

**Title** Nondestructive measurement of soluble solid content of navel orange fruit by visible–NIR spectrometric technique with PLSR and PCA-BPNN

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#### **Abstract**

A relationship was established between the soluble solid content (SSC) of navel orange fruit determined by destructive measurement and visible–near infrared diffuse reflectance spectra in the wavelength range of 350–1800 nm. Multiplicative scatter correction (MSC) and standard normal variate correction (SNV) were applied to the spectra, partial least squares regression (PLSR) and back propagation neural network (BPNN) based on principal component analysis (PCA) were used to develop the models for predicting the SSC of intact navel orange fruit. Thirty-eight unknown samples were used to evaluate the performance of these models. The principal component analysis-back propagation (PCA-BPNN) method with MSC spectral pretreatment obtain the best predictive results, resulting in correlation coefficient, root mean square error of prediction (RMSEP), average difference between predicted and measured values (Bias) of 0.90, 0.68 °Brix and 0.16 °Brix, respectively. Experimental results indicate that PCA-BPNN is a suitable tool to model the non-linear complex system, with additional advantages over PLSR, and the vis/NIR spectrometric technique can be used for measuring the SSC of intact navel orange fruit, nondestructively.