Title Influence of preharvest calcium applications, fruit injury, and storage atmospheres on postharvest brown rot of apple

Author Imre J. Holb , Barbara Balla, Alex Vámos and József M. Gáll

Citation Postharvest Biology and Technology. Volume 67, May 2012, Pages 29–36

Keywords *Monilinia fructigena*; ULO; Controlled atmosphere; Air storage; Injury–inoculation combination; Spatial disease spread

Abstract

In a three year study, the effect of preharvest calcium applications on postharvest losses of apple fruit (cultivar 'Idared') caused by *Monilinia fructigena* was evaluated in fruit under air storage, controlled atmosphere (CA), and ultra low oxygen (ULO) conditions. Injured and noninjured fruit were used and storage was at 1 °C for all three storage conditions. In addition, temporal dynamics of postharvest brown rot development were assessed monthly over four months storage and the spread of brown rot infection amongst fruit was assessed at the final assessment date. For all years, disease development, final brown rot incidence and the area under curves of disease progress were lower amongst calcium-treated than in the nontreated controls (mean values of 3.6 and 11.1%, respectively). CA and ULO treatments reduced rot incidence (mean values of 12.4, 6.3, and 0.7%, for air, CA and ULO fruit respectively). In addition, with regard to injury–inoculation combinations, final brown rot incidence increased in the order noninjured–noninoculated, noninjured–inoculated, injured–noninoculated and injured–inoculated treatments (mean values of 3.6, 5.0, 7.3, and 11.4%, respectively). The number of infected fruit was generally higher in the first layer of neighbouring fruit in storage boxes than in the second one. Calcium treatment significantly reduced the number of infected fruit both in the first and second layers compared to the controls (mean values of 45.5 and 75, respectively). CA and ULO treatments also reduced the number of infected fruit both in the first and second layers of neighbouring fruit (mean values of 94, 69.5, and 10.5, for air, CA and ULO respectively). With regard to injury treatments, the number of infected fruit increased in both the first and second layers of neighbouring fruit in the order of noninjured–inoculated and injured–inoculated treatments (mean values of 51.5 and 75.5, respectively). This study suggests that integration of preharvest calcium applications and CA storage, along with minimization of fruit injury/infection, may reduce brown rot incidence during long term storage.