

Preharvest methyl salicylate treatment enhance the chilling tolerance and improve the postharvest quality of apricot during low temperature storage

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Abstract

Apricot is highly susceptible to chilling injury during low temperature storage, while methyl salicylate (MeSA) can alleviate chilling injury and enhance the postharvest quality of fruit. The apricots were preharvest sprayed twice with 0.05 mmol L⁻¹, 0.1 mmol L⁻¹ and 0.2 mmol L⁻¹ of MeSA solution, and then were harvested and stored at 2 °C (humidity of 70 %). After cold storage for every 4 d, apricots were transferred to 20 °C for 2 d to determine the fruit quality. Our results indicated that 0.2 mmol L⁻¹ MeSA treatment exhibited the best efficacy. Preharvest MeSA treatment could reduce decay rate and chilling injury (CI) index, and maintain firmness, soluble solid content (SSC), organic acids and antioxidant capacities at a relative higher level. Preharvest MeSA treatment inhibited the increase of electrolyte leakage, malondialdehyde (MDA) and H₂O₂ content in apricot. The chilling temperature of 2 °C could lead to the degradation of sucrose to fructose and glucose in apricot. At the same time, preharvest MeSA treatment effectively alleviated CI symptoms of apricot by reducing the degradation rate. The enhanced chilling tolerance of apricot treated with MeSA could be affected by the increased sucrose content, which was regulated by the higher activities of sucrose phosphate synthase (SPS) and sucrose synthase-synthesis (SS-S), and the lower activities of acid invertase (AI), neutral invertase (NI) and sucrose synthase-cleavage (SS-C). We proposed that preharvest MeSA treatment could enhance the chilling tolerance by regulating sugar metabolism and further improve the postharvest quality of apricot during low temperature storage.