

Metabolism and Nutrition: Nutrition I

154 Inclusion of Na-butyrate in diets based on corn or wheat: Effects on growth performance and nutrient retention in broilers from 1 to 40 d of age. L. Cámara^{1,2}, M. V. Kimiaetalab¹, I. Solís¹, B. Saldaña¹, A. Ortiz³, and G. G. Mateos^{*1,2}, ¹Departamento de Producción Agraria, Universidad Politécnica de Madrid, Madrid, Spain, ²CEI Campus Moncloa, UCM-UPM, Madrid, Spain, ³Nutega, S. L., Madrid, Spain.

The effects of inclusion of 0.1% of a chemically protected Na-butyrate (Butirex C4, Nutega, S. A.) in the diet on growth performance and total-tract apparent retention (TTAR) of broilers were studied. There were 8 treatments arranged as a 2 × 2 × 2 factorial with 2 sources of cereal (wheat and corn), 2 AMEn content of diets [high energy (HE) and low energy (LE) differing in 60 kcal AMEn/kg], and 2 levels of protected Na-butyrate (0 vs. 0.1%). Each treatment was replicated 4 times and the experimental unit was a pen with 25 broilers. The experiment consisted in 3 feeding phases (starter, grower, and finisher). For the entire experimental period (0 to 40 d), feed conversion ratio (FCR) was better in broilers fed the corn diet ($P < 0.05$) than in broilers fed the wheat diet and for broilers fed the HE diets ($P \leq 0.01$) than for broilers fed the LE diets. Also, the inclusion of Na-butyrate tended to increase ADFI ($P = 0.09$) in this period. From 0 to 20 d of age, broilers fed the corn diet ate less feed and had better FCR than broilers fed the wheat diet ($P < 0.001$). Chicks fed the low energy diets had proportionally greater ADFI (5.9%) and worse FCR (5.3%) than broilers fed the HE diet ($P < 0.001$). Also in this period, the inclusion of Na-butyrate increased ADG by 8.6% and ADFI by 4.8% and improved FCR by 3.6% ($P < 0.001$). The TTAR of DM, OM, and N ($P < 0.01$) and the AMEn of the diet ($P < 0.001$) were higher in broilers fed corn than in broilers fed wheat. The AMEn of the diet tended to increase with the inclusion of Na-butyrate ($P = 0.09$). In summary, the use of corn and an increase in energy content of the diet improved FCR from 0 to 40 d of age. The supplementation with Na-butyrate improved ADG and FCR at 20 d of age, irrespective of the main cereal and energy content of the diet.

Key Words: broiler, cereal, growth performance, Na-butyrate

155 Effect of dietary sunflower hulls on nutrient digestibility, ileal morphology, and volatile fatty acid concentration in broilers and pullets fed a broiler diet from 1 to 21 days of age. M. V. Kimiaetalab¹, L. Cámara¹, E. Jiménez-Moreno², S. Mirzaie Goudarzi³, H. A. Mandalawi¹, and G. G. Mateos^{*1}, ¹Producción Agraria, Universidad Politécnica de Madrid, Madrid, Spain, ²Cargill Animal Nutrition, Zaragoza, Spain, ³Department of Animal Science, Buali Sina University, Hamedan, Iran.

The effects of sunflower hulls (SFH) inclusion on performance, TTAR of nutrients, ileal mucosa morphology, and volatile fatty acid (VFA) concentration in the ceca were studied in birds from 1 to 21 d of age. There were 4 treatments organized as 2 × 2 factorial with 2 chicken lines (broilers vs. pullets) and 2 levels of SFH (0 vs. 3%). Each treatment was replicated 7 times (10 birds). The corn-soybean meal control diet contained 3,010 kcal AMEn/kg, 1.25% digestible Lys, and 8.7% NDF. In the experimental diet, SFH was included at the expense (wt:wt) of the control diet. Diets were offered in mash form. No interactions between main effects were detected for any trait. From 1 to 21 d of age, ADG was greater and FCR was better in broilers than in pullets ($P < 0.001$) but SFH inclusion did not affect bird performance. The TTAR of all nutrients was higher ($P < 0.05$) in broilers than in pullets. The inclusion of SFH improved AMEn of the diet ($P < 0.05$) at both ages and DM and N retention ($P < 0.001$) at 21 d. Broilers had larger villus and deeper crypt ($P < 0.01$) than pullets. Broilers tended to have higher ($P = 0.077$) cecal proportion of acetate than pullets but no effects were observed for the other VFA. SFH inclusion tended to increased villus height ($P < 0.05$) and cecal proportion of acetate and propionate (P

