

Effect of pulsed controlled atmosphere with CO₂ on the quality of watercored apple during storage

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Abstract

Watercored 'Fuji' apple with special water core and unique flavor is a characteristic fruit. However, the problems of water core disappearance and browning in the apples are outstanding during postharvest storage. In this study, pulsed controlled atmosphere (pCA) with CO₂ was used to protect the water-core and resist browning of apples. Effects of different concentrations of CO₂ on the quality of apple fruits was investigated, and CO₂ injury characteristic to apple fruits were studied as well. Results showed that pCA with CO₂ could effectively maintain the sensory and texture qualities of watercored apples. Treated with pulsed controlled CO₂, the degree of membrane lipid peroxidation of the apples was effectively reduced and the membrane system was well maintained. Meanwhile, the activity of polyphenol oxidase (PPO) and phenylalanine ammonia-lyase (PAL) of the apples were inhibited and the browning was reduced. On the whole, pCA with 1% CO₂ presented the most significant effects on the quality preservation of watercored apples while higher CO₂ showed negative effects on the quality of the samples. Under the condition of pCA with 5% CO₂, the endurance of watercored apples was less than 45 days and the internal browning was serious. In conclusion, 2%~3% O₂ and pCA with 1% CO₂ was the best and most effective in the long-term preservation of watercored apples, and it is beneficial to guide for the preservation of apple fruits.