Title Rapid 1-methylcyclopropene (1-MCP) treatment and delayed controlled atmosphere storage of apples

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Abstract

The quality of 'McIntosh' and 'Empire' apples [*Malus* × *sylvestris* (L.) Mill. var. domestica (Borkh.) Mansf.] after treatment with 1-methylcyclopropene (1-MCP) and delayed controlled atmosphere (CA) storage has been investigated. For each cultivar, fruit from three orchard blocks were harvested in two growing regions. 1-MCP was applied after overnight cooling to 2 °C and CA conditions applied 2, 7 and 14 d after harvest. Quality of fruit was assessed after CA storage for 6 months plus 1 and 7 d at 20 °C. 1-MCP suppressed the internal ethylene concentrations (IECs) of the fruit during the14 d period before CA conditions were applied, but the extent of suppression was lower in fruit with high IECs at harvest. Untreated fruit of both 'McIntosh' and 'Empire' exposed to CA storage after 2 d maintained firmness levels similar to 1-MCP treated fruit, but only for 1 d of shelf life. 1-MCP treatment resulted in firm fruit after delayed CA up to 14 d, but the most consistent effects were found in 'Empire' which has lower IECs than 'McIntosh'. Orchard block differences in IEC affected the persistence of 1-MCP effects on firmness. Effects of 1-MCP treatment on storage disorders were inconsistent, although slight increases in risk of external carbon dioxide injury were detected. Rapid treatment of fruit with 1-MCP after harvest can afford storage operators more freedom to delay CA storage application, but attention to cultivar, fruit maturity and susceptibility of fruit to storage disorders must be considered.