

Title Effect of salicylic acid on the antioxidant system in the pulp of ‘Cara cara’ navel orange (*Citrus sinensis* L. Osbeck) at different storage temperatures

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Abstract

Effects of salicylic acid (SA) on active oxygen metabolism and the antioxidant system in the pulp of ‘Cara cara’ navel orange (*C. sinensis* L. Osbeck) fruit stored at 6 °C and 20 °C were investigated through analysis of the contents of malondialdehyde and hydrogen peroxide, the activities of superoxide dismutase (SOD, EC 1.15.1.1), catalase (CAT, EC 1.11.1.6), glutathione reductase (GR, EC 1.6.4.2), dehydroascorbate reductase (DHAR, EC 1.8.5.1) and ascorbate peroxidase (AsA-POD, EC 1.11.1.11), and non-enzyme components such as ascorbate (AsA), dehydroascorbate (DHAsA), glutathione (GSH) and oxidized glutathione (GSSG) in the AsA-GSH cycle. The results showed that the control fruit (dipped in water) had lower contents of malondialdehyde and activities of antioxidant enzymes at 6 °C, and lower contents of ascorbate and glutathione at 20 °C. During storage, the contents of hydrogen peroxide and malondialdehyde together with activities of SOD and CAT gradually increased at both storage temperatures. SA-pretreatment accelerated hydrogen peroxide accumulation and the increase in SOD, but it significantly slowed down malondialdehyde and CAT rate of increase during storage compared to controls under these two temperatures. At the end of storage, malondialdehyde contents in SA-pretreated fruit were 12.6 and 27.6% lower than those in control fruit. The activities of GR and DHAR and the contents of AsA and GSH during fruit storage declined but the SA-pretreatment reduced the rate of this decline. The SA-pretreated fruit had higher values of AsA/DHAsA than those in control fruit at the same temperature, and these ratios were highest at 6 °C. These results indicate that low storage temperature and exogenous SA can reduce lipid peroxidation by regulating the antioxidant system, and suggest that pretreatment with SA combined with lower storage temperature might provide a useful means of maintaining beneficial antioxidant activity during storage of navel orange.