

Prasan Laosubchareon 2009: Empirical Study of Using the Peel Spectra Information for Improving the Internal Quality Evaluation of Orange and Mango Using Near Infrared Spectroscopy. Master of Engineering (Food Engineering), Major Field: Food Engineering, Department of Food Engineering. Thesis Advisor: Associate Professor Anupun Terdwongworakul, Ph.D. 168 pages.

This research studies an accuracy in predicting internal quality of *Sai Num Pueng* oranges and *Num Dok Mai* mangoes using Near Infrared Spectroscopy (NIRS) in the short wavelength region (SWNIR) of 609 to 1066 nm and long wavelength region (LWNIR) of 1100 to 2500 nm. In the study, for each fruit, a sample of 51 fruits for each intact sample, the diffuse reflectance and the interactance were measured at LWNIR and SWNIR, respectively. juice was then used to measure soluble solids content and total acidity. The spectra were pretreated with either Multiplicative Scatter Correction (MSC) or Second Derivative (2D) prior to analyses Principle Component Regression (PCR) and Partial Least Squares Regression (PLSR) were used to analyze the spectra to create calibration models.

The study showed that prediction of total acidity of Sai Num Pueng oranges gave the lowest accuracy in LWNIR. Partial Least Squares Discriminant Analysis (PLS-DA) was performed to determine the appropriate wave bands relating to the peel Original. The obtained wave bands were then used to normalize the intact orange spectra. The results suggested that dividing or subtracting total original with original at 1128 nm improved the accuracy performance of the calibration model. The prediction accuracy of the total acidity was better with the standard error of prediction (SEP) of 0.153 using the original spectra against 0.101 using normalized spectra respectively. The SEP was significantly lowered at 95 percent confident interval.

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Thesis Advisor's signature

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