Title The influence of 1-methylcyclopropene on 'Cortland' and 'McIntosh' apple quality following long-term storage.

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Abstract

Redcort Cortland and Redmax and Summerland McIntosh apples were treated with 900 nl 1-methylcyclopropene (1-MCP)/litre for 24 hours at 20 deg C before storage and were kept at 3 deg C in either a controlled atmosphere (CA) of 2 kPa O2 and <2.5 kPa CO2 or in an air (RA) environment for up to 9 months. After 4.5 months, half of the fruits were treated with a second 900 nl 1-MCP application/litre in air at 3 deg C for 24 hours and then returned to RA or CA storage. At harvest and following removal at 3, 6 and 9 months and a 7-day shelf life at 20 deg C, fruit firmness, titratable acidity (TA) and soluble solids content (SSC) were measured, while internal ethylene concentrations (IEC) in the apple core were quantified after 1 day at 20 deg C. Upon storage removal and following a 21-day shelf life at 20 deg C, disorder incidence was evaluated. 1-MCP-treated apples, particularly those held in CA-storage, were firmer and had lower IEC than the untreated fruits. Higher TA levels were maintained with 1-MCP in all 3 strains from both storages, while SSC was not affected. Following the 6- and/or 9-month removals, 1-MCP suppressed superficial scald development in all strains and reduced core browning and senescent breakdown in RA-stored Redmax and Summerland and senescent breakdown in RA-stored Redcort. 1-MCP generally maintained the quality of Cortland and McIntosh fruits held in CA and RA environments (particularly the former) to a higher degree than untreated apples over the 9-month storage period. A second mid-storage application of 1-MCP at 3 deg C did not improve post-storage fruit quality above a single, prestorage treatment.