Title Wound-induced H_2O_2 and resistance to *Botrytis cinerea* decline with the ripening of apple fruit

Author Jing Su, Kang Tu, Lei Cheng, Sicong Tu, Min Wang, Hongrui Xu and Ge Zhan

Citation Postharvest Biology and Technology, Volume 62, Issue 1, October 2011, Pages 64-70

Keywords Apple; Disease resistance; Fruit ripening; Hydrogen peroxide; Wound healing

Abstract

Fruit ripening is a developmental process and is associated with increased susceptibility to mechanical injury, which favours *Botrytis cinerea*infection. Using 'Gala' apples harvested at different stages of ripening, we demonstrated that wounding can activate initial H_2O_2 accumulation and wound healing ability to defend against *B. cinerea* penetration. Delaying the harvest date attenuated those responses. Superoxide dismutase, peroxidase and catalase, which are all involved in H_2O_2 metabolism, were differentially activated by wound stress depending on the stage of fruit maturity. Mature fruit were less able to respond to wounding by increasing phenylalanine ammonia lyase and peroxidase activity, which are associated with reduced phenolics and lignin content in local wound sites. The reduced response in late-harvested fruit contributes to the fruit ripening-induced loss of wound healing ability and increases susceptibility to *B. cinerea*. In addition, the rapid increase of H_2O_2 content immediately after wounding in early-harvested fruit was followed by increased phenylalanine ammonia lyase and peroxidase activity. In late-harvested fruit, the reduced ability to increase phenylalanine ammonia lyase and peroxidase activity in response to wounding was consistent with ripening-reduced generation of H_2O_2 early after wounding, leading to reduced resistance to *B. cinerea*. Thus, H_2O_2 accumulation in response to wounding is modulated by fruit maturity and is required for efficient wound healing and resistance to *B. cinerea*.