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## NIRS Prediction of Neutral Detergent Fiber Digestibility (NDFD) of Tropical Forages

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### Abstract

Near infrared reflectance spectroscopy (NIRS) is a method to obtain rapidly information on plant compounds at low cost. It is environmentally friendly as it avoids the use of chemical reagents for analysis. Neutral detergent fiber digestibility (NDFD) is used to estimate energy content of feedstuffs and also as an important criterion in forage breeding. Thus the aim of this work was to develop a NIRS calibration equation for NDFD of tropical forages as a necessary step towards a quick tool for decision making in breeding and in diet formulation to increase productivity on farm. The study was conducted with 238 forage samples (154 grasses and 84 legumes, of which 42 were herbaceous and 42 shrubs). Different plant parts were collected with different cutting ages, vegetative stage and from varying localities forming a group with a high heterogeneity (CV of 36.63%). They were then scanned and subject to standard laboratory analysis. The groups were analysed by the mathematical treatment 2,4,4,1, complete wavelength, and the mathematical model MPLS (Modified Partial Least Squares). The results of the equation shows an  $R^2$  of 0.95, error of 2.1, 3.2 and 3.6, for standard error of the calibration (SEC), standard error of cross validation (SECV) and standard error for prediction (SEPcalibration) and the RPD (ratio of performance deviation) of 4.4 meaning a high predictive ability. This is associated with a correlation coefficient of 0.96 with a  $P < .0001$  and confidence interval of  $mbox{95\%}$ . Validation of the equation was conducted with a total of 40 external forage samples (grasses and legumes) showing a SEPvalidation calibration of 4.3,  $R^2$  of 0.93, a correlation of 0.96 ( $P < .0001$ ) with a 95% confidence interval. In conclusion, the study showed that is possible to obtain a calibration curve for NDFD to predict this trait with high accuracy and reliability for tropical forages, which facilitates decision making by breeders and farmers in suitable time frames.

**Keywords:** Calibration, neutral detergent fiber digestibility, NIRS, prediction, tropical forages