

Evaluation of food additives and low-toxicity compounds as non-polluting means to control the main postharvest diseases of California peaches

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Abstract

More than twenty food additives, GRAS (Generally Regarded as Safe), and low-toxicity compounds were evaluated as nonpolluting means to control postharvest decay. The chemicals were tested at three concentrations in in vivo primary screenings with California-grown 'Flavorcrest', 'O'Henry', or 'Last Chance' peaches that had been artificially inoculated with seven major postharvest pathogens: *Monilinia fructicola*, *Botrytis cinerea*, *Geotrichum candidum*, *Alternaria alternata*, *Penicillium expansum*, *Mucor piriformis*, and *Rhizopus stolonifer*. Overall, the best compounds were potassium sorbate, sodium benzoate, and sodium sorbate at 200 mM, 2-deoxy-D-glucose at 100 mM, sodium carbonate at 400 mM, and potassium carbonate at 250 mM. Sodium and ammonium molybdates, acid lactic, and hydrogen peroxide were somewhat effective but phytotoxic to fruit skin tissues. The selected compounds, however, lacked effectiveness and persistence when tested against brown rot, caused by *M. fructicola*, in small-scale trials as 60 s dips in aqueous solutions at ambient temperatures. Heating the solutions to 55 or 60°C significantly increased treatment efficacy and brown rot incidence and severity were reduced by 35 and 25%, respectively, after 7 days of incubation at 20°C on peaches treated with potassium sorbate. However, treatment efficacy was not superior to water alone at these temperatures. Therefore, the potential for use of common food additives or GRAS compounds as alternative chemicals to conventional fungicides for the control of brown rot of California peaches is rather limited and heat treatments appear more suitable than these chemicals to be combined with other environmentally-friendly antifungal treatments for integrated disease control. The control by these means of other important peach postharvest diseases such as gray mold and sour rot, caused by *B. cinerea* and *G. candidum*, respectively, deserves further study.