

Title Cell wall modifications during on-tree maturation of ‘Golden Reinders’ apples
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Abstract

Softening is one of the most common changes taking place during fruit ripening, and is generally measured as a decrease in firmness. Fruit firmness at harvest is an important quality parameter determining not only sensory quality, but also storage potential of fruit. Firmness loss arises largely from modifications in cell wall structure and polysaccharide composition, as a result of the coordinated action of several related enzyme activities. Although a number of studies have reported the activity of several cell-wall modifying enzyme activities during growth and development of apples (*Malus domestica* Borkh.), few works have focused on possible relationships between modifications on cell wall architecture and related enzyme activities during fruit maturation. Thus, the objective of this study was to examine possible relationships between cell wall composition, cell wall modifying enzyme activities and firmness loss throughout on-tree maturation of apples. ‘Golden Reinders’ fruit were picked weekly and analysed for firmness, cell wall composition and pectatelyase (PL), polygalacturonase (PG) and endo-1,4- β -glucanase (EGase) activities during two months prior to commercial harvest. Good correlations were found between flesh softening and the yields of some cell wall fractions obtained from the samples. Non-covalently bound pectins, a main constituent of the middle lamella, were found to decrease concurrently with firmness, possibly in relation to higher PL and PG activities at early and advanced stages of fruit maturation, respectively. Contrarily, firmness loss was apparently not related to the yield of the hemicellulose-containing fraction, in accordance with the absence of significant changes in EGase activity throughout the experimental period.