tion with diet were evident for calorie conversion from 0 to 42 d. XAP supplementation reduced calorie conversion from 4,889 to 4,787 kcal/kg BW gain in the corn-soy diet, whereas it reduced calorie conversion from 4,993 to 4,753 kcal/kg BW gain in the mixed diet. These results indicate that the effects of XAP supplementation on broiler FCR and calorie conversion were greater in mixed diets compared to corn-soy diets when phytase was included in the background.

Key Words: broiler, diet type, performance, enzyme, corn-DDGS

M13 Live Production and Carcass Characteristics of Broilers Fed a Blend of Poultry Fat and Corn Oil Derived from Distiller’s Dried Grains with Solubles (DDGS) T. E. Kim1, J. L. Purswell2, J. D. Davis3, R. E. Loar, II1, K. Karges4 1ARS-USDA, Poultry Research Unit, Mississippi State, MS, 2USDA-ARS Poultry Research Unit, Mississippi State, MS, 3Department of Agricultural and Bioengineering, Mississippi State University, Mississippi, MS, 4POET Nutrition, Sioux Falls, SD

The objectives of this study were to evaluate the effects of a poultry fat (PF) and a new DDGS-derived corn oil (CO) on live performance and carcass characteristics of 49 d broilers. Four corn-soybean meal based diets were formulated with differing blends of PF and CO and fed to 6 replicate pens of 42 birds each. For each of the 3 feeding phase, all diets contained the same percentage of total fat, but differed in the composition of the fat blends. Diet 1 consisted of 100% PF while portions of fat in Diets 2, 3, and 4 were replaced with 25%, 75%, and 100% CO, respectively. On d 49, birds were processed and carcass, abdominal fat pad, and breast (fillet) weights were determined. For the starter phase (0-18 d), there were no differences (P > 0.05) in BW, BW gain, feed intake (FI) and FCR for birds fed the four treatments. For the grower phase (0-35 d), birds from treatments fed 75:25 (PF:CO), had increased (P < 0.05) BW, BW gain, FI and decreased FCR. Birds fed diets with 0:100 (PF:CO) also saw the same significant increase in BW and BW gain; however, FCR was significantly higher for these birds when compared to the birds fed the 75 (PF:CO) diets. There were no significant differences for the finisher phase (0-48 d) in BW, BW gain, FI, and FCR, but there was a trend where the 75:25 (PF:CO) resulted in an improvement in live production parameters. Pellet quality (PDI) of the grower and finisher pellets were improved with increasing amounts of CO (P < 0.05). On d 49, live weights for birds fed the 100:0 (PF:CO) diets were lower (P < 0.05) versus all other treatments, with a trend for lower carcass and breast weights and increased abdominal fat content. Results indicate that addition of a new DDGS-derived CO may improve broiler performance when blended with PF.

Key Words: Poultry fat, corn oil, broilers

M14 Performance of broiler chickens fed a diet supplemented with Zinc (Zn) sourced from polysaccharide complex Zn (SQM® Zn) or inorganic ZnSO4 at levels of 0, 20, 40, 60, 80 and 100 ppm M. D. Sims1, J. E. Garrett2 Virginia Diversified Research Corp, Harrisonburg VA, 1QualiTech, Inc., Longmont, CO

A 42-day broiler floor pen study was conducted to compare the body weight (BW), feed conversion ratio (FCR), mortality, feed cost/penn (SFD/PEN), and feed cost/lb of body weight gained (SFD/GN) of broilers fed a single diet supplemented with 0, 20, 40, 60, 80 or 100 ppm Zn from zinc sulfate (ZnSO4) or SQM® Zn for a total of 11 treatment groups. Cobb 500 straight-run chicks (2,640) were randomly assigned to 8 pens (30 chicks/pen; 8 pens/treatment). Pens were 1.22 x 1.52 meters, and stocking density was 0.0619 m2 (0.67 ft2) per bird (based on pen dimensions only without considering equipment). The mash type, corn-soy basal diet had 20% crude protein and 3,142 kcal ME/kg. The 42-d BW of 20 ppm ZnSO4 (2.058 kg) and 40 ppm ZnSO4 (2.154 kg) groups were not different (P ≥ 0.05) but both were lower (P < 0.05) than 60 ppm ZnSO4 (2.179 kg) and 80 ppm ZnSO4 (2.29 kg) groups; 100 ppm ZnSO4 (2.201 kg) was not different (P > 0.05) from 40 ppm ZnSO4 but was greater (P < 0.05) than 20 ppm ZnSO4 group. The 42-d BW of 20 ppm SQM® Zn (2.139 kg) was lower (P < 0.05) than all other SQM® Zn groups with the exception of 100 ppm SQM® Zn (2.201 kg), which was not different (P > 0.05) from any of the SQM® Zn groups. Comparisons of BW of broilers fed same Zn levels but different sources 21 and 42 d were not different (P > 0.05) with the exception of the 40 ppm SQM® Zn (2.212 kg) having a greater (P < 0.05) BW than 40 ppm ZnSO4 (2.154 kg). The 21-d FCR of 20 ppm ZnSO4 (1.380) was lower (P < 0.05) than 40 ppm ZnSO4 (1.480). The 42-d FCR of 60 ppm SQM® Zn (1.795) was lower (P < 0.05) than 60 ppm ZnSO4 (1.870). April-May 2011 feed ingredient prices were used. The SFD/PEN of 20 ppm SQM® Zn ($34.440) was higher (P < 0.05) than 20 ppm ZnSO4 ($33.096). The SFD/GN of 60 ppm SQM® Zn ($0.227) was lower (P < 0.05) than 60 ppm ZnSO4 ($0.241). Mortality ranged from 0% to 1.79% by treatment and was unaffected by Zn level or source. It was concluded that BW, FCR, SFD/PEN, SFD/GN, and mortality of broilers fed organic Zn sourced from SQM® Zn, a polysaccharide complex Zn, was equal to or better than comparative results for broilers fed inorganic Zn sourced from ZnSO4. The findings of this observation show that SQM-Zn can be supplemented in broiler feeds at lower levels than inorganic Zn without performance losses making it a cost effective alternative to inorganic Zn.

