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“Filling gaps and removing traps
for sustainable resource management”

Comparison of NIRS and Wet Chemistry Methods for Analysing Nutritional Value of Indonesian Local Feedstuffs

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Abstract

Near Infrared Spectroscopy (NIRS) instrument use for feed analysis is increasingly popular due to its fast, low cost, non-destructive, and no requirements for solvents or reagents. As the used database was developed based on feedstuffs from temperate zones, its utilisation for tropical feedstuffs need to be calibrated. The aim of this study was to compare results of NIRS feed analysis with the result from conventional wet chemistry (CWC) methods. Five types (Napier grass, natural grass, corn leaves, corn husk and rice straw) of mainly used forages in dairy cattle in Indonesia were used in this study. The forages were collected from 5 different dairy cattle production areas. From each area, forage from 4 different farms was collected. In total, 100 forage samples were analysed both using NIRS and CWC to measure proximate compositions (dry matter (DM), ash, crude protein (CP), crude fiber (CF), crude lipid (XL)), and Van Soest cell wall contents (neutral detergent fiber (NDF), acid detergent fiber (ADF) and acid detergent lignin (ADL)). The results showed that proximate analyses (DM, ash, CP, CF, XL parameters) were significantly lower when using CWC method than NIRS. While NDF and ADF parameters were higher when using NIRS than CWC. Correlation between the methods was low especially for water content ($r = 0.413$). Therefore, estimation of tropical chemical compositions using NIRS temperate feedstuffs database were biased. Calibration using local database improved the correlation ($r > 0.80$). Validation NIRS based on local data base were also resulted in better result. It is concluded that utilisation of NIRS for analysing tropical forage need to be calibrated with local feedstuffs wet chemistry analysis data.

Keywords: Local forage, NIRS, proximate composition, Van Soest, wet chemistry