Research Title   Statistical Analysis of Sugar Content in Pineapple Fruit

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Abstract

The objective of this research is set up an equation for predicting the sugar content in pineapple flesh from the measurement of light absorption at the wavelength in NIR region of which the fruit is nondestructive. In addition, relation between the sugar content in pineapple flesh predicted from equation derived from NIR data and the sugar content obtained from chemical method will be correlated, and derived equation will be applied in screening the pineapple of various qualities through the use of the reflectance (R_λ) data which is transformed to the absorbancy. This research distributed 120 data and randomized 60 data to analyze by SPSS program, then 60 data left were used to compare sugar content obtained from this assumption with the prediction results as following.

Equation from Principal Component Regression (PCR) method is

$$TSS = 12.884 - 1.555*fac3 - 0.710 + *fac6 + 0.563*fac4 + 0.419*fac8 - 0.812*fac1fac8$$

when   TSS is sugar content or total soluble solid.

$$fac1 = 0.011*Z_{800} + 0.011*Z_{805} + 0.011*Z_{810} + 0.011*Z_{815}\ldots + 0.011*Z_{1250}$$

$$fac3 = 0.678*Z_{800} + 0.630*Z_{805} + 0.585*Z_{810} + 0.532*Z_{815}\ldots + 0.178*Z_{1250}$$

$$fac4 = -3.244*Z_{800} -2.657*Z_{805} -2.328*Z_{810} -1.736*Z_{815}...+ 1.071*Z_{1250}$$

$$fac6 = 0.271*Z_{800} + 0.272*Z_{805}+ -0.567*Z_{810}+ 0.324*Z_{815}...+ 0.269*Z_{1250}$$

$$fac8 = 0.011*Z_{800}+ 0.011*Z_{805}+ 0.011*Z_{810}+ 0.011*Z_{815}...+ 0.011*Z_{1250}$$

Z_i is standard score of variable i when i = 800, 805, ... ,1250.

R^2 as 0.912 and standard error of estimation as 1.0456.

Equation from multiple linear regression is

$$TSS = 12.838 - 84.120*d(A800) + 76.164*d(A820) + 41.705*d(A950) - 32.159*d(A995)$$

when A_i is the drawing value at the wavelength i

$d(A_\lambda)$ is differences $A_i - A_{i-1}$ of absorbance value at the wavelength λ

R^2 as 0.935 and standard error of estimation as 1.3534.

* is a multiplication sign.