Metabolism and Nutrition–Amino Acids

333P Do we properly formulate pelleted rations for broiler chickens? F. C. Tavernari*[1], G. J. M. M. Lima[1], V. R. S. M. Barros[2], R. C. Maia[2], and L. F. T. Albino[2], [1]*Embrapa Swine and Poultry, Concordia, Santa Catarina, Brazil,* [2]*Federal University of Viçosa, Viçosa, Minas Gerais, Brazil.*

Most diets for broilers are pelleted in Brazil. However, knowledge about feed ingredients and nutritional requirements are still obtained using mash diets. Therefore, the objective of this research was to evaluate amino acid digestibility and apparent metabolizable energy (AME) of a diet, both mash and pelleted, for male broilers (COBB-500) in the initial (8 to 21 d) and finishing (22 to 42 d) phases. In the first trial, AME determination was performed by total excreta collection (12 to 16 and 30 to 34 d of age) with 2 treatments (mash or pelleted diets, based on corn and soybean meal) and 30 6 replicates with 10 birds per treatment. In the second trial, amino acid apparent digestibility coefficients (AADC) were determined after slaughtering and ileal digesta collection on d 14 and 32, in 6 replicates of 4 birds per treatment each time. Both trials were in RCB design and F test was used. In the initial phase, pelleted diet AME was higher ($P < 0.01$) on dry matter basis (DM) than mash diet AME (3,384 and 3,352 kcal/kg), but there were no differences ($P > 0.05$) in the finishing phase (3,515 and 3,513 kcal/kg). Pelleted diet AME were lower ($P < 0.01$) than mash diets in as-fed basis in both phases. This can be explained by the decrease in DM with the use of steamed heat during pelleting. Higher ($P < 0.05$) AADC were observed for all amino acids evaluated, except cystine and tyrosine, in pelleted rations in the initial phase, either in DM or as-fed basis. On the other hand, there were no differences ($P > 0.05$) in AADC between the 2 diet forms, both in DM and as-fed basis during the second phase, except for tyrosine. Differences between phases may be partially explained by the development of the gastrointestinal tract with age. Therefore, pelleted diets show better AADC and AME for young broilers and it is necessary to correct nutritional values during feed formulation when feeds are pelleted, especially due to differences between DM and as-fed basis.

Key Words: pellet, mash, broiler, amino acid, metabolizable energy

334P Assessment of metabolizable energy and amino acid digestibility of cottonseed meal on Lohmann hens by NIRS. M. D. Hui[1], G. Jia*[1,2], K. Y. Zhang[1], X. M. Ding[1], A. Sarsour[2], and E. O. Oviedo-Rondón[2], [1]*Animal Nutrition Institute of Sichuan Agricultural University, Sichuan, Ya'an, China,* [2]*North Carolina State University, Raleigh, NC.*

Near-infrared spectroscopy (NIRS) can minimize cost and reduce time to estimate nutrient values. One experiment was conducted using laying hens to determine ME and total-tract apparent amino acid digestibility (TAAAD) of 30 different sources of cotton meals (CSM). Additionally, the NIRS calibrations were established to predict ME and TAAAD of CSM for layer feeds. The experiment was conducted using the substitution method and total excreta collection. A completely randomized design was used with a total of 248 Lohmann laying hens (40 wk old) with initial BW of 1.71 ± 0.12 kg. Hens were divided into 31 treatments with 8 replicates each. Hens were housed individually in metabolic cages. The control diet consisted of a corn-soybean meal diet and the 30 test diets were supplemented with 30 different CSM sources at a concentration of 200 g/kg. After 7 d of dietary adaption, excreta was collected 3 times a day and lasted for 4 d, freeze-dried, and analyzed for dry matter (DM), nitrogen, gross energy, and amino acids. The ME and TAAAD were calculated using the general procedure and a predictive model was built using NIRS readings. Results of the experiment showed no significant effects of treatments on laying rate (89.30 ± 0.06%) and egg quality. The average ME of the 30 sources of CSM was 3,129 ± 459 kcal/kg DM, ranging from 2,290 kcal/kg to 3,562 kcal/kg. The TAAAD was 92 ± 2%, ranging from 86.2% to 94.7%. The prediction equations estimated to calibrate NIRS for ME and TAAAD had R^2 of 0.98, 0.95, and 0.91 for AME, CP and TAAAD, respectively. The R^2 for essential TAAAD such as threonine, isoleucine, leucine, phenylalanine, histidine, and arginine were 0.96, 0.98, 0.99, 0.99, 0.99 and 0.98, respectively. The R^2 of the models for lysine and total sulfur amino acids were lower than 0.50 and not used for predictions. The ME and TAAAD of the 30 sources of CSM for laying hens were significantly different. NIRS can be used to establish accurate prediction models to rapidly estimate ME and TAAAD of CSM from different sources to be used in layer diets.

Key Words: cottonseed meal, laying hens, ME, amino acid digestibility, NIRS

335P Improved prediction of amino acids digestibility and metabolizable energy content in soybean meal and full-fat soybean for broilers. S. F. Castro[1], A. G. Bertechini*[1], L. V. Teixeira[1], H. Mazzuco[2], and B. G. Amorin[1], [1]*Universidade Federal de Lavras, Lavras, MG, Brazil,* [2]*EMBRAPA, Concordia, SC, Brazil.*

This study evaluated if a modification method for energy and AA digestibility analysis can predict more accurately apparent metabolizable energy (AME), nitrogen-corrected apparent metabolizable energy (AMEn), apparent ileal digestible energy (AIDE) and apparent ileal AA digestibility (AIAAD) for all AA values of soybean meal and full-fat soybean (toasted and ground) for broilers. Two experiments run with a total 256 birds each, being 160 birds with 14 to 21d of age, and 96 birds with 35 to 42d of age, testing the ingredients. The test ingredients were measured by total excreta and ileal digesta collection and replaced in 30% a corn-soybean meal basal diet including nutritional adjustments to energy, Ca, P, Na, vitamins and microminerals of soybean meal diet and, to Ca, P, Na, DL-Met (99%), vitamins and microminerals of full-fat soybean diet. Celite marker was used for ileal digestibility. Birds were randomly allocated in a 2 × 2 factorial scheme (age vs. method), 8 replicates and 5 or 3 birds/replicate. No significant differences ($P > 0.05$) were found on age by method interaction. Higher values ($P < 0.05$) were observed for evaluations with 42 d of age. Using nutritional adjustments (method), increments ($P < 0.05$) in the following variables were observed at 21 d: AME (2,383 vs. 2,301 kcal/kg), AMEn (2,294 vs. 2,244 kcal/kg), AIDE (3,043 vs. 2,934 kcal/kg), AIAAD (85.93 v 83.44%) for soybean meal, and AME (3,462 vs. 3,371 kcal/kg); AMEn (3,323 vs. 3,236 kcal/kg); AIAAD (89.35 vs. 86.36%) for full-fat soybean, and for 42d: AME (2,378 vs. 2,306 kcal/kg), AMEn (2,306 vs. 2,232 kcal/kg), AIDE (3,079 vs. 2,935 kcal/kg) and AIAAD (86.00 vs. 83.37%) of soybean meal and for full-fat soybean, AME (3,481 vs. 3,376 kcal/kg), AMEn (3,306 vs. 3,251 kcal/kg), AIDE (4,069 vs. 3,868 kcal/kg) and AIAAD (88.66 vs. 87.05%). The nutritional adjustments during the measurement of energy and AA digestibility provide more suitable values to be applied in practical formulation diets for the broilers industry.

Key Words: ileal digestibility, AMEn, practical formulation