Key Words: SQM®, ZnSO4, organic, floorpen, broilers

Nutrition I

M15 Effects of phytase and xylanase supplementation on ileal digestibility and growth performance of female broilers from 1 to 32 d of age Curran Gehring1,2, Mike Bedford3, William Dozier, III1 1Auburn University, Auburn, Alabama, 2AB Vista Feed Ingredients, Marlborough, Wiltshire, United Kingdom (Great Britain)

This experiment evaluated the interactive effects of phytase and xylanase supplementation on standardized ileal amino acid digestibility (SIAAD), ileal digestible energy (IDE), and 1 to 25 d growth performance of female broilers. Treatments consisted of a 4 × 4 factorial arrangement of phytase (0, 500, 1,000 and 2,000 U/kg) and xylanase (0, 8,000, 16,000, and 32,000 U/kg) concentrations. One thousand one hundred and fifty two (12 per battery cage; 0.45 m2 per bird) Ross × Ross 708 chicks were randomly distributed to 96 cages (6 replicates per treatment). Experimental diets (enzyme-supplemented corn-soybean meal-based basal diet with 0.50% TiO2) were provided from 1 to 32 d of age. On d 32, digesta from the distal ileum (4 to 30 cm upstream from the ileocecal junction) was collected from 8 birds per cage. Feed and digesta were analyzed for TiO2, amino acid (AA), and gross energy content. No significant (P > 0.05) effects of xylanase were observed on any variables evaluated. Birds responded to phytase with linear (P ≤ 0.03) increases in IDE and digestibility of all AA with the exception of His and Met (P > 0.05). Digestibility of energy and AA were increased (P < 0.05) in birds fed diets with 1,000 but not 500 U/kg phytase. The most prominent increases in SIAAD were observed for Cys (1.1 and 1.5%), Ile (0.8 and 1.0%), Ser (1.0 and 1.2%), and Thr (0.8 and 0.9%) in birds fed diets with 1,000 and 2,000 U/kg phytase, respectively. Birds fed diets supplemented with phytase at 1,000 U/kg exhibited IDE 26 kcal per kg above those fed the basal diet. Linear increases in cumulative BW gain (P < 0.001) by 31 and 51 g per bird were observed with diets having 1,000 and 2,000 U/kg phytase, respectively. Feed intake

Poult. Sci. 91(Suppl. 1)
increased proportionally with no significant \( P > 0.05 \) effects on feed conversion ratio. These results indicated that birds fed diets containing 1,000 U/kg phytase exhibited increased SIAAD and IDE which resulted in increased BW gain.

