

### Abstract

The cycloolefin 1-methylcyclopropene (1-MCP) is a potent inhibitor of ethylene action. When pre-climacteric fruit are exposed to a treatment of 1-MCP, many ripening patterns associated with the action of ethylene are compromised. In the present study, the phenylpropanoid metabolic pathway was monitored in order to determine the impact that a treatment of 1-MCP had on the antioxidant status of fruit during cold storage and a simulated marketing period. Red and green 'd'Anjou' pear (*Pyrus x communis* L.) fruit were harvested at optimal maturity, treated with 1  $\mu\text{l L}^{-1}$  1-MCP for 24 hours at 0-1°C, and subsequently placed in cold storage (0-1°C, 90-95% R.H.). Fruit were removed every 21 days for 126 days, and evaluated for firmness, TSSC, and ethylene and volatile production over a one-week period at 22°C. Tissue samples were collected for determination of flavonoid content and antioxidant capacity for an additional week. The total oxygen radical scavenging capacity (TOSC) assay was used to determine total reductive capacity of the pear fruit. Anthocyanins, flavonols, flavan-3-ols and chlorogenic acid were evaluated by HPLC-DAD analysis. The total antioxidant capacity (TAC) remained relatively stable throughout cold storage in fruit treated with 1-MCP, however, the TAC score demonstrated a transient decline in levels over the same period for the non-treated control fruit. Anthocyanins increased during the first 42 days of storage and declined thereafter, whereas levels of flavonols and flavan-3-ols remained relatively constant throughout storage. Chlorogenic acid increased linearly during storage, but was severely inhibited by 1-MCP treatment. During the simulated one-week shelf-life, chlorogenic acid levels further increased significantly, whereas this rapid accumulation was inhibited in fruit treated with 1-MCP. Across all treatment effects, 1-MCP resulted in a significant retention of TAC and total flavonoids, and may be a useful tool to help maintain some of the intrinsic antioxidant levels available in pear fruits.