Title Ethylene biosynthesis in apricot: Identification of a ripening-related 1-aminocyclopropane-1-carboxylic acid synthase (*ACS)* gene

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Abstract

Apricots are climacteric fruits with a high susceptibility to flesh softening and loss of flavor during postharvest storage, and most of the ripening processes are regulated by ethylene, which also has an effect on its own biosynthesis. To understand this process in apricot, inhibition of ethylene biosynthesis and perception was performed for studying key genes involved in the ethylene biosynthetic pathway. Apricots, cv. "Patterson", were harvested with yellow-green ground color and immediately treated with either the ethylene perception inhibitor 1-methyl cyclopropene (1-MCP) at 10 ฮL L^{-1} or the ethylene biosynthesis inhibitor aminoethoxyvinylglycine (AVG) at 1 g L^{-1}. After treatment, quality and physiological attributes such as firmness, color, total soluble solids, acidity, fruit weight, ethylene production and respiration rates were evaluated every 2 d until they ripened at 20 °C. Gene expression analysis was performed by quantitative polymerase chain reaction (qPCR). Both ethylene inhibitors were effective in reducing ethylene production, respiration rate and fruit softening. Three 1-aminocyclopropane-1-carboxylic-acid synthase (*ACS*) genes were characterized, but only the expression of *ACS2* was highly reduced by ethylene inhibition, suggesting a key role in ethylene synthesis at ripening. Contrarily, *ACS1* and *ACS3* showed a higher expression under ethylene inhibition suggesting that the corresponding genes are individually regulated in a specific mode as observed in other climacteric fruits. Finally, changes in 1-aminocyclopropane-1-carboxylic-acid oxidase genes did not show a consistent pattern of ethylene modulation.