Abstract

The relationships between the nondestructive visible and near-infrared (Vis-NIR) measurements and the internal quality indices of pear fruit were established, and the potential of Vis-NIR spectrometry technique was investigated for its ability to nondestructively measure soluble solids content (SSC) and firmness of intact pear fruit. Intact pear fruit were measured by diffuse reflectance Vis-NIR in 350–1800 nm range. In this study, calibration models relating Vis-NIR spectra to SSC and firmness were developed based on multi-linear regression (MLR), principal component regression (PCR) and partial least squares regression (PLSR) with respect to the logarithms of the reflectance reciprocal $\log(1/R)$, its first derivative $D_1 \log(1/R)$ and second derivative $D_2 \log(1/R)$. The best combination, based on the robust models and the prediction results, was PLSR method with respect to $\log(1/R)$ at equatorial position of pear fruit. The PLSR models for prediction samples resulted correlation coefficient (r_p) of 0.912 and 0.854, and root mean standard error of prediction (RMSEP) of 0.662°Brix and 1.232 N for SSC and firmness, respectively. The results indicate that Vis-NIR spectrometry technique could provide an accurate, reliable and nondestructive method for assessing the internal quality indices of intact pear fruit.