Abstract

Laser-induced light backscattering imaging was studied regarding its potential for analyzing apple soluble solids content (SSC) and fruit flesh firmness. Images of the backscattering of light on the fruit surface were obtained from 'Elstar' and 'Pinova' apples using laser diodes emitting at five wavelength bands. Image processing algorithms were tested to correct for dissimilar equator and shape of fruit. Particularly the frequencies of gray scale intensities obtained for selected wavelengths were used for the first time to calibrate on the fruit firmness and SSC using partial least squares regression. Calibration with highest performance for predicting 'Elstar' SSC was based on the corrected intensity frequency of raw data set with correlation coefficient of $r = 0.89$ and standard error of cross validation %SECV = 4.14. For evaluating 'Elstar' flesh firmness, corrected frequency gave the highest $r = 0.90$, and %SECV = 5.49. An inter-cultivar test-set validation of the method resulted in SEP < 13% for SSC and firmness prediction.