

**Title** Short-term oxygen exposure at curing temperature to control postharvest *Penicillium* molds on hybrid mandarins cv. Ortanique

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### Abstract

Green and blue molds, caused by *Penicillium digitatum* (PO) and *P. italicum* (PI), respectively, are the most important citrus postharvest diseases. Alternatives to synthetic fungicides are needed worldwide in order to reduce consumer health risks and environmental damage. Curing treatment of citrus fruit at 30-37°C and 90-98 % RH for 65-72 h is an effective method to control green and blue molds. However, commercial adoption of this practise is limited because of the length of the treatment and risks of negative impact on fruit quality. It is known that, in some fresh fruit, exposure to high concentrations of O<sub>2</sub> effectively reduces postharvest decay. To improve the feasibility of curing treatments against citrus postharvest green and blue molds, work is in progress to determine if short treatments with O<sub>2</sub> at curing temperature can control established infections and/or induce fruit resistance. 'Ortanique' mandarins were artificially inoculated with PD and PI and exposed, 24 h later, to air (control) or 30 or 45 kPa O<sub>2</sub> at 20 or 33°C for 8, 24 or 48 h. After 4, 7 and 14 d of incubation at 20°C, the number of decayed fruit and the number of sporulated lesions were assessed. None of the treatments at 20°C was effective against green or blue molds. Treatments at 33°C with 30 or 45 kPa O<sub>2</sub> for 8 h reduced by 30 and 35% the incidence of green and blue mold, respectively, after 3 d of incubation but this effect was not observed after 7 d. The same treatments applied for 24 h completely controlled green and blue molds after 3 d of incubation, but only reduced the incidence by 25 and 10 %, respectively, after 7 d. Treatments with 30% O<sub>2</sub> at 33°C for 48 h completely controlled green and blue molds after 3 d of incubation, and reduced their incidence by 95 and 90% after 7 d, but only by 25 and 10% after 14 d, respectively. Therefore, the effect of short O<sub>2</sub> treatments at 33°C was fungistatic and lacked persistence. On the other hand, to assess potential induction of resistance and time of induction, the same treatments were applied to another set of non-inoculated mandarins. Treated fruit were kept at 20°C for 1, 2 or 5 d, at which time the mandarins were wound-inoculated with PD. Lesion diameters were then measured after 3 and 6 d of incubation at 20°C. All treatments were ineffective in reducing disease severity. It was concluded that under these experimental conditions, short-term O<sub>2</sub> treatments did not induce in the mandarins any kind of resistance to PD.