Abstract

Fresh-cut melon is a growing and convenient segment of melon products. Melon cultivars were not bred specifically for freshcut processing, and the genetic bases for fresh-cut quality are unknown. We examined the link between quality and cell wall changes and genetics in three fresh-cut near-isogenic lines (NILs) of melon (*Cucumis melo* L.) and in a 'Piel de Sapo' (PS) cultivar during a 6-day storage period at 5 °C. The three NILs differed in initial firmness and differences persisted throughout storage of fresh-cut. One NIL (SC3-5-1) showed climacteric behavior, while the others and the parental line PS were non-climacteric. The climacteric NIL SC3-5-1 was softer and had higher juice efflux than the remaining NILs of the parental line PS. Fresh-cut prepared from NILs SC7-2 and SC10-2 were firmer than SC3-5-1 and PS. Water-soluble pectins (WSP) increased from 34% of total to 65% of total pectins in the climacteric SC3-5-1, but only a moderate increase from 33% to 47% of total in PS. NIL SC7-2 showed no increase in the proportion of WSP during storage and SC10-2 exhibited an increase in WSP similar to that of PS. Chelator-soluble pectins of SC3-5-1 exhibited a marked molecular size downshift during 6-day storage period in SC3-5-1, but no significant differences in molecular size distribution were observed in the other NILs. Apparently two different quantitative trait loci (QTL) with pleiotropic effect were affecting flesh firmness and juice efflux. One QTL located in the linkage group (LG) III increased pectin depolymerisation, which was probably associated with climacteric behavior. Another two QTLs in LG VII and X were associated with initial firmness levels.