Article: Near infrared (NIR) spectroscopy for estimating the chemical composition of Acacia (Acacia mangium Willd.)

Abstract. Research on wood technological properties using near infrared (NIR) spectroscopy has shown promising results. The aim of this study was to evaluate the efficiency of NIR spectroscopy for estimating chemical properties of mangium wood (Acacia mangium). NIR spectra were obtained from 150 wood meal samples of mangium trees that were 5–7-years-old. A multivariate data analysis method of partial least squares was used to develop calibration regression models for predicting chemical properties based on NIR spectra. The results showed a good relationship between values derived from laboratory analyses and those predicted by NIR spectroscopy for a-cellulose and hemicellulose content. The calibration models had high values for the coefficient of determination ($R^2 > 0.80$) and the ratio of performance to deviation ($RPD > 2.0$). Meanwhile, lignin and extractive content were poorly predicted; calibration validation revealed $R^2 < 0.60$ and $RPD = 1.0$. This study indicated that NIR spectroscopy analysis on wood meal of A. mangium could be reliably used to predict a-cellulose and hemicellulose.

Keywords: Near infrared (NIR), Acacia mangium, Wood meal, Partial least squares (PLS)

Reference: