PREDICTING OF SOLUBLE SOLIDS CONCENTRATION AND ACID ASCORBIC IN NON-DESTRUCTIVE JACKFRUIT VAR. TEKAM YELLOW BRONZING DISEASE USING VISIBLE NEAR INFRARED SPECTROSCOPY

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Jackfruit (*Artocarpus heterophyllus* Lam) industry in Malaysia is currently under threat with a disease named "jackfruit-bronzing". It is caused by *Pantoea stewartii* subsp. *stewartii* where the affected pulp and rag shows yellowish-orange to reddish discoloration. However, the rind does not have any symptom of infection. Jackfruit cultivar Tekam Yellow is prone to this disease and it causes huge postharvest losses to the industry. Therefore, a study to predict the internal bronzing by using visible near infrared spectroscopy (Vis-NIRS), a non-destructive technique was carried out. The spectral measurements were performed on the rind of 10, 12 and 14 weeks after anthesis (WAA) jackfruit. The rind was then divided into 30 portions and Vis-NIRS with an optical resolution of 0.50 nm worked in the wavelength region ranging from 200 to 1100 nm was used to scan the fruit. The effective wavelength between 500 and 950 nm was selected in this study. The shortwave near infrared spectroscopy (SWNIRS) based partial least square regression model analysis was applied to the flesh of soluble solids concentration (SSC) and ascorbic acid (AA) jackfruit using pretreatment with smoothing Savitzky-Golay + standard normal variate or multiple scattering correction. The highest coefficient of prediction determination, Rp^2 value of flesh bronzing SSC and AA in 10-, 12- and 14-WAA were obtained when the raw data were treated Rp^2 value of 0.94, 0.94, 0.97, 0.99, 0.99, 0.96 and the values of root-square-square error prediction (RMSEP) were 1.29%SSC, 1.56%SSC, 1.71%SSC, 1.58%mg/100g, 1.33% mg/100g, 0.71% mg/100g and coefficient of calibration determination, Rc^2 value of 0.94, 0.94, 0.97, 0.99, 0.95, 0.96 and the root-mean-square error calibration (RMSEC) were 1.26%SSC, 1.50%SSC, 1.67%SSC, 1.59%mg/100g, 1.32%mg/100g and 0.72% mg/100g respectively. The flesh of SSC and AA were also measured in destructive methods. ANOVA and mean comparisons were analysed using FPLSD at $p \leq 0.05$. The mean comparison of flesh SSC and AA in 10-, 12-, 14-weeks WAA were obtained with 4.38%SSC, 9.09%SSC, 10.01%SSC, 18.98mg/100g FW, 19.95mg/100g FW and 12.23mg/100g FW respectively. As a promising alternative, the performance of SWNIRS in Vis-NIR device can be used to predict the fruit bronzing through the spectrum of wavelength.

Keywords: jackfruit, Pantoea stewartii, shortwave near infrared spectroscopy (SWNIRS), predicting, non-destructive