

Title Control of storage diseases of citrus by pre- and postharvest application of salts
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Abstract

The effectiveness of sodium bicarbonate (SB), sodium carbonate (SC), sodium silicate (SS), potassium bicarbonate (PB), potassium carbonate (PC), potassium sorbate (PS), calcium chloride (CC), and calcium chelate (CCh) against naturally occurring postharvest decay on ‘Comune’ clementine and ‘Valencia late’ orange fruit was investigated. Aqueous salt solutions (2%, w/v, 20 hl ha⁻¹) were applied according to three strategies: (i) by spraying before harvest, (ii) by dipping after harvest, and (iii) by the combination of pre- and postharvest applications. Decay was assessed after two months at 4 ± 1 °C (oranges) or 6 ± 1 °C (clementines) and 95–98% RH, followed by 7 days of shelf life at 20 ± 2 °C. For both species, preharvest sprays and the combination of pre- and postharvest applications were more effective in suppressing decay than postharvest dipping. With regard to preharvest application, several salts completely inhibited the incidence of decay as compared to the water control, namely, SC and PC on both species, and SS on ‘Valencia late’ oranges. In combined applications, all salts were effective in reducing the decay as compared to the water control with an efficacy varying between 66–100 and 78–100% for oranges and clementines, respectively. When salts were applied after harvest, the activity was in general less pronounced, SC and PC being the most effective on both species. In *in vitro* tests, the minimum inhibitory concentration (MIC) for both *Penicillium digitatum* and *P. italicum*, was achieved at 0.25% SB, SC, PB, PC, PS, and SS. The filamentous fungal population on fruit treated once in the field and with the double treatment was reduced as compared to the water control, whereas no statistical differences were observed for postharvest application. Based on these results, field application of salts can be considered a useful strategy to be included in an integrated approach for controlling postharvest diseases of citrus fruit.