

Title The effect of postharvest 1-MCP treatment and storage atmosphere on ‘Cripps Pink’ apple phenolics and antioxidant activity

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Abstract

This study investigated the effect of a postharvest 1-methylcyclopropene (1-MCP) treatment, controlled atmosphere and storage time on the total antioxidant activity (TAA) and phenolic compounds in the peel and flesh of ‘Cripps Pink’ apples (*Malus domestica* Borkh.). Preclimacteric apples were harvested and treated with 1-MCP then stored in normal atmosphere (NA) or controlled atmosphere (CA) at 0 °C for up to 160 days. In general, the level of phenolics decreased by 9% in the peel and significantly increased twofold in the flesh during cold storage, regardless of storage atmosphere or 1-MCP treatment. However, treatment with 1-MCP resulted in significantly lower concentrations of chlorogenic acid and procyanidin B2 in apple flesh, and catechin and epicatechin in the peel compared to the control fruits. There was no significant effect of CA on the phenolic compounds during long-term storage, except for quercetin 3-galactoside and quercetin 3-glucoside, which both significantly increased under CA storage. Total antioxidant activity (TAA) is an important nutritional attribute of apples in the human diet. The results showed that TAA in the peel tissue was about eight times higher than that of the flesh, with mean values of 4.75 g TE/kg FW and 0.56 TE/kg FW, respectively. The TAA in both the peel and flesh tissue increased significantly during storage by 40% and 70%, respectively. The storage atmosphere did not significantly affect TAA in either the peel or flesh, whilst the 1-MCP treatment significantly reduced the TAA in the peel tissue only. These results show the beneficial combined effects of pre-storage 1-MCP treatment and CA on ‘Cripps Pink’ apple phenolic composition and antioxidant capacity during long term storage.