
Research has shown that most egg yolk lipids came from de novo synthesis at the beginning of lay and then from feed and body mobilization at older age (Duran et al., 2011). A feed withdrawal program that removes approximately 10% of peak feed from 30 to 45 wk of age may not provide adequate energy to breeder hens for lean mass gain and egg production. The objective of the present study was to determine the effect of different feeding programs during production period (21–65 wk of age) on reproductive performance of broiler breeder hens. At 21 wk of age, a total of 324 breeder females (Cobb 500) were randomly assigned into 6 treatments, 54 birds each, and placed in individual battery cages. Feeding program 1, 2, 4, 5, and 6 provided 390 kcal of ME/kg/hen/day at 60% egg production while program 3 provided the same feed amount at 75% egg production. Feed was withdrawn after peak production only in program 2 (10% of peak feed during 30 to 45 wk of age). Peak feed intake was increased to 415 kcal ME/hen/day at 75% egg production (program 4) and at 32, 35, and 40 wk of age for programs 3, 5, and 6, respectively. The ANOVA was used to compare means of interest parameters using SAS 9.3. The accumulated egg production from 25 to 47 wk of age from treatments 3 (119.6 eggs/hen) and 5 (118.8 eggs/hen) had higher (P < 0.001) total egg numbers than breeders in other programs (105.3 to 111.7 eggs/hen). Feeding program 2 showed a faster post-peak reduction in egg production compared with other programs. The difference in hen body weight among treatments appeared at 35 wk, at which time hens in treatment 2 had lower body weights (3.56 kg vs. 3.65 kg average, P < 0.001) than other groups. At 47 wk of age, chick weights at hatch were also different among treatments, relating to hen weights. Chicks from treatment 2 had lower hatch weights (P < 0.001) than chicks from other treatments. In conclusion, standard feed withdrawal program after peak production may need to be modified for breeders of today to provide adequate kilocalories of energy needed for lean mass accretion and maximum hatching egg production.

Key Words: feeding program, peak feed, egg production, hatchability, growth performance

62 Evaluation of feeding dietary flaxseed oil on egg yolk fatty acid content of first-cycle laying hens. I. J. Ehr*, J. Lewis1, M. Fray1, and M. E. Persia2, 1Iowa State University, Ames, IA, 2Virginia Tech, Blacksburg, VA, 3ADM Oilseed Processing, Red Wing, MN.

The objective was to evaluate the transfer of n-3 (omega-3) fatty acids (ALA, EPA, and DHA) from either milled flax seed (MFS) or extracted flax seed oil (FSO) into egg yolk over an 8-wk feeding period. In total, 132 W-36 Hy-Line hens were randomly placed into 4 cages for each of the 11 dietary treatments, resulting in 3 hens per cage (438 cm²/hen) in a completely randomized design with ad libitum access to feed and water. Experimental diets were formulated to be isocaloric and consisted of a control diet, 5 FSO diets (0.5, 1.0, 2.0, 3.0, 5.0% added FSO), 5 MFS diets (estimated oil concentration from the MFS 0.5, 1.0, 2.0, 3.0, 5.0%). Egg production and egg weights were measured daily. Body weights were recorded initially and at wk 4 and 8 of the experiment. Feed intake, egg to feed ratio, egg solids, and yolk fatty acid profile were measured on wk 4, 6, and 8. The data were analyzed using ANOVA and, if a single time point was measured, Fisher’s protected least significant difference test, or, if multiple measurements were recorded over time, repeated measures and Tukey’s test was used to separate means. In all cases, significance was accepted at P < 0.05. The n-3 fatty acid concentration in the yolk increased as both FSO and MFS concentrations increased. Linear regression modeling was used to determine transfer of n-3 fatty acids to the yolk. Extracted FSO resulted in an equation of y = 1.6037x + 2.1708 (P < 0.01; R² = 0.965) n-3 fatty acids in the yolks compared with y = 0.7833x + 2.3102 (P < 0.01; R² = 0.911) for the MFS. There were no significant differences in feed intake (P = 0.93) or final body weights (P = 0.67) among treatments and the difference in hen-housed egg production (P = 0.03) was not thought to affect yolk n-3 fatty acid content. There were reductions in body weight gain over the 8-wk period as the diets with the highest FSM concentration (15% FSM and 5.0% flax oil) resulted in reduced weight gain compared with all other treatments (P = 0.01). In conclusion, n-3 fatty acids were transferred to egg yolk at approximately twice the rate when FSO was compared with MFS.

Key Words: flaxseed oil, n-3 fatty acid, egg yolk, laying hen

63 Assessing the digestible lysine requirement of laying hens while maintaining an ideal amino acid profile. D. Kumar*, C. Raginski, K. Schwean-Lardner, and H. L. Classen, University of Saskatchewan, Saskatoon, SK, Canada.

