

Title Effect of chitosan dissolved in different acids on its ability to control postharvest gray mold of table grape

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Abstract

Chitosan is a natural biopolymer that must be dissolved in an acid solution to activate its antimicrobial and eliciting properties. Among 15 acids tested, chitosan dissolved in 1% solutions of acetic, L-ascorbic, formic, L-glutamic, hydrochloric, lactic, maleic, malic, phosphorous, and succinic acid. To control gray mold, table grape berries were immersed for 10 s in these chitosan solutions that had been adjusted to pH 5.6. The reduction in decay among single berries of several cultivars (Thompson Seedless, Autumn Seedless, and grape selection B36-55) inoculated with *Botrytis cinerea* at 1×10^5 conidia/ml before or after immersion in chitosan acetate or formate, followed by storage at 15°C for 10 days, was $\approx 70\%$. The acids alone at pH 5.6 did not control gray mold. Decay among clusters of two cultivars (Thompson Seedless and Crimson Seedless) inoculated before treatment was reduced $\approx 60\%$ after immersion in chitosan lactate or chitosan acetate followed by storage for 60 days at 0.5°C. The viscosity of solutions was 1.9 centipoises (cp) (ascorbate) to 306.4 cp (maleicate) and the thickness of chitosan coating on berries was 4.4 μm (acetate) to 15.4 μm (ascorbate), neither of which was correlated with solution effectiveness. Chitosan acetate was the most effective treatment which effectively reduced gray mold at cold and ambient storage temperatures, decreased CO_2 and O_2 exchange, and did not injure the grape berries.