

Volatile compounds and overall quality of 'Braeburn' apples after long-term storage: Interaction of innovative storage technologies and 1-MCP treatment

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Abstract

In this study, we evaluated storage methods which sustains 'Braeburn' apples volatile compounds and overall quality characteristics after 9 months of storage at 2.5 °C, and their relation with 1-methylcyclopropene (1-MCP) treatment. We also proposed to evaluate if there was a relation of the methyl and ethyl esters with flesh breakdown incidence. The storage design was composed by five atmosphere conditions: controlled atmosphere (CA) (1.2 kPa O₂), dynamic controlled atmosphere based on the chlorophyll fluorescence (DCA-CF), and three levels of respiratory quotient: 1.3; 1.5 and 1.7 (DCA-RQ 1.3; DCA-RQ 1.5 and DCA-RQ 1.7). In all conditions, the CO₂ was kept at 0.7 kPa and relative humidity was 94 ± 1 %, whether without or with 1-MCP treatment (0.625 μL L⁻¹). 1-MCP maintained higher flesh firmness, suppresses the ethylene production and internal ethylene concentration (IEC), due to lower ACC oxidase enzyme activity. Ethyl acetate was not reduced by 1-MCP treatment in DCA-RQ 1.3, 1.5 and 1.7 storage conditions. Without 1-MCP, DCA-RQ 1.3 storage resulted in better flesh firmness and titratable acidity maintenance. There was no correlation of methyl and ethyl esters with flesh breakdown.