As laying hens improve in egg production and other characteristics, it is relevant to examine their response to dietary digestible ideal amino acid level. Research using Lohmann LSL pullets (28 to 40 wk of age) compared digestible Lys (dLys) intake levels of 550, 625, 700, 775 and 850 mg/hen/d, with dLys kept in proportion to other essential amino acids. Each treatment (trt) had 10 replicates (2 cages of 6 birds each). Diets containing 500 and 850 mg dLys/kg feed were blended every 3 wk based on feed consumption to produce diets that would provide trt levels of dLys intake. Data collection included egg production (5 d/wk), and feed intake, egg weight and egg specific gravity every 3 wk. Feed efficiency was calculated based on egg and egg mass production, and feed intake. Data were analyzed for dLys effects using SAS 9.3 and a completely randomized design; regression analysis was used to determine the relationship between dependent variables and dLys intake. Differences were considered significant when P < 0.05. In the following, result means are shown in brackets in order of increasing dLys intake (550, 625, 700, 775, and 850 mg/hen/d). Means followed by different superscript letters are significantly different. Actual dLys intake (mg/d) varied slightly from trt objectives as shown by the comparative values in parentheses (550 vs 553; 625 vs 647; 700 vs 719; 775 vs 804; 850 vs 856 mg/d). Hen-day egg production increased in a quadratic fashion with dLys intake (88.4, 94.4, 96.7, 97.2, 97.0%). Egg weight (54.4, 57.0, 58.5, 59.7, and 60.0 g) and egg mass (48.5, 53.9, 56.5, 58.0, and 58.0 g/h/d) similarly increased quadratically with dLys intake. Feed efficiency (kg feed/kg egg mass = 1.87, 1.79, 1.74, 1.68, and 1.67) and egg specific gravity (1.089, 1.088, 1.088, 1.089, and 1087) decreased in a quadratic manner with increasing dLys intake. Dietary trt did not affect feed per dozen eggs (1.32, 1.32, 1.32, 1.31, and 1.30 kg of feed per dozen). In conclusion, the requirement of laying hens for amino acid balanced dLys varies with response criteria.

Key Words: ideal protein, egg weight, feed efficiency, specific gravity
Protein nutrition during the early life of turkey poults is important because of its long lasting effect on bird performance. This study evaluated the digestibility of 5 protein sources—canola protein concentrate (CPC), fish meal (FM), porcine meal (PM), corn gluten meal (CGM), and soybean meal (SBM)—as well as examining the effect of replacing a portion of SBM with CPC, FM, PM, and CGM on early turkey performance. In Exp. 1, AMEn and apparent ileal amino acid digestibility (AID) were determined for each ingredient in 5 and 21 d broiler chickens. In Exp. 2, 4 replication pens (23 mixed-sex Hybrid Converter poults each) were fed 1 of 5 dietary treatments formulated based on the results of Exp. 1, and consisting of a high SBM diet (control), and 4 diets where CPC, FM, PM, and CGM replaced 25% of the protein supplied by SBM in the control diet. The crude protein content of the diets were 27.7, 28.6, 28.5, 28.8, and 28.6% for SBM, CPC, FM, PM, and CGM, respectively. The research examined the effect of this substitution on poult performance from 0 to 21 d of age. Statistical analyses were completed using Proc Mixed in SAS, with a 5 × 2 factorial arrangement in Exp. 1 and a completely randomized design in Exp. 2. Planned contrasts in Exp. 2 permitted comparison of the control with each substituted diet, as well as the average of the substituted diets. Differences were considered significant when P ≤ 0.05. The AMEn was not different between d 5 and 21 for CPC, FM, PM, and SBM, but decreased with age for PM. AID generally increased with increasing age, but the response was AA and ingredient dependent, with the largest response observed for CGM. Comparisons of the control versus the average of the substituted diets revealed that inclusion of CPC, FM, PM, and CGM increased body weight compared with SBM up to 14 d, with no effect on feed efficiency. Contrasts of the control versus the average of the substituted diets showed no effect on water consumption. However, water consumption tended to increase for pouls fed CPC and PM (P = 0.08) diets compared those fed SBM. Combining SBM with CPC, FM, PM, or CGM significantly improves poult performance during the first 14 d of life.

Key Words: protein source, early nutrition, soybean meal, amino acid digestibility

66 Effect of roller mill ground corn inclusion and floor types on broiler gastric development and intestinal morphology. Y. Xu*, C. Stark, P. Ferket, C. Williams, and J. Brake, Prestige Department of Poultry Science, North Carolina State University, Raleigh, NC.

