Title Combination of postharvest antifungal chemical treatments and controlled atmosphere storage to control gray mold and improve storability of 'Wonderful' pomegranates

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Abstract

Common food additives (sodium bicarbonate (SB), sodium carbonate (SC), and potassium sorbate (PS)) were compared to the fungicide fludioxonil for the control of gray mold on California-grown 'Wonderful' pomegranates artificially inoculated with *Botrytis cinerea* and stored at 7.2 °C in either air or controlled atmosphere (CA, 5 kPa O_2 + 15 kPa CO_2) conditions. Fludioxonil was superior to other treatments. PS was the most effective additive. Synergistic effects between antifungal treatments and CA storage were observed. After 15 weeks of storage at 7.2 °C, the combination of PS treatment (3 min dip in 3% solution at 21 °C) and CA storage was as effective as the combination of heated fludioxonil (30 s dip in 0.6 g L^{-1} of active ingredient at 49 °C) and air storage. Mixtures of PS with SB or SC did not improve the efficacy of either treatment alone. In tests conducted in commercial facilities, decay development and external and internal fruit quality were assessed on naturally infected pomegranates stored in either air or CA after application of a selected postharvest antifungal combined treatment (CTrt) integrating PS, SB + chlorine, and fludioxonil. CTrt was effective in controlling natural gray mold after 6 weeks of storage at 8.9 °C, but lacked persistence and it was not effective after 14 weeks. CA storage greatly enhanced decay control ability of CTrt. Skin red color was better maintained in CA-stored than in air-stored fruit. Juice color and properties (SSC, TA, and pH) were not practically affected by either postharvest treatment or storage condition. The integration of PS treatments with CA storage could provide an alternative to synthetic fungicides for the management of pomegranate postharvest decay.