

Pectin modifications and the Role of Pectin-degrading Enzymes during Postharvest Softening of Jonagold Apples

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Abstract

This study aimed at understanding softening in Jonagold apple (*Malus × domestica* Borkh.) fruits, by investigating pectin modifications and the evolution of pectin-modifying enzymes during postharvest storage and ripening. Jonagold apples were harvested at commercial maturity and stored at different temperatures and controlled atmosphere conditions for 6 months, followed by exposure to ambient shelf life conditions (20 °C under air) for 2 weeks. The composition of the pectic material was analysed. Furthermore, the firmness and the ethylene production of the apples were assessed. Generally, the main changes in pectin composition associated with the loss of firmness during ripening in Jonagold apples were a loss of side chains neutral sugars, increased water solubility and decreased molar mass. Also, the activities of four important enzymes possibly involved in apple softening, β -galactosidase, α -arabinofuranosidase, polygalacturonase and pectin methylesterase, were measured. Pectin-related enzyme activities highly correlated with ethylene production, but not always with pectin modifications.

Keywords

Malus × domestica; Firmness; Pectin; Cell wall-modifying enzymes; Controlled atmosphere