

Title Effects of ethylene inhibition on development of flesh browning in apple fruit
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Abstract

Flesh browning has been a long term problem during controlled atmosphere (CA) storage of many apple cultivars, including 'Empire'. This cultivar is susceptible to chilling injury at low storage temperatures and current recommendations are 1-2°C. In this study we have used 1-methylcyclopropene (1-MCP) as a tool to investigate the role of ethylene in browning development. Inhibition of ethylene production by the fruit was associated with higher browning incidence at 3 °C compared with 0.5°C. Browning of the flesh was greater at the stem end than at the blossom end of the fruit. Postharvest treatments such as delayed CA that decreased browning in untreated fruit had no effect on browning in 1-MCP treated fruit. No major differences in total phenolic concentrations were detected between untreated and 1-MCP treated apples at either 0.5 or 3°C. POX activity was higher at 3 °C than at 0 °C, but not affected by 1-MCP treatment. However, involvement of PPO activity in browning development of was suggested by higher activity in flesh tissues of 1-MCP treated compared with untreated fruit at both storage temperatures. Overall, our results indicated inhibition of ethylene production in the fruit is associated with higher browning incidence at warmer storage temperatures and that effective postharvest treatments to decrease injury are difficult to identify.