

Preharvest aminoethoxyvinylglycine (AVG) and 1-methylcyclopropene (1-MCP) effects on ethylene and starch concentrations of ‘Empire’ and ‘McIntosh’ apples

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Abstract

Aminoethoxyvinylglycine (AVG; ReTain®) and 1-methylcyclopropene (1-MCP; Harvista™) are used to delay apple fruit maturation and ripening, and thereby reduce fruit drop and manage harvest logistics. In this study, ‘McIntosh’ and ‘Empire’ fruit were treated with AVG at four weeks or two weeks, or with 1-MCP one week, prior to the anticipated first harvest date, to assess effects of these chemicals on maturation and ripening in relation to starch degradation. In a second season, ‘Empire’ fruit were treated with either AVG or 1-MCP four weeks and one week prior to the anticipated first harvest. Fruit from this experiment were also harvested to investigate the effects of treatment on ripening in air storage. Cultivar and timing of application influenced the efficacy of both AVG and 1-MCP in delaying the increase of internal ethylene concentration (IEC) and the starch pattern index (SPI), and the decrease of starch concentration, in the fruit. Little effect of treatment was found for the high ethylene producing ‘McIntosh’, with only the SPI being affected on the date of first harvest. ‘Empire’ fruit from trees treated with 1-MCP or AVG had lower IEC and were greener (higher absorbance difference index (I_{AD}) values), and had lower SPIs and higher starch concentrations, but the effects were inconsistent and limited to only some harvest dates. In storage, only 1-MCP applied 10 d before harvest markedly slowed the increase in IEC and the rate of softening. AVG treatment effects on IEC were intermediate, between the one week 1-MCP treatment and the untreated controls and 4 week 1-MCP treatment, while it did not affect softening. Treatments did not affect the rate of starch concentration loss during storage.