Dietary coarsely ground corn (CC) or new litter has been shown to improve broiler live performance through the unique interaction between gizzard activity and gastrointestinal tract (GIT) function. The objectives of the present study were to evaluate the effect of CC inclusion and different floor types on GIT development and intestinal morphology. The experiment was a factorial arrangement of 2 dietary levels of CC (0 and 50%) and 3 floor types [wire net (WN), new wood chip litter (NL), and recycled old litter (RL)]. A total of 1,152 day-old male broiler chicks were randomly assigned to 1 of 6 treatments with 6 replicate pens per treatment and 32 birds per pen. Fine corn (FC) was produced with a hammermill (271 µm) whereas CC was produced with a roller mill (1,145 µm). From 0 to 14 d, a common crumble diet with 100% FC was fed. The grower and finisher diets were fed as pellets and contained either 100% FC or a blend of 50% FC and 50% CC. At 28 and 49 d of age, the addition of CC resulted in increased gizzard weight (P < 0.01) while NL resulted in greater gizzard weight than WN and RL (P < 0.05). Dietary inclusion of 50% CC significantly decreased proventriculus weight at 49 d (P < 0.01), and NL decreased proventriculus weight as compared with WN at 28 and 49 d (P < 0.05). At 28 d, inclusion of 50% CC increased pancreas weight (P < 0.01), and WN exhibited greater pancreas weight than RL (P < 0.05). Inclusion of 50% CC decreased liver weight at 49 d (P < 0.05). At 49 d of age, inclusion of 50% CC increased jejunum villi height (P < 0.01), surface area (P < 0.05), villus height: crypt depth ratio (P < 0.05), and ileal villi surface area (P < 0.05), but decreased ileal muscularis thickness (P < 0.05). NL increased jejunum villi height (P < 0.05), surface area (P < 0.05), and ileal muscularis thickness (P < 0.05), but decreased ileal villi surface area as compared with WN (P < 0.05). Broilers that were fed diets containing 50% CC or raised on NL exhibited enhanced GIT function as evidenced by differential GIT development. This indicated that the broiler may require some coarse textural component to facilitate complete gastric development and function.

Key Words: corn particle size, broiler, gizzard, GIT development, intestinal morphology
67 Feed form and liquid application method effects on feed augering segregation. R. B. Sellers*,1, J. Boney2, C. McDaniel1, J. S. Moritz2, and K. G. S. Wamsley1,1Mississippi State University, Mississippi State, MS2West Virginia University, Morgantown, WV.

Preliminary research in association with 4 different poultry integrators demonstrated that pellets and fines segregate when transported and augered from the feed mill throughout a commercial house. Nutrients, such as phytase, also segregated based on liquid application method (LAM). The objective of the current study was to quantify the effects of feed form (FF; 75 or 55% pellets) and LAM (mixer or post-pellet addition of fat and liquid phytase) on feed quality and nutrient segregation as diets are augered throughout a commercial poultry house feed system. All diets were of common formulation, including total supplemental fat inclusion (2.44%) and use of a liquid, heat stable phytase enzyme. Except for LAM, feed manufacture methodology was identical among dietary treatments. The 75% pellet treatment was made first, and then a portion of the diet was ground and mixed with pellets to create the 55% pellet treatment. Diets requiring post-pellet LAM were initially manufactured with 1% mixer-added fat. All treatments were added back to the mixer and fat, as well as phytase, was added based on LAM. The experimental unit was a 680.6-kg allotment of feed, and run order was replicated 4 times. Six feed pan sampling locations were identified throughout the line at 0, 15, 30, 32, 44, and 58 m. There were 4 auguring times (each time the feed line completely filled) for each replicate at each location, resulting in 384 feed samples. Data were analyzed as a randomized complete block with split-split plot design utilizing a 2 FF × 2 LAM factorial arrangement. Treatments were blocked by run order; split plot was augering time, and split-split plot was feed pan location. The main effect for LAM (P < 0.0001) demonstrated that post-pellet diets had increased percent pellets as compared with mixer. A significant location × FF interaction (P < 0.0001) established that percent pellets declined dramatically when feed was augered from 0 to 15 m and 44 to 58 m regardless of FF; however, the 75% pellet treatment fluctuated from 50 to 44 m, but the 55% treatment remained stable. These differences may affect nutrient segregation and bird performance/uniformity.

Key Words: pellet quality, feed manufacture, commercial, post-pellet

68 Understanding the importance of particle size to improve oil inclusion in pellets with or without vacuum coating. S. Lamichhane*, K. Sahtout, J. Smillie, and T. A. Scott, University of Saskatchewan, Saskatoon, SK, Canada.

Vacuum coating is not usually associated with pelleted broiler feed. However, if vacuum coating can economically improve broiler performance, then pellet porosity and liquid uptake will become more important. An experiment was conducted to investigate the effect of particle size on post pellet fat absorption with (V+) and without (V−) vacuum coating. Three different grains; wheat, barley and corn were ground with hammer mill using 2 different screens (3.17 and 6.35 mm). Two ground and a whole grain (i.e., 3 particle sizes) for each of the 3 grains were pelleted using a 4.7-mm die. Following cooling, samples of intact pellets were prepared for additions of canola oil (15% by weight) that was deemed to be in excess of pellet surface area and porosity. Statistical analysis was carried out separately for 3 grain types; duplicate measurements of oil uptake were taken and analyzed based on completely randomized design for particle size (n = 3) and coating method (V+ and V−) for each of the grain. With coarse grinding, particle size was highest for barley (1,896 ± 54.5 μm), then wheat (1,289 ± 46.5 μm) and corn (1,057 ± 59.11 μm). The particle sizes of finely ground grains were 1,153 ± 81.0 μm, 767 ± 36.0 μm and 732 ± 21.0 μm for barley, wheat and corn, respectively. Overall, there was a 1.4 ± 0.36% higher oil uptake when vacuum (V+) was applied during oil addition and mixing in all of the pellets. There were significant differences in amount of canola oil absorbed in all grain sources with different particle size (P < 0.05). The highest oil absorption (11.6%, V+; 9.7%, V−) was found in pellets produced from barley that was finely ground. However, for wheat and corn, pellets produced from coarse particle size absorbed more oil than pellets from fine particle size, both with and without vacuum coating. The pellets formed from whole grain absorbed the least amount of oil (P < 0.05) in all grain sources, both with (V+; 8.2, 8.8 and 4.2%) or without (V−; 6.9, 7.4 and 3.2%) vacuum, respectively for wheat, barley and corn. In conclusion, particle size of the grain can be manipulated to get higher post pellet fat absorption, using both coating methods.

Key Words: particle size, fat absorption, vacuum coating, broilers, pellets

69 An analysis of the causative relationship between daily feed and water consumption in broilers. D. McCreery* and S. Watkins, University of Arkansas, Fayetteville, AR.

The objective of this study was to determine if there is a causative relationship between daily feed and water consumption with the goal of establishing if the daily intake of one influences the next day’s consumption of the other. Daily production data was collected from 13 successive flocks at a 4-house broiler farm. This farm is solid sided and tunnel ventilated. Bird placement averaged 20,298 birds per house with a range of 19,500 to 21,375 and an average stocking density of 13.66 birds/m2. Average growout was 45 d with a range of 42 to 49 d. Daily water and feed intake values were analyzed in 3 ways; water intake’s effect on the following days feed consumption, feed consumption’s effect on the following day’s water intake and daily feed and water intake. The brood portion of each flock was not used in the calculations. All 3 variations were found to be highly correlated (P < 0.0001). Analysis of daily feed consumption compared with daily water intake was found to be significant (P < 0.0001) and can be predicted by the slope water/1,000 head = 38.68 + 1.50 × feed/1,000 head. The effect of feed consumption on the following day’s water intake was found to be significant (P < 0.0001) and can be predicted using the slope: water/1,000 head = 48.65 + 1.50 × feed/1,000 head. The comparison of water intake to the following day’s feed consumption was found to be significant (P < 0.0001) and predicted using feed/1,000 head = 3.56 + 0.56 × water/1,000 head. It was found that the relationships between the 3 variables were all similarly correlated and therefore a causative factor could not be identified.

Key Words: broiler, feed, water, nutrition

70 Effect of particle size of distillers dried grains with solubles and soybean meal on pellet quality, nutrient digestibility, and broiler live performance. W. J. Pacheco*, A. C. Fahrenholz, C. R. Stark, P. R. Ferket, and J. Brake, Prestage Department of Poultry Science, North Carolina State University, Raleigh, NC.

Expeller-extracted soybean meal (ESBM) remains after soy oil has been mechanically removed from whole soybeans. ESBM contains more fat and energy but less protein and higher trypsin inhibitor (TI) levels than solvent-extracted soybean meal (SSBM), which has limited its inclusion in diets of young chicks. Inclusion of coarse feed ingredients has been shown to alter gastrointestinal function, nutrient digestion, and broiler live performance, but coarse particles have also decreased pellet quality. The objective of these studies was to evaluate effects of particle size of distillers dried grains with solubles (DDGS) and SBM
on pellet quality, nutrient digestibility, organ development, and live performance. Experiment 1 and 2 evaluated the effect of SBM source (SSBM and ESBM), particle size (coarse: 1.024 µm and fine: 408 µm), and TI level (9, 12, 15, 18, and