

Title Changes of glycosidase activities in response to ethylene production during avocado fruit softening

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Abstract

Fruit softening and textural changes are important factors influencing fruit quality. During fruit softening, pectic and some hemicellulosic substances of the cell wall become soluble and depolymerized with the release of neutral sugar residues. Several glycosidase activities were found in cell wall fractions. The releasing activity of neutral sugar residues may relate to cell wall modification during softening. Avocado is a typical climacteric fruit and its softening is closely related to ethylene production. Pre-ripe avocado fruit were treated with either ethylene or 1-MCP exogenously, and changes in glycosidase activities were measured in order to investigate how ethylene regulates the activity of the enzymes. Endogenous ethylene production was promoted by exogenous ethylene and the days of to eating ripe were reduced. On the contrary, in 1-MCP treated fruit both the peak of ethylene production and the progress of softening were significantly delayed. a-L-Arabinofuranosidase and b-glucosidase activities increased with fruit softening, and they were promoted by exogenous ethylene and delayed by 1-MCP treatment. There was no apparent effect of ethylene on a-galactosidase and b-xylosidase activities. Among three b-galactosidase isozymes found in avocado fruit, one showed an increasing in its activity with ripening but could not be detected in pre-ripe hard fruit before production commenced. Onset of the increasing isozyme activity was promoted by exogenced ethylene and delayed by 1-MCP treatment. It seems that the up-regulated activities of a-L-arabinofuranosidase, b-glucosidase and one of the b-galactosidase isozymes during fruit ripening was induced by ethylene. These enzymes may play an important role in avocado fruit softening.