**Key Words:** phytase, xylanase, ileal digestibility, performance

**M16 Effect of a protease on a commercial carbohydrase when fed to broiler chickens.** 1 B Barash, 1 M Culp, 1 J L Grimes, 1 P E Biggs, 2 J D Garlich, 1 J W Wang 1, 2 North Carolina State University, Raleigh, NC. 3 Bioresource International, Inc., Morrisville, NC

Anti-nutritional factors in grains, such as wheat and barley, can decrease digestive efficiency thus decreasing the nutritive value of the feed ingredients. Exogenous enzymes, such as carbohydrases (CH) and proteases, can be added to animal feed to improve the nutrient utilization of these ingredients. This can lead to an improvement in feed conversion (FCR) and body weight gain (BWG). A challenge of using enzymes in combination is the possibility of interactions between the enzymes. The objective of these studies was to determine whether the protease reduced the effectiveness of the carbohydrase. Two studies were conducted with Ross 708 broiler chicks raised to 3 or 4 wk. Birds were raised with ad libitum access to feed and water and were assigned to 1 of 6 wheat-barley-based dietary treatments: study 1 (30% wheat-20% barley) and study 2 (15% wheat-40% barley). In both studies the diets met NRC and breeder recommendations for all nutrients including protein and amino acids. The treatments consisted of a positive control with high fat, a negative control with low fat, and low fat diets containing a commercially available CH, protease, or both. Birds and feed were weighed weekly to calculate BWG and FCR. At the end of each study ileal digesta content was collected and viscosity was measured. There were 8 birds per pen with 6 replicate pens per treatment. Data were analyzed using GLM with means separated using LS means. There were 8 birds per pen with 6 replicate pens per treatment. In Study 1 there were no differences in BWG or FCR. In Study 2, the birds fed diets containing CH addition had a significantly higher gain per bird during weeks 1 and 2 compared to the PC and NC (429 and 430g respectively, vs. 393 and 376g). Birds fed the CH resulted in significantly improved FCR during week 1 when compared to the NC (1.077 vs. 1.180). In both studies the viscosity was reduced with the inclusion of CH compared to the NC. The data from these studies show that there was no interference of the protease on the CH activity and that the protease used in this study can be used in combination with commercial carbohydrases.

**Key Words:** wheat, barley, viscosity, carbohydrase, protease

**M17 Dietary calcium, phosphorus and phytase effects on broiler performance during a natural exposure to Clostridium perfringens** Diegos Paiva, 1, 2, 3, Carrie Walk, 4, F.W. Pierson, 1, Rami Dalloul, 1, Audrey McElroy, 4 Virginia Tech Department of Animal and Poultry Sciences, Blacksburg, Virginia, 2 AB Vista, Marlborough, Marlborough, United Kingdom (Great Britain), 3 Virginia-Maryland Regional College of Veterinary Medicine, Blacksburg, Virginia Medicine

Diet composition and nutrient balance can have a critical impact on intestinal integrity during exposure to enteric pathogens. The objective of this study was to evaluate dietary Ca, P, and phytase on broiler performance during exposure to Clostridium perfringens. Day old, Cobb 500 male broilers were weighed and randomized into 8 treatment groups (9 replicates pens/treatment with 32 birds/pen). The 35 d trial was designed as a 2 x 2 x 2 factorial which included 2 levels (0.6% and 0.9%) of a highly soluble Ca source, 2 levels of available P (0.3% and 0.45%), and 2 levels of phytase (0 and 1000 FTU/kg). Day old birds were placed on dirty litter from a previous flock that exhibited clinical signs of necrotic enteritis (NE). Birds and feed were weighed on d 12, 19 and 35, and body weight (BW), BW gain (BWG), feed intake (FI), and feed conversion (FC) were calculated for each of these periods and cumulatively. Mortality was recorded daily, and pH of the gizzard, duodenum and jejunum were measured on d 12, 19 and 35. Significance is reported as \( P < 0.05 \). Birds began exhibiting clinical signs of NE on d 9, and elevated NE-associated mortality persisted until d 26. Mortality was influenced by the main effects of dietary Ca or phytase. Dietary Ca supplemented at 0.90% or 1000 FTU/kg phytase increased mortality compared to 0.6% Ca or 0 FTU/kg phytase, respectively, from d 0 to 19. Feed intake and FC were affected by Ca x P interaction. From d 0 to 19, diets with 0.9% Ca and 0.3% P decreased FI and improved FC compared to 0.9% Ca and 0.45% P, while FI and FC were similar in birds fed diets with 0.6% Ca regardless of P level. Calcium x P x phytase influenced BW or BWG from d 0 to 12. In general, birds fed 0.9% Ca and 0.45% P with phytase were heavier compared to birds fed 0.6% Ca, 0.45% P, and phytase. Calcium at 0.90% increased gizzard (d 19) and jejunum (d 12) pH. The results suggest a high level of soluble Ca in the diet may influence NE associated mortality. In addition, bird performance was affected by interactions of Ca, P, and phytase during the exposure to C. perfringens and NE outbreak.

