

Title Influence of multiple applications and exogenous ethylene on the efficacy of 1-MCP in delaying ripening of 'Cavendish' bananas [*Musa* sp.]

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Abstract

Ethylene-free, mature-green 'Cavendish' bananas (*Musa* sp., AAA type) were subjected to multiple (3X) applications of an ethylene antagonist 1-methylcyclopropene (1-MCP) for 24 hrs at 20degC to investigate the ripening response. By performing application of 1-MCP three times, it was found that a distinct ethylene evolution in treated bananas appeared at 27 days after treatment (DAT) whereas a ethylene evolution in untreated bananas appeared of 8 DAT. Single treatment was less effective in delaying ripening than repeated applications but the concentrations of 100 and 500 nl/l of 1-MCP affected the retardation to the same extent. Regardless of ripening period, the fruit firmness and breakdown of starch to sugar at the ripe stage were almost at the same level in both treated and untreated bananas, although some bananas changed abnormally in peel color. It is often observed that the untreated bananas demonstrated ethylene evolution at 4 DAT, much earlier than expected, thus we investigated the 1-MCP response of the bananas possibly contaminated by ethylene during transit or storage. The simultaneous presence of ethylene affected the effectiveness of 1-MCP treatment. At -0.5microl/l ethylene, 20 nl/l 1-MCP was sufficient to obtain almost maximum delay in ripening. However, at 1.0microl/l ethylene, 100 nl/l 1-MCP was necessary to obtain the maximum delay. These indicate a competitive relationship between ethylene and 1-MCP, the effect of exposure to ethylene during transit or storage could be canceled out by using higher concentrations of 1-MCP.