

## Abstract

'Golden Delicious' apples were wound-inoculated with either *Colletotrichum acutatum* or *Penicillium expansum* and then treated with various combinations of heat (38 °C) for 4 days, 2% sodium bicarbonate, and two biocontrol agents alone or combined. The fruit were stored for 4 months at 1 °C and then at 20 °C for 2 weeks. Either heat or the antagonists reduced decay caused by *C. acutatum*, but a combination of the two was required to completely eliminate decay caused by this pathogen in most cases. Sodium bicarbonate alone or in combination with the antagonists had little effect on *C. acutatum*. The antagonists alone reduced decay caused by *P. expansum* but tended to be more effective when combined. Sodium bicarbonate increased the effectiveness of decay control by each antagonist alone or in combination. All of the treatments that included heat virtually eliminated decay caused by this pathogen. The proper combination of alternative control measures can provide an effective strategy to reduce postharvest decay of apple fruit.