Title Cell wall modifications during softening in melting type peach "Akatsuki" and non-melting type peach "Mochizuki"

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Abstract

Cell wallpolysaccharides were sequentially extracted from the melting peach cultivar "Akatsuki" [*Prunus persica* L. Batsh] and the non-melting peach cultivar "Mochizuki" with 1,2-cyclohexanediaminetetraacetic acid (CDTA), Na_2CO_3 and NaOH solutions. Residues remaining after solvent extraction were treated with cellulase, and the released soluble pectic polysaccharides were referred to as the cellulosic residue extract (CE). The abundance of pectic polysaccharides present in the CDTA-soluble extract increased during ripening of "Akatsuki" fruit accompanied by a decrease of these cell-wall polymers in the Na_2CO_3-soluble and CE extracts. Size-exclusion chromatography (SEC) of pectic polysaccharides in the CDTA, Na_2CO_3 and CE extracts from ripening "Akatsuki" fruit revealed the existence of neutral sugar rich polyuronides and homogalacturonan-like polysaccharide fractions. These fractions did not show obvious changes in molecular weight distribution except that a homogalacturonan-like pectic polysaccharide in the CDTA-soluble extract shifted to a lower molecular weight. A relatively small amount of pectic polysaccharides were solubilized in non-melting "Mochizuki" fruit during ripening compared to melting "Akatsuki" fruit. The molecular weight distribution of cell-wall polymers in all extracts of "Mochizuki" peach did not change during ripening. Homogalacturonan-like polysaccharides observed in the CDTA-soluble fraction in melting "Akatsuki" were not found in the non-melting "Mochizuki", but the high molecular weight pectic polymers and the relatively small amount of neutral sugar rich polymers distributed in a relatively wide range of molecular weights increased steadily in the CDTA-soluble extract of "Mochizuki" during ripening. These results suggest that pectic polysaccharides might be solubilized during peach fruit ripening without substantial de-polymerization. In melting type peach fruit that increases endo-polygalacturonase (endo-PG) activity during ripening, the homogalacturonan regions of pectic macromolecules might be hydrolyzed and de-polymerized only after or accompanied by the solubilization of pectic polysaccharides. Polysaccharides in the CE were characterized by a significantly higher amount of neutral sugars compared to other polyuronide fractions, and loss of these pectic polysaccharides during ripening occurred in both melting and non-melting peaches. We also investigated the roles of endo-PG and

other cell wall modifying enzymes and the significance of loosing CE polysaccharides in the solubilization of polyuronides during peach fruit ripening.