< 0.01). In summary, broilers grew faster, were more efficient, had higher ileum absorptive capacity, TTAR of nutrients than pullets. The inclusion of 3% SFH in substitution (wt:wt) of the whole diet improved AMEn without showing any negative effect on growth performance of the birds.

Key Words: ileal morphology, insoluble fiber, total-tract apparent retention, volatile fatty acid

156 The effect of poultry litter biochar on pellet quality, 1- to 21-d broiler performance, digesta viscosity, bone mineralization, and apparent ileal amino acid digestibility. Ashley M. Evans* and Joseph S. Moritz, West Virginia University, Morgantown, WV.

Feeding poultry litter biochar (PLB), a result of litter gasification, could decrease diet cost, enhance growth performance, and decrease land application of manure, contributing to the continued success of poultry production. Past research revealed improved pellet quality with dietary inclusion of PLB; however, broiler performance was decreased due to potential digesta viscosity challenges and heavy metal adulteration. The objective of the current study was to assess a low arsenic PLB on descriptive feed manufacture, broiler performance, digesta viscosity, bone mineralization, and apparent ileal amino acid digestibility (AIAAD). Treatments were arranged in a 4 × 2 factorial in a randomized complete block design with 8 replications per treatment. The 4 dietary treatments consisted of positive control (PC) formulated to 0.45% non-phytate phosphorus (nPP), negative control formulated to 0.23% nPP, and 2 or 4% PLB formulated to 0.45% nPP. Phytase either was withheld or included. Contrasts comparing PC ± phytase, and 2 or 4% PLB ± phytase, were also conducted. Diets were pelleted and ground before feeding. Diets containing PLB, regardless of phytase inclusion, demonstrated numerical improvement in pellet quality. Birds fed 2 or 4% PLB demonstrated increased tibia ash mg/g of gain compared with PC ($P < 0.0001$). Birds fed 2% PLB demonstrated greater AIAAD for all analyzed amino acids compared with PC ($P < 0.05$) and birds fed 4% PLB resulted in greater cysteine and methionine digestibility compared with PC ($P < 0.05$). Birds fed 2% PLB with phytase were found to be superior to PC with phytase for ending bird weight, live weight gain, and tibia ash mg/bird ($P < 0.0001$). Birds fed 4% PLB with phytase were statistically similar to PC with phytase for all performance metrics. No differences were observed for digesta viscosity ($P > 0.05$). These data demonstrate improved pellet quality and bird performance with diets containing PLB that suggest PLB can partially replace rock phosphorus in diet formulations.

Key Words: poultry litter biochar, rock phosphorus, viscosity, bone mineralization, apparent ileal amino acid digestibility

157 Prevalence of mycotoxins in 2014 US corn samples. Ganapathi R. Murugesan^{*1}, Chasity Pender¹, Ruben Beltran², and Paula Kovalsky³, ¹Biomim America Inc., San Antonio, TX, ²Biomim USA Inc., San Antonio, TX, ³Biomim Holding GmbH, Herzogenburg, Austria.

Understanding the occurrence of mycotoxins in newly harvested corn is of utmost importance because corn is the major ingredient in most feeds. A mycotoxin survey was conducted to determine the prevalence of mycotoxins in the corn crop harvested in 2014 in the United States. A total of 504 corn samples from 27 states were collected and analyzed for aflatoxins (Afla), zearalenone (ZEN), deoxynivalenol (DON), fumonisins (FUM), T-2 toxin (T-2) and ochratoxin A (OTA). 99% of the samples were analyzed using liquid chromatography-tandem mass spectrometry and the rest using high-performance liquid chromatography. Overall, 87% of samples tested were positive for one or more of the major mycotoxins. With a prevalence of 62% and an average value of 1,441 ppb, DON was