**Key Words:** Necrotic enteritis, calcium, phosphorus, phytase

**M18 Inclusion of Allzyme SSF® in brown layer diets containing up to 30% distillers dried grains with solubles (DDGS) reduces the detrimental effects on shell quality** Anthony D. Quant, 1, Anthony J. Pecatore, James L. Pierce, Tuoying Ao, Austin H. Cantor, Micheal J. Ford, W. D. King Alltech/University of Kentucky Nutrition Research Alliance, Lexington, KY

An experiment was conducted to evaluate the effect of including up to 30% DDGS in brown layer diets with or without an enzyme supplement (Allzyme SSF®, Alltech, Nicholasville, KY) throughout an entire production cycle (60 weeks production). This experiment utilized 288 Hy-Line Brown hens that were randomly allotted to five dietary treatments (12 hens per replicate group). Dietary treatments included a 1) positive control (corn-soybean meal), 2) 15% DDGS, 3) 15% DDGS + 150 g/ton Allzyme SSF®, 4) 30% DDGS, and 5) 30% DDGS + 150 g/ton Allzyme SSF®. In comparison with the positive control diet, diets containing DDGS were calculated to contain reduced levels of AME (2877 vs. 2794 Kcal/kg), Ca (0.3% vs. 0.23% for the 30% DDGS diet). Six eggs from each replicate were randomly selected every 4 weeks for determination of egg quality. Dietary inclusion of DDGS resulted in a significant decrease in shell weight when compared with the positive control (\( P < 0.01 \)), however this effect was alleviated by the addition of Allzyme SSF® to diets containing 15% DDGS. Similarly, shell breaking strength was reduced by the inclusion of DDGS compared to the positive control (\( P < 0.01 \)). This effect was eliminated by the addition of Allzyme SSF® to diets containing 15% DDGS. Numerus breaking strength was significantly lower than the positive control in diets containing 15% DDGS (\( P < 0.03 \)), however values for the tibia breaking strength were unaffected by dietary treatment. The inclusion of DDGS resulted in increased Haugh unit values compared with the positive control (\( P < 0.01 \)). Yolk color was affected by DDGS inclusion, regardless of enzyme inclusion, as \( L^* \) (lightness) values decreased, and \( a^* \) (redness) and \( b^* \) (yellowness) values increased as dietary DDGS inclusion increased (\( P < 0.01 \) for all). Hen body weight, however, was significantly lower than that of the positive control for all diets containing DDGS (\( P < 0.01 \)). There was no effect of dietary treatment on egg weight, yolk weight, albumen weight, hen body weight, feed conversion, and hen day production through 60 weeks of production. This study indicates that the detrimental effects on shell quality from brown layers fed DDGS may be alleviated by the addition of Allzyme SSF®.

**Key Words:** DDGS, brown egg layers, egg quality, shell quality
The influence of supplemental fat and enzyme inclusion on the performance of Bovan Robust laying hens

Joshua Hamburg, Amy Batal, Robert Beckstead University of Georgia

Fat inclusion has been shown to decrease gut transit time, which increases the energy availability of the diet; this is known as the extra metabolic effect of fat. Enzymes, specifically xylanases are available commercially to reduce gut viscosity by breaking down non-starch polysaccharides, which improves availability and absorption of nutrients. Thus, the objective of this study was to determine the effects of fat and enzyme inclusion on passage rate, apparent metabolizable energy, and true metabolizable energy, egg production, feed intake, and body weight. A 3 x 2 x 2 factorial study was conducted in which a standard corn, soybean meal, wheat midds based diet was fed to 384 Bovan Robust laying hens at 24 weeks of age for 16 weeks. Excreta were collected for AME determination and passage rate was measured by first appearance of chromic oxide, an indigestible marker. The experimental diets contained one of three levels of supplemental fat: 0%, 1.5% and 3% and one of two levels of enzyme: no enzyme or xylanase at 0.2lbs/ton. Each of the six diets were fed ad libitum and were also fed at 90% of the daily ME requirement, defined by the management guide. Diets were formulated to meet the birds digestible amino acid requirements; however the ME of the diets varied with fat inclusion. The calculated ME of the control diet (0% fat and no enzyme) was 2,600 kcal/kg and the ME increased 126 kcal/kg for every 1.5% inclusion of fat. After being acclimated to individual wire cages, hens were weighed and fed one of the six experiment diets. Egg production and mortality were measured daily, feed intake and body weight were measured every 4 weeks. Carcass composition was determined at the end of the experiment. Egg production was not affected by fat level or enzyme inclusion. Body weights did increase with enzyme and fat inclusion and the hens had higher body fat composition than the hens fed the diets with less ad-libitum diet. The results showed that fat level or enzyme inclusion. Body weights did increase with enzyme and fat inclusion and the hens had higher body fat composition than the hens fed the diets with less additional fat. TME, and AME values increased as fat level increased and also with the addition of the enzyme.

