

## Abstract

Ethylene treatment of detached mature avocado fruit promoted the onset of ripening. Avocado fruits from immediate ethylene treatment had more uniform ripening and better pulp quality than control fruit (not exposed to ethylene), although ethylene treatment did not affect fruit quality as determined by dry matter content and oil content.

The 1-Methylcyclopropene (1-MCP) treatment delayed ripening of avocado fruit, characterized by a significant reduction in the rate of fruit softening and in the timing and intensity of the ethylene and respiratory climacterics. Avocado treated with 1-MCP also showed significantly less weight loss and retained more green color than control fruit (not exposed to 1-MCP).

Inhibition of polygalacturonase (PG) activity was the strongest response to 1-MCP and activity showed little or no recovery over the storage period. Consistent with the marked suppression of PG levels in 1-MCP-treated avocado fruit, the solubilization and degradation of polyuronides was significantly delayed and reduced in 1-MCP-treated fruit. 1-MCP treatment did not significantly affect quantity or composition of the neutral sugar of 4 *M* alkali-soluble hemicellulose during ripening. The 1-MCP treatment, however, significantly reduced molecular mass downshifts in 4 *M* alkali-soluble hemicelluloses and xyloglucan.

In addition to its effect on PG, 1-MCP treatment significantly delayed the activities of C<sub>x</sub>-cellulase, pectinmethylesterase, and total extractable  $\alpha$ - and  $\beta$ -galactosidase during avocado fruit ripening. Selected cell wall enzymes (PG,  $\beta$ -galactosidase, and C<sub>x</sub>-cellulase) were upregulated by ethylene. Exogenous ethylene treatment before or after 1-MCP treatment did not influence fruit firmness, weight loss, respiration, or C<sub>2</sub>H<sub>4</sub> production, implying that ethylene response was completely suppressed by 1-MCP.

Combined 1-MCP and wax treatment exerted maximal delay of avocado fruit ripening by reducing the rate of fruit softening and water loss. Waxing also helped to retain better green peel color and depressed ethylene production of avocado fruit. Inhibition of ethylene action with 1-MCP during the early stages of the avocado climacteric produces changes in subsequent ripening behavior. The 1-MCP blocks C<sub>2</sub>H<sub>4</sub> action and delays C<sub>2</sub>H<sub>4</sub>-dependent ripening of avocado fruit.

