin. For pyrimethanil, the mean EC₅₀ value for mycelial growth obtained using a minimum growth medium for anilinopyrimidine fungicides was significantly lower but comparable to values obtained when using potato dextrose agar. For mycelial growth of *P. digitatum*, mean EC₅₀ values were 0.014, 0.025, and 0.313 µg/ml, whereas for conidial germination, they were 0.074, 0.163, and 1.195 µg/ml for azoxystrobin, fludioxonil, and pyrimethanil, respectively. For *P. italicum*, mean EC₅₀ values for mycelial growth for fludioxonil and pyrimethanil were 0.005 and 0.040 µg/ml, respectively. For azoxystrobin, the mean EC₅₀ value for mycelial growth for 33 isolates was 0.029 µg/ml. Four isolates had EC₅₀ values ≥ 0.772 µg/ml and were considered part of a resistant subpopulation. Multiple resistance between the older and new postharvest fungicide classes on citrus was not detected in *P. digitatum*, and all isolates that were sensitive or resistant to imazalil or thiabendazole were sensitive to the new compounds. This information is important for monitoring populations of *P. digitatum*, where resistance against the older fungicides has commonly developed.