

Title The effect of postharvest calcium application on tissue calcium concentration, quality attributes, incidence of flesh browning and cell wall physicochemical aspects of peach fruits

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Abstract

The effects of postharvest calcium applications on cell wall properties and quality attributes of peach fruits (*Prunus persica* L. Batsch, cv. 'Andross') after harvest or cold storage up to 4 weeks were determined. The fruits were immersed in deionised water or in different calcium sources (calcium chloride, calcium lactate and calcium propionate) at two calcium concentrations (62.5 and 187.5 mM Ca). Calcium concentration profiles in fruits (peel and flesh), in cell wall and in pectin fractions were determined. The calcium content in the peel increased up to 2.7-fold, whereas flesh calcium increased up to 74%, 1 day after immersion. The increase of flesh calcium was accompanied by increase of cell wall calcium, which corresponded to a significant increase of calcium in the water-insoluble pectin fraction. However, calcium became saturated in the water-insoluble, but not water-soluble, pectin fraction with 62.5 mM Ca treatment. Treatment with 62.5 mM Ca salts was as effective as higher concentrations of calcium chloride maintaining tissue firmness during storage. Inversely, calcium lactate and calcium propionate at high concentrations (187.5 mM Ca) caused toxicity symptoms on the fruit surface, expressed as skin discoloration and superficial pitting, leading to additional chemical changes and reduced tissue firmness. Postharvest calcium applications limited the intense of chilling injury symptoms, expressed as flesh browning after 4 weeks cold storage. Peach fruits with severe flesh browning symptoms were characterized by reduced ethylene production, and reduced activities of the pectin modifying enzymes polygalacturonase and pectin-methyl-esterase.