Non-destructive detection of internal mold infection in sweet tamarind using short wavelength near infrared spectroscopy

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Abstract

Internal quality of sweet tamarind ('Prakaytong') is an essential commercial attribute. Determination of internal mold cannot be done by visual inspection on the outside of an intact tamarind. Therefore, a non-destructive measurement and data evaluation technique were considered using short wavelength near infrared (SW-NIR) transmittance spectroscopy in order to detect internal mold infection in sweet tamarind. A set of 176 tamarind samples (a calibration set = 124 and a prediction set = 52) were used in this research. Spectra in the region of 665-955 nm were acquired from scanning the center of each seed pod. The averaged spectral reading was used for partial least squares-discriminant analysis (PLS-DA) to establish a classification model for tamarind quality between groups of normal and defected samples. The calibration model obtained optimal result by cross validation using second derivative spectral pretreatment. The classification accuracy on the calibration set was 86.3% (58 out of 62 for the normal samples and 49 out of 62 for the defected samples) and on the prediction set was 84.6% (26 out of 26 for the normal samples and 18 out of 26 for the defected samples). The results showed that SW-NIR transmittance spectroscopy can be used to non-destructively detect internal mold infection in intact sweet tamarind.