

Title Influence of time from harvest to 1-MCP treatment on apple fruit quality and expression of genes for ethylene biosynthesis enzymes and ethylene receptors

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Abstract

A strong potent inhibitor of ethylene action, 1-methylcyclopropene (1-MCP) maintains apple fruit quality during storage. To understand the influence of time after harvest until 1-MCP treatment, we studied expression patterns of genes for ethylene biosynthesis enzymes and ethylene receptors in two apple cultivars, 'Orin' and 'Fuji', which differ in ethylene production. Ethylene production and expression of *MdACS1*, *MdERS1*, and *MdERS2* were suppressed in all 1-MCP-treated 'Fuji' fruit, but in 'Orin', the later 1-MCP was applied after harvest, the less was the suppression of ethylene production and expression of these genes. In fruit in which 1-MCP had low efficacy (e.g., 'Orin' treated at 7 DAH), ethylene production and the level of *MdERS1* were briefly reduced by 1-MCP treatment at 2 days after treatment, then began to increase. Since ethylene receptors negatively regulate the ethylene signalling pathway, the increased levels of ethylene production and ethylene receptors after 1-MCP treatment might reduce 1-MCP efficacy.