

Title Storability and fruit quality of 'Braeburn' apples as affected by harvest date, 1-MCP treatment and different storage conditions

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Abstract

The storage quality of 'Braeburn' apples is limited by the development of a typical browning disorder called "Braeburn browning disorder" (BBD) within the fruit flesh. The aims of these investigations was to prevent 'Braeburn' physiological disorders and to reduce the quality loss during storage and shelf-life by defining the optimal harvest date in combination with using 1-methylcyclopropene (1-MCP) and the new DCA (dynamic controlled atmosphere) storage technology where the effects of DCA on BBD and quality preservation were compared with the 1-MCP treatments. In 2006 'Braeburn' apples (*Malus domestica* 'Braeburn') were harvested at three different stages of maturity (Optimal harvest date (OHD), one week before OHD and one week after OHD). After harvest, fruit of each maturity stage were stored for approximately 7 months under different storage conditions (CA and DCA). Recommended CA conditions were used as a reference (1°C, O₂ 1.5%, CO₂ 1.0%) and DCA was based on the fruit's fluorescence response to low oxygen stress, where O₂ was set at 0.3-0.4% plus 0.7-0.8% CO₂ in DCA. 1-MCP was applied prior to CA and DCA storage at 625 ppb for 24 h at 3.5°C. After storage and a 7 days shelf-life period at 20°C, fruit quality was assessed automatically with the 'Pimprenelle' laboratory device. BBD and storage diseases were estimated visually. DCA storage maintained firmness at levels comparable to CA plus 1-MCP treatments. DCA combined with MCP stabilized firmness perfectly and no firmness reduction was observed during storage. Whereas 1-MCP treated fruit in both CA and DCA showed a higher incidence of BBD (on average + 53%) than untreated, DCA storage reduced BBD to 46% compared to fruit stored only in CA. The fruit's susceptibility to low temperature breakdown (soft scald, + 7.6%) and external CO₂ injury (+ 3.6%) was significantly higher in DCA.