

Title Effect of 1-methylcyclopropene (1-MCP) treatment on quality and ethylene production of muskmelon fruit

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Abstract

Before the onset of climacteric in mature muskmelon fruit (cv. 'Pearl'), grown in a plastic house, 1-methylcyclopropene(1-MCP), a gaseous inhibitor of ethylene, was applied and an evaluation of the subsequent molecular metabolic changes, including expression of genes involved in biosynthesis and perception of ethylene, were undertaken on fruit during storage at 25°C. Ripening-associated physiological changes in fruit treated with 1-MCP were very slow, compared to those in control fruit. Only a slight increment in ethylene production, a significant delay of tissue softening and of yellow color development in fruit skin was manifested by 1-MCP treatment. However, little difference was observed in changes of total soluble solids content from the fruit either treated with the inhibitor or air. Application of 1-MCP to melon fruit reduced expression of *CM-ACSI* and delayed normal expression of *CM-ACO1* when compared to the controls. Expression of genes involved in ethylene reception, *CM-ETR1* and *CM-ERS1*, remained unaffected during 15 days of storage after 1-MCP application. The data obtained in the present study support that 1-MCP applied to muskmelon fruit blocked ethylene binding to its receptor and thus inhibited action, consequently suppressing the autocatalytic regulation of expression of *CM-ACSI*. A relatively small peak in ethylene production in 1-MCP treatment fruit is probably due to reduced expression of *CM-ACSI* rather than *CM-ACO1*, leading to inhibition of an autocatalytic production of ethylene, a prerequisite for climacteric fruit to undergo ripening.