Key Words: phytic acid, coccidia, phytase, intestinal health, broiler

Effect of low phytate and normal phytate soybean meal and dietary corn particle size on male broiler performance and nutrient digestibility to 21 days of age

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A 2 X 2 factorial experiment was conducted to compare the effect of Normal (NP) and Low Phytate (LP) varieties of soybean meal in the presence of either 50% coarse (Coarse) or 100% fine (Fine) particle size corn on male broiler performance to 21 d of age in battery cages. From 1 to 9 d, all birds received two prestarter diets (Coarse or Fine) but with the same source of soybean meal. From 9 to 21 d birds received either NP-Coarse, NP-Fine, LP-Coarse, or LP-Fine treatment diets. There were 8 pens of 8 broilers each for each interaction cell from 9 to 21 d. The cage BW, BW gain, feed intake (FI), feed conversion ratio (FCR), gizzard and proventriculus weights, ileal and fecal nitrogen (N), and fecal total phosphorus (P) were measured. Although BW (208 versus 203 g) and FCR (1.10 versus 1.13 g) were improved with Fine diets at 9 d of age this difference did not persist to 21 d of age. There were no main effects of LP versus NP that persisted to 21 d of age as well. However, upon necropsy at 21 d of age, the LP diets produced a lower proventriculus weight while the Coarse diets produced larger gizzards and smaller proventriculus weights. The LP diets produced less ileal but more fecal total P as well as less phytate P. The LP diets also produced less fecal N. The Coarse diets produced less ileal but more fecal moisture, less ileal N, and less ileal and fecal phytate P. Examination of the interaction means revealed that the greatest proventriculus weight was with the NP-Fine combination, which could suggest a difference in ingesta pH or digestive function that could affect endogenous phytate hydrolysis. This conjecture was supported by the finding that ileal and fecal phytate P was less in the NP-Fine than NP-Coarse diets and both were greater than in the presence of LP diets. Results of the current study indicated that feeding 50% coarse particle size corn reduced digestion of phytate P in NP diets but had no effect in LP diets in the presence of similar live performance in cages.

Key Words: broilers, low phytate, soybean meal, phosphorus, feed particle size

Effect of roller mill ground corn inclusion and litter type on broiler performance and fecal characteristics

Yi Xu, Charles Stark, Peter Ferker, John Brake Department of Poultry Science, NC State University, Raleigh, NC

Previous research has shown that the addition of coarse-ground grain altered broiler gizzard motility in battery cages, while the availability of litter may also influence gizzard motility in floor pens. Thus, a 49-d floor pen study was conducted to evaluate the effect of coarse-ground corn and litter type on broiler performance and fecal characteristics. A total of 1024 1-d-old male broiler chicks were used in a randomized complete block design experiment with a factorial arrangement
of two dietary levels of coarse corn (0 and 50%) and two litter forms (finely ground old litter and new wood chip litter). Each treatment was assigned to 8 replicate pens of 32 birds. A portion of the corn and all soybean meal were ground with a hammermill (2.4 mm screen) to ~400 µ, while the coarse corn was ground to with a roller mill to ~1350 µ. Feed consumption and BW were determined at 14, 28, 35, and 49 d of age and FCR was calculated by including BW of mortality. Dietary inclusion of coarse corn reduced feed intake throughout the experiment without affect on BW. Consequently, dietary inclusion of coarse corn improved 1-49 d FCR in comparison to fine ground corn (1.87 vs 1.92, p<0.05). Mortality rate was also reduced among birds consuming diets containing coarse corn (5.86 versus 3.52%, p<0.05). New litter improved FCR only 1-14 d. Mortality rate was reduced by new litter among birds fed the fine-ground corn diet (7.03 vs. 4.69%, p<0.05). Litter nitrogen (N), moisture, pH, and temperature were measured at 49 d. Fecal N was lower (3.05 vs. 2.81%, p<0.05), litter moisture was lower (40.0 vs. 35.9%, p<0.05), and fecal pH was higher (8.13 vs. 8.68, p<0.05) from birds fed the coarse corn diet. Litter form had no affect on fecal characteristics. The results of this study confirmed dietary inclusion of 50% coarse corn significantly improved FCR and reduced fecal N without adversely affecting BW, while coarse litter had a marginal benefit on broiler growth performance.

Key Words: broilers, corn particle size, litter texture, growth performance, N emission

M23 Evaluation of ESBM and corn particle size on broiler performance Wilmer Pacheco*SC, Charles Stark, John Brake, Peter Ferket North Carolina State University, Raleigh, NC

Recent research has focused on the optimal particle size of cereal grains but there is limited information on the effects of SBM particle size on broiler performance. Previous research has shown that increasing the particle size of the expeller-extracted soybean meal (ESBM) in pelleted diets helped to negate the negative effects of trypsin inhibitors. We hypothesized that increasing the particle size of ESBM and/or corn will improve efficiency of nutrient utilization and growth performance in broiler chicks. The objective of this study was to evaluate two particle sizes of ESBM and corn on broiler performance, and ileal protein and fat digestibility. The experiment was a 2 x 2 factorial of ESBM particle sizes of ESBM and corn particle size (coarse-1290 and fine-470 μm) and corn particle size (coarse-1330 and fine-520 μm). A total of 256 male 1-d-old broiler chicks were randomly assigned to one of four dietary treatments with 8 replicate cages per treatment and 7 birds per cage. The birds were fed a starter diet in mash form. Feed consumption and BW were determined at 7 and 19 d of age and adjusted feed conversion (AdjFCR) calculated by using the weights of all dead birds. At 21 d ileal digesta was collected for determination of protein and fat digestibility. Birds fed fine ESBM had a higher BW at 19 d than birds fed coarse ESBM (809 vs. 774 g, P<0.05). Likewise, birds fed fine corn had a higher BW at 19 d as compared to birds fed coarse corn (829 vs. 755 g, P<0.01). Birds fed fine ESBM had a higher FI at 19 d than birds fed coarse ESBM (945 vs. 906 g, P<0.05). Similarly, birds fed fine corn had a higher FI at 19 d than birds fed coarse corn (951 vs. 900 g, P<0.01). A significant ESBM x corn particle size interaction revealed that birds fed fine ground ESBM and fine corn had significant lower ileal protein digestibility than the other treatments (84.8 vs. 86.1, 87.2, 86.2%, P<0.01). The results of this study suggest that large ESBM and corn particles (>1300 µm) depressed FI, which resulted in lower BW in starting chicks (1-19 d), but improved ileal protein digestibility and had a marginal positive effect on fat digestibility.

Key Words: Particle size, expeller-extracted SBM, ileal digestibility, cages, trypsin inhibitors

M24 Effect of incorporation of DDGS and canola meal to turkey diets on the dietary electrolyte balance, performance, and litter moisture Mahmoud Farahat*SC, El-Sayed Hassanein1, Walaa Abdel-Razik1, Sally Noll1 University of Minnesota, St. Paul, MN 2Faculty of Veterinary Medicine, Zagazig University, Zagazig, Sharkia, Egypt

The following study determined if chloride addition to diets varying in alternative products could shift the dietary electrolyte balance to levels that could adversely affect turkey performance and litter moisture. A total of 990 tom Nicholas turkeys were used from 2-14 wks of age. The pouls were arranged at random into 99 pens (10 pouls/pen). In a factorial design, there were three diet sets (corn-soy-meal (CSM), CSM+20% DDGS, CSM+20% DDGS+10% canola meal) and three chloride levels (.22, .32, .42%) making nine dietary treatments with 11 replicates per treatment. Diets were formulated to be isocaloric with a similar digestible amino acid content. There were four feeding phases (2-5, 5-8, 8-11, and 11-14 wks of age). Individual BW and pen feed residues were measured at each phase to determine the average BW, ADG, daily feed intake, and feed efficiency (F/G). Samples of litter were collected at end of 11th and 14th wks of age for measuring moisture. ANOVA was conducted to determine statistical significance of diet set and chloride level and their interaction on performance. During 2-14 wks, no differences were observed in BW and ADG. Birds fed diets with DDGS or DDGS with canola meal consumed 6.0 % more daily feed (P<0.05) than those fed CSM. No differences were found for chloride or diet x chloride interaction for BW, ADG, or feed intake. Feed efficiency was higher (P<0.05) for birds fed diets containing DDGS or DDGS with canola meal. A diet by chloride interaction was found for F/G. During 8-14 wks of age and only in diets with DDGS and canola meal, increased chloride significantly increased F/G by 3% in comparison to low chloride. Litter moisture increased by 6.5 and 8.0 % in diets with DDGS or DDGS with canola meal respectively in comparison to CSM (P<0.05). It can be concluded that considerable attention should be paid to the dietary electrolyte balance and chloride level during incorporation of DDGS with canola meal in turkey diets as chloride levels higher than 0.22% could be detrimental to feed efficiency.

Key Words: turkey, electrolyte, chloride, DDGS, canola meal

M25 Effect of roller mill ground corn inclusion and litter type on broiler performance and fecal characteristics Charles Stark*SC, Peter Ferket, John Brake Department of Poultry Science, NC State University, Raleigh, NC

Previous research has shown that the addition of coarse-ground grain altered broiler gizzard motility in battery cages, while the availability of litter may also influence gizzard motility in floor pens. Thus, a 49-d floor pen study was conducted to evaluate the effect of coarse-ground corn and litter type on broiler performance and fecal characteristics. A total of 1024 1-d-old male broiler chicks were used in a randomized complete block design experiment with a factorial arrangement of two dietary levels of coarse corn (0 and 50%) and two litter forms (finely ground old litter and new wood chip litter). Each treatment was assigned to 8 replicate pens of 32 birds. A portion of the corn and all soybean meal were ground with a hammermill (2.4 mm screen) to ~400 µ, while the coarse corn was ground to with a roller mill to ~1350 µ. Feed consumption and BW were determined at 14, 28, 35, and 49 d of age and FCR was calculated by including BW of mortality. Dietary inclusion of coarse corn reduced feed intake throughout the experiment without affect on BW. Consequently, dietary inclusion of coarse corn improved 1-49 d FCR in comparison to fine grind corn (1.87 vs 1.92, p<0.05). Mortality rate was also reduced among birds consuming diets containing coarse corn (5.86 versus 3.52%, p<0.05). New litter improved FCR only 1-14 d. Mortality rate was reduced by new litter among birds.
fed the fine-ground corn diet (7.03 vs. 4.69%, p<.05). Litter nitrogen (N), moisture, pH, and temperature were measured at 49 d. Fecal N was lower (3.05 vs. 2.81%, p<.05), litter moisture was lower (40.0 vs. 35.9%, p<.05), and fecal pH was higher (8.13 vs. 8.68, p<.05) from birds fed the coarse corn diet. Litter form had no affect on fecal characteristics. The results of this study confirmed dietary inclusion of 50% coarse corn significantly improved FCR and reduced fecal N without adversely affecting BW, while coarse litter had a marginal benefit on broiler growth performance.

Key Words: broilers, corn particle size, litter texture, growth performance, 

M26 Evaluation of energy values of various oil sources when fed to broiler chickens G Raj Murugesan1, Brian Kerr2, Michael Persia1
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A digestibility study was conducted using Ross 308 chicks to determine the nitrogen-corrected apparent metabolizable energy (AMEn) of various lipid sources in broiler chickens. The 22 dietary treatments were comprised of 7 different oil sources (soy oil, corn oil, choice-white grease, poultry fat, methyl soyate esters and 2 different blends of animal-vegetable fat) fed at either 3, 6, or 9% inclusion rates, in addition to a basal diet that did not contain fat. The treatment diets were prepared from a corn-SBM basal diet which was formulated to meet NRC standards for young growing chicks. Each treatment was fed to 6 experimental units (EU) of 4 chicks each. Chicks were provided a common basal diet until d 14 after which they were randomly allocated to EU and provided with experimental diets until d 21. Excreta samples were collected for the last 2 days of the experimental period for AMEn analysis. The oil sources were analyzed for the proximate principles (crude fat, moisture, insolubles and unsaponifiables) and fatty acid composition. An equation for the slope of the regression line was formulated based on the AMEn digestibility of the oil sources at 0 (basal), 3, 6, and 9% inclusion rates. The AMEn kcal/kg values were determined for each oil source from the equations and are as follows, Soy oil, 8,121; corn oil, 7,801; choice-white grease, 8,883; poultry fat, 7,827; methyl soyate, 7,975; AV blend-I, 8,092; and AV blend-II, 7,480. Direct comparison of the excess energy contributed by the 3% diets against the energy determined through the slope of the regression line equations for each of the oil sources provided an average of 69% increase over the energy value derived from the equations. This increase in estimated energy by difference in comparison to slope-ratio analysis can be attributed to an extra calorific effect of the additional fat due to increased digesta transit time and absorption rate of dietary energy.

Key Words: Broiler, Oil, Energy, Digestibility, Extra calorific effect

M27 Effects of calcium and phosphorus levels during the grower phase for Heritage broilers: bone mineralization, strength and leg health M.J. Da Costa1, E.O. Oviedo2, M.R. Dalmagro2, P.L. Mente2, K.N. Claassen1, A. Mitchell1, H Engster1, R. Mitchell1 1Department of Poult. Sci., North Carolina State University, Raleigh, NC, 2Department of Biomedical Engineering, NC State University, Raleigh, NC, 1USDA, ARS, ANRI, Beltsville, MD, 2Perdue Farms Inc., Salisbury, MD

One study was conducted to evaluate the effects of calcium (Ca) and non phytate phosphorus (nPP) levels during the grower phase (18 to 35 d) on bone biomechanical properties, and leg abnormalities of Heritage broilers. Common starter and finisher diets were fed from 1 to 17 and 36 to 49 d of age, respectively. Treatments consisted of 16 diets containing combinations of 4 levels of Ca (0.46, 0.62, 0.78, 0.94%) and 4 levels of nPP (0.23, 0.30, 0.37, 0.44%). 1,920 male and female chicks were distributed in 64 pens. At 35 d, legs were collected, bone strength was evaluated in 3-point bending test, and tibial dyschondroplasia (TD) scores were recorded. Gait scores and prevalence of leg problems were obtained at 49 d. Legs were also collected at 49d and bone mineral content and density (BMC and BMD) evaluated by DEXA. Thighs and drumsticks were mechanically deboned and TD scores registered. Data were analyzed as a completely randomized block design by response surface methodology. Male tibia ash increased (P<0.01) as Ca and nPP levels rose, though in females only Ca had linear effect (P<0.01) on bone mineralization. nPP levels had a linear effect (P<0.01) on male BMC and BMD. Female bone strength in 3-point bending test was affected (P<0.01) by Ca*nPP interaction, and linearly (P<0.01) by Ca in males. Interaction effect (P<0.05) of Ca and nPP was observed on crooked toes incidence, and the occurrence of severe valgus condition was quadratically affected (P<0.05) by nPP levels in the grower diet. At 35 days, TD incidence was affected quadratically by nPP levels (P<0.05). Incidence of bone breakage in drumstick automatic deboning was affected quadratically by Ca (P<0.05). No significant effects of treatments were observed on gait scores. It was concluded that Ca and P in grower diets influenced bone traits and leg problems prevalence, yet did not influence walking ability in Heritage broilers.

Key Words: Calcium, Phosphorus, Bone traits, Mechanical deboning, Locomotion issues

M28 Evaluation of carryover effects of dietary lysine intake by Cobb 500 broiler breeder hens on progeny live performance Leonel Mejia1, Keyla Lopez, Christopher McDaniel, Holly Parker, Alex Corzo Mississippi State University, Mississippi State, MS

Two experiments were conducted to examine the progeny performance of broiler breeder hens that were fed diets differing in dig Lys. A total of 240 Cobb 500 broiler breeder pullets and 40 cockerels, 20 wk of age, were used for each experiment. In Experiment 1, treatment diets were fed from 35 to 45 wk of age. Treatment 1 and 2 diets were formulated with commonly used feed ingredients and had dig Lys daily intakes of 1,200 (IDL) and 1,010 mg/hen/d (ID), respectively. Treatments 3 and 4 were composed of semi-purified diets formulated to contain dig Lys intakes of 1,010 (SPL) and 600 mg/hen/d (SP), respectively. Chicks corresponding to eggs collected from wk 42 were grown to 56 d of age. Chick weight at hatch was lower (P<0.05) for those that came from the SP and SPL-fed hens, but 42 and 56 d BW was similar for all treatments. Marginal improvements (P<0.10) in FCR were seen at 42 and 56 d for chicks from ID-fed hens compared to IDL hens. For Experiment 2, diets were fed to hens from 24 to 42 wk of age. Treatment 1 was a corn-soybean meal-based diet formulated to have a dig Lys intake of 1,000 mg/hen/d (CS1,000). Treatments 2, 3, and 4 had the inclusion of DDGS with dig Lys intake levels of 1,010 (SPL) and 600 mg/hen/d (SP), respectively. Chicks with commonly used feed ingredients and had dig Lys daily intakes of 1,000 mg/hen/d (CS1,000). Treatments 2, 3, and 4 had the inclusion of DDGS with dig Lys intake levels of 1,010 (SPL) and 600 mg/hen/d (SP), respectively. Chicks corresponding to eggs collected at wk 26 were grown to 56 d of age. Chick weight at hatch was lower (P<0.05) for those that came from the SP and SPL-fed hens, but 42 and 56 d BW was similar for all treatments. Marginal improvements (P<0.10) in FCR were seen at 42 and 56 d for chicks from ID-fed hens compared to IDL hens. For Experiment 2, diets were fed to hens from 24 to 42 wk of age. Treatment 1 was a corn-soybean meal-based diet formulated to have a dig Lys intake of 1,000 mg/hen/d (CS1,000). Treatments 2, 3, and 4 had the inclusion of DDGS with dig Lys intake levels of 1,010 (SPL) and 600 mg/hen/d (SP), respectively. Progeny performance was evaluated from eggs collected at wk 26, 31, and 36. Chick hatch weight was similar for all 3 hatches. Birds from hens at 26 wk and fed DDGS600 diets resulted in lower (P<0.05) BW, carcass and breast weight, and higher (P<0.05) back half weight, at 42 d of age. No effects were observed for any parameter at 56 d. Growout studies performed on eggs laid during wk 31 and 36 revealed that dig Lys intake levels fed had no effect on live performance or carcass characteristics of the progeny. In conclusion, the results from Experiments 1 and 2 were not complementary of each other. Therefore, the potential impact of dietary Lys in the breeder hen diet on progeny performance should be further evaluated.

Key Words: broiler breeder, lysine, progeny