

Effect of salicylic acid treatment on sensory quality, flavor-related chemicals and gene expression in peach fruit after cold storage

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Abstract

Salicylic acid (SA) has been used in reducing chilling injury of horticultural crops caused by postharvest cold storage. However, effect of SA on fruit flavor quality in response to chilling need to be further investigated. In the present study, SA treated peach fruit (*Prunus persica* L. Batsch., cv. Hujingmilu) were stored at 0 °C for 7, 14, 21 and 28 d followed by a subsequent shelf-life at 20 °C, respectively. SA treatment (1 mM) alleviated development of flesh browning and maintained softening ability of peach fruit after cold storage. Electronic nose (e-nose) and electronic tongue (e-tongue) analysis showed separation of SA treated fruit and controls based on discriminant factor analysis (DFA) plots, particular for peaches during 3 d shelf-life after 28 d cold storage (C28dS3). Reduced content of fruity note volatile esters and lactones was observed for peach fruit with extended cold storage, SA treatment maintained significant higher volatiles than controls. Transcript levels of genes derived from volatile ester biosynthesis pathway, including lipoxygenase *PpLOX1*, hyperoxide lyase *PpHPL1*, alcohol dehydrase *PpADH1* and alcohol acyltransferase *PpAAT1*, were analyzed using real-time quantitative PCR. For SA-treated peach fruit after cold storage, significant higher transcript levels was detected for the *PpLOX1* which encodes the first enzymatic step of the pathway. Regarding to soluble sugars, high sucrose content and low content of fructose and glucose was observed for SA-treated peach fruit. Gene expression analysis revealed higher transcript abundance of sucrose synthase *PpSUS4*, neutral invertase *PpNINV8* and tonoplastic monosaccharide transporter *PpTMT2* in peach fruit treated with SA. No significant difference in contents were observed for citric acid, malic acid and quinic acid between SA-treated samples and controls. This study showed that SA treatment alleviated the cold storage-induced reduction of a number of volatiles and sugars, and thereby maintained flavor quality of peach fruit during shelf-life after cold storage.