Abstract

Near-infrared (NIR) measurements of fruit quality are influenced by instrument configuration, fruit growth condition, and postharvest storage condition. The objective of this research was to determine how NIR measurements of soluble solids content (SSC) and firmness were affected by postharvest storage and were related to instrument setting. A low-cost CCD-based visible/NIR spectrometer and an InGaAs-based NIR spectrometer were used in interactance mode for collecting spectra from three groups of 'Golden Delicious' apples with different postharvest conditions (freshly harvest and one and two months in cold storage at 0 °C). Calibration models were developed using the partial least squares method for each group of apples. Model performances were evaluated for within groups and cross groups. The coefficients of determination R^2 (standard errors of validation or SEV) for within-group predictions of SSC were in the range 0.57-0.71(0.67- 0.76%) for the Vis/NIR spectrometer and 0.77-0.85(0.41-0.55%) for the NIR spectrometer. Poor predictions of SSC were obtained (SEV = 0.7-1.4%) with both spectrometers when the calibration model for one group was used to predict other groups (cross-group validation). Excellent firmness predictions (R^2=0.839 and SEV=4.8 N) were obtained for the pooled data with the NIR spectrometer. To ensure accurate and reliable NIR measurement of fruit SSC, calibration samples must be representative of the population of fruit to be measured and different post-storage conditions/times.