

Nondestructive prediction of internal browning in pineapple using transmittance short wavelength near infrared spectroscopy

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Abstract

Pineapple [*Ananas comosus* (L.) Merr.] is one of the most important commercial fruit of Thailand. The taste and consistency of the fruit is of great importance, however “internal browning”, a common physiological disorder affecting the fruit, which cannot be identified by visual inspection, makes the product unacceptable for export. In this study, Near Infrared (NIR) spectroscopy in the range of 665-955 nm was investigated as a non-destructive means to identify internal browning. Partial least squares-discriminant analysis (PLS-DA) was used in conjunction with the pre-treated NIR spectra as a first step in the development of an automated method of pineapple fruit sorting. A set of 243 samples was used for this research (131 commercially acceptable pineapples and 112 pineapples suffering from internal browning). A sample of 145 fruits was used for a training set and 98 samples for a test set. The smoothing and the first derivative pretreatment of averaged spectra were performed to obtain the best calibration model. The overall classification accuracy of the PLS-DA/NIR model on the prediction set was 90.8% (47 out of 53 for the sound pineapples and 42 out of 45 for the internally browned pineapples). This study demonstrates that NIR transmittance spectroscopy is potentially a useful nondestructive method that can be used to predict internal browning disorder in intact pineapples.