

Dollaphon Chananiramitphon 2012: Rapid Nutrition Assessment in Guava by Near Infrared Spectroscopy. Master of Engineering (Food Engineering), Major Field: Food Engineering, Department of Food Engineering. Thesis Advisor: Assistant Professor Ronnarit Rittiron, Ph.D. 148 pages.

The objective of this research was to develop a system for nutrition assessment of guava fruit by Near Infrared Spectroscopy (NIRs). Sixty-eight cultivars of guava were used as samples. There were two systems developed. The first system was developed for rapid and nondestructive analysis. The qualities considered were total soluble solids (TSS), total phenolics, catechin and vitamin C contents. The spectra of intact guava were measured by portable NIR spectrometer in the wavelength region of 700-1100 nm in interactance mode and FT-NIR spectrometer in the region of 900-2500 nm in reflectance mode. Then, the values of nutrition were measured by digital refractometer, Folin Ciocalteu-based, High performance liquid chromatography (HPLC) and titration methods, respectively. Multiple linear regression (MLR) and partial least square (PLS) regression were used to develop calibration equation. From the results, the calibration equation by MLR and PLS could be used for rapid prediction and nondestructive determination of values of nutrition.

Second system was developed for highly accurate analysis. The qualities considered were TSS and total phenolics contents. The spectra of guava juice were acquired by FT-NIR spectrometer in the region of 900-2500 nm with a specially designed sample cell for solution in transfectance mode. Then, TSS and total phenolics contents of guava juice were measured by digital refractometer and Folin Ciocalteu-based methods, respectively. PLS regression was used to develop calibration equation. The developed system gave very high accuracy with a correlation coefficient R of 0.99, root mean square error of prediction (RMSEP) of 0.22 %Brix and bias of 0.05 %Brix for TSS content and R of 0.92, RMSEP of 2.63 mg/100g and bias of -0.05 mg/100g for total phenolics content.

Using the paired t-test for all developed calibration equations, there was not significant difference between NIR predicted values and actual values analyzed by standard methods at 95% confidence.

Student's signature

Thesis Advisor's signature