

Title Nondestructive evaluation of jujube quality by visible and near-infrared spectroscopy
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Abstract

This study compared prediction ability of interactance, transmission measurements of visible and near-infrared (Vis/NIR) spectroscopy in detecting the soluble solids content (SSC) of jujubes. Calibration models relating Vis/NIR spectra to SSC were developed based on partial least squares regression (PLSR) with respect to the logarithms of the reciprocal absorbance ($\log(1/R)$), its first and second derivatives ($D_1\log(1/R)$, $D_2\log(1/R)$). The PLSR models for prediction samples resulted correlation coefficients (r_p) of 0.74–0.91 and root mean square error of prediction (RMSEP) of 2.018–3.200 °Brix for interactance; r_p of 0.63–0.73 and RMSEP of 3.517–3.863 °Brix for transmission, respectively. The results indicate that interactance displays an obvious advantage over transmission measurement.

The reflectance measurement was used to access the discrimination potential in sorting external insect-infested jujubes from intact class. Stepwise discriminant analysis (SDA) was performed to identify the effective wavelengths that best discriminated the insect-infested jujubes from intact jujubes and to derive a discriminant function in classifying the jujubes showing external infestation and those that were free of infestation. The results showed that $\log(1/R)$ had better correct classification rate than $D_1\log(1/R)$, and $D_2\log(1/R)$ for classifying intact, insect-infested and stem-end classes.