

**Title** Decrease in galactose residues in cell wall polysaccharide of 'Andesu' netted melon (*Cucumis melo* L.) fruit influences the formation of water-core

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### Abstract

Water-core symptoms of netted melon 'Andesu' were observed frequently in open field cultivation on sand dunes in Yamagata Prefecture, Japan. Previously we reported that shading treatment resulted in the accelerated fruit softening, the development of water-core during the ripe to over-ripe stages, and shortening of the shelf life. In this study, 'Andesu' plants were grown under shaded conditions during the fruit developing stages, 14 days before harvest. Cell wall polysaccharides of the inner mesocarp of pre-ripe, ripe, over-ripe fruits, and water-cored fruits induced by shading treatments were extracted sequentially with water, CDTA and Na<sub>2</sub>CO<sub>3</sub>. Uronic acid and neutral sugar contents were higher in the Na<sub>2</sub>CO<sub>3</sub>-soluble fraction than in the CDTA-soluble fraction in all fruits. In the Na<sub>2</sub>CO<sub>3</sub>-soluble fraction, ripe, water-cored and over-ripe fruits were characterized by lowered neutral sugar contents than pre-ripe fruit. In the CDTA-soluble fraction, distribution profiles of polysaccharides by gel filtration chromatography showed a decrease in molecular size in ripe, over-ripe and water-cored fruits. Among the neutral sugars, marked decreases were observed in the galactose residue in both of CDTA- and Na<sub>2</sub>CO<sub>3</sub>-soluble fractions. The decreases of galactose residue in the Na<sub>2</sub>CO<sub>3</sub>-soluble fraction were more significant in ripe and water-cored fruits, particularly in the high molecular weight pectic fractions, while it was observed in both high and low molecular weight fractions in over-ripe fruits. Galactosidase activity was higher in water-cored fruits than in over-ripe fruits. Water-core symptoms induced by shading treatment of plants before harvest of fruits can be related to the degradation of cell wall polysaccharides, particularly the decrease in galactose residue on the side chain of pectic polysaccharides. To prevent the development of watercore fruit, sufficient light is necessary during the ripening stage