Galoá

Book of Abstracts

DETERMINATION OF CORN METABOLIZABLE ENERGY FOR BROILERS THROUGH NEAR INFRARED SPECTROSCOPY (NIR)

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Track

8. Agriculture and food

Maize is the main energy source for broilers and comprises more than 60% of the diets, accounting for approximately 50% of the production cost. Due to seed genetic factors, environmental effects and post-harvest processing, the nutritional value of corn may vary widely. Despite this, the matrix of feed formulation still uses a single average value of metabolizable energy (AMEn), for any corn batch, and this happens due to the high cost and time delays that limit the determination of AMEn through the "in vivo" methodology concomitantly with the formulation of diets. For consolidation of the energy nutrition accuracy it is necessary to establish a methodology that enables the determination of the value of AMEn, specific to each corn batch in real time with the diet formulation. This work was carried out in order to develop and validate a rapid methodology by spectroscopy technology in the near infrared (NIR), to predict the AMEn value of corn for broilers. Fourteen corn grain batches were purchased commercially and processed using a hammer mill with sieves of different hole openings: 1.5; 1.8; 3.0; 4.5 and 8.0 mm, except for five batches for which the sieve with 1.5 mm holes were not used, totaling 65 samples of ground corn. Besides the determination of AMEn values for broilers by "in vivo" methodology with total excreta collection, the spectra for 65 samples were obtained by reading them in NIR equipment. The AMEn results measured “in vivo” were correlated with their spectra obtained at NIR. Forty six samples of ground corn out of sixty five were used to establish the calibration equation, and the remaining nineten samples were used for external validation of the equation. The spectra were obtained in 6500 NIRSystems equipment (FOSS NIRSystems, Silver Spring, MD), the equation was generated with the software WinISI III (Infrasoft International LLC, Silver Spring, MD, USA) using the template of Principal Component Analysis (PCA) for selecting samples, and the statistical model

(Modified Partial Least Squares) was used for the calculation of the calibration equation. SNV & Detrend model was used for pre-processing of data, and the mathematical treatment was performed with 1,4,4,1 model for the first derivative, gap, smooth and smooth2. The equation was generated for spectra obtained by diffuse reflectance in the wavelength range 1100 to 2500 nm. The statistical parameters for the calibration equation: R2 = 0.86, SEC = 33, VR-1 = 0.52, and validation of this equation: R2 = 0.75, SEP = 45, bias = -3.17, although indicate a reasonable accuracy, suggest the need for continuing this line of study expanding the sample universe, so to improve calibration accuracy, for a more robust practical use of this methodology.