Abstract

The use of near infrared (NIR) spectroscopy was proved to be a useful tool for quality analysis of fruits. A bifurcated fiber type NIR spectrometer, with a detection range of 800～2500 nm by InGaAs detector, was used to evaluate the firmness of peaches. Anisotropy of NIR spectra and firmness of peaches in relation to detecting positions of different parts (including three latitudes and three longitudes) were investigated. Both spectra absorbency and firmness of peach were influenced by longitudes (i, ii, iii) and latitudes (A, B, C). For modeling, two thirds of the samples were used as the calibration set and the remaining one third were used as the validation or prediction set. Partial least square regression (PLSR) models for different longitude and latitude spectra and for the whole fruit show that collecting several NIR spectra from different longitudes and latitudes of a fruit for NIR calibration modeling can improve the modeling performance. In addition, proper spectra pretreatments like scattering correction or derivative also can enhance the modeling performance. The best results obtained in this study were from the holistic model with multiplicative scattering correction (MSC) pretreatment, with correlation coefficient of cross-validation r_{cv}=0.864, root mean square error of cross-validation $RMSECV$=6.71 N, correlation coefficient of calibration r = 0.948, root mean square error of calibration $RMSEC$=4.21 N and root mean square error of prediction $RMSEP$ = 5.42 N. The results of this study are useful for further research and application that when applying NIR spectroscopy for objectives with anisotropic differences, spectra and quality indices are necessarily measured from several parts of each object to improve the modeling performance.

http://www.springerlink.com/content/4w732267765t442p/fulltext.pdf