Abstract:

The impact of harvest maturity, growing season, orchard location, and delayed application of controlled atmosphere (CA) storage on tissue antioxidant protectant systems and on the incidence of internal browning in ‘Braeburn' apples (BBD) were studied. As harvest date was delayed, BBD incidence increased and tissue superoxide dismutase activities declined. In the three years of study, incidence of BBD was low only in 1998. Lower incidence of BBD in 1998 was associated with much higher levels of superoxide dismutase, catalase and peroxidase activity in fruit cortical tissues. Susceptibility to BBD varies by location in the Okanagan Valley of British Columbia and an orchard which was found to be consistently more susceptible had lower levels of catalase and lipid soluble antioxidants (LSA) in the tissues. Storage in air prior to application of CA conditions led to retention of LSA levels at "at-harvest" levels, whereas fruit stored immediately in CA had significantly reduced LSA levels and developed much more BBD. The results collectively indicate that the incidence of BBD is associated with the antioxidant protection systems in the ‘Braeburn' apple. However, no single antioxidant protectant mechanism could be directly linked with the susceptibility of ‘Braeburn' apples to the incidence of BBD.