Cell wall composition during expansion, ripening and postharvest water loss of red bell peppers (*Capsicum annuum* L.)

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Abstract

We have investigated the cell wall polysaccharides of a commercially grown blocky-type red bell pepper (*Capsicum annuum* L. 'Funky') during on-plant growth and ripening, and after postharvest water loss. There was no evidence of substantial depolymerisation of cell wall pectic polysaccharides or hemicelluloses at any ripening stage. The onset of fruit ripening was accompanied by a slightly increased solubilisation of very high molecular weight polyuronides. Measurable polygalacturonase activity was absent, despite an *endo*-polygalacturonase mRNA being present as fruit turned red. The largest cell wall change was a substantial loss of galactose (primarily from Na_2CO_3-soluble rhamnogalacturonan-I) as green fruit approached full size, which could not be directly correlated with conventionally assayed β-galactosidase/galactanase activities. The majority of β-galactosidase/galactanase gene expression and enzyme activity was found in fully ripe fruit, although by this stage galactose loss was comparatively minimal. This suggests that the upregulation in activity has significance beyond wall rheology, or is vestigial. Severe water-stress applied to harvested ripe fruit did not result in any cell wall changes suggestive of cell wall breakdown, compared with cell walls of fruit stored under high humidity conditions. We conclude that this commercial line of bell pepper, which was bred for intensive glasshouse production, has wall characteristics that result in retention of typical crisp texture and extended postharvest storage life.