

Abstract

Thickness of apple cuticle and cell wall quantity in epidermis region, expressed in percent of image pixels, were measured for three apple cultivars: *Gala* (*Ga*), *Elstar* (*EI*) and *Smoothie* (*Sm*). Cuticle zone (CQ) was thicker for *Sm* with 32%, *EI* and *Ga* had similar CQ with 22% and 19%, respectively. CQ could be linked to limited mass losses during storage: *Sm* showed the most important CQ and less mass losses compared to *Ga* and *EI*. Cell wall quantity (CWQ) allowed classifying the three studied cultivars as following: $Ga > EI > Sm$ with 63%, 59% and 56%, respectively (percent of image pixels). CWQ was also measured on fruits stored 14 and 28 days in cooled room (CR) and 14 days in shelf life (SL). Relations between CWQ and rheological properties of apples, measured by penetrometry, were calculated. CWQ showed highest correlation with strength (F_p) for *Ga* ($R^2=0.77$), stiffness (E^*) and Flesh firmness (F_f) for *EI* with correlation coefficient values of $R^2=0.94$ and $R^2=0.87$, respectively. *Sm* didn't show any correlation.