

### Abstract:

This work was carried out to test the effectiveness of a delayed controlled atmosphere (CA) storage (21 days at 1 °C in air before CA storage) on the occurrence of browning disorders and related physiological changes like energy status and fatty acid metabolism in 'Braeburn' apples. After delayed CA, fruit were stored for up to 5 months in 4% CO<sub>2</sub> + 1% O<sub>2</sub> at 1 °C. Fruit subjected to rapid CA showed a high incidence of internal browning and cavities, whereas in delayed CA-fruit a very low incidence of these disorders was found. No significant losses of flesh firmness, acidity, skin colour and soluble solids content between treatments could be observed. Delayed CA-fruit showed clearly higher ethylene production and respiration rate during the first 2 months of storage which was associated with higher ATP concentrations in the fruit tissue. Therefore, significant higher energy charge of delayed CA-fruit was found and remained high until the end of storage period. Delayed CA-fruit showed higher contents of total fatty acids and polar fatty acids esterified with lipids than rapid CA-stored fruit. These results suggest that 'Braeburn' apples can become adapted to CA during the early stages of the storage period by delaying CA storage conditions making them more tolerant against browning disorders.