

Estimation of Harumanis (*Mangifera indica* L.) Sweetness using Near-Infrared (NIR) Spectroscopy

Abstract

Harumanis mango quality demanded by consumers is depending on the sweetness level of the fruit. The sweetness is evaluated by brix percentage using refractometer as a representative factor correlated with near-infrared (NIR) spectroscopy spectral absorbance. NIR spectroscopy method of sampling have been tested to overcome the time consuming, complex chemical analysis more importantly invasive sampling methods in order to determine the sugar content in mangoes. Spectral absorbance data from range 941 nm to 1685 nm of mango skin is correlated with Brix reading then tested through five pre-processing techniques. Data calibration and prediction of both data is evaluated using Partial Least Square Regression (PLSR) model. In the final analysis, Unit vector normalization (UVN) technique has achieved as a best pre-processing technique for predicting results, with the coefficient of determination (R^2) values of 0.9836 and root mean square error (RMSE) values of 0.3131. Overall, the correlation of NIRS absorbance data and Brix data can be obtained using PLSR model with UVN pre-processing technique. Henceforth, we can conclude that the NIRS method of sampling can be used to identify sugar content in Harumanis mango by using time saving, non-invasive and less laborious method of sampling.

Keywords

Crack growth; Fracture; Life prediction; Rice husk/polypropylene