

Title Short-term CO₂ exposure at curing temperature to control postharvest green mold of mandarins

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Abstract

Alternatives to synthetic fungicides are needed worldwide for the control of citrus postharvest diseases. Curing of citrus fruit at 30-37°C and 90-98% RH for 65-72 h has been reported repeatedly as an effective method to control green mold caused by *Penicillium digitatum*. However, commercial adoption of this practice is limited because of the length of the treatment and risks of negative impact on fruit quality. Exposure to CO₂-enriched atmospheres is known to provide fungistatic effects and, in some cases, to induce resistance in fresh fruit against major postharvest pathogens. In order to improve the feasibility of curing treatments against citrus postharvest green mold, work is in progress to determine if short treatments with CO₂ at curing temperature can control established infections and/or induce fruit resistance. Mandarins cvs. Ortanique and Nadorcott were artificially inoculated with *P. digitatum* and exposed 24 h later to air (control) or 15, 30 and 50 kPa CO₂ at 20 and 33°C for 8 and 24 h. The number of decayed fruit was counted after 4 and 7 days of incubation at 20°C. To assess potential induction of resistance and time of induction, the same treatments were applied to another set of non-inoculated fruit. Treated fruit were kept at 20°C for 1, 2 and 5 days, at which time mandarins were wound inoculated with the pathogen. Lesion diameter was measured after 3 and 6 days at 20°C. For both cultivars, only treatments at 33°C for 24 h reduced the incidence of disease significantly after 4 days of incubation, 15 kPa CO₂ being slightly superior to the other gas concentrations used. Incidence reduction, however, was not significant after 7 days. Regardless of time between treatment, inoculation and incubation period, all treatments were ineffective in reducing disease severity and, therefore, in inducing any kind of fruit resistance. It is planned to evaluate longer exposure times (maximum of 48 h) to 15 kPa CO₂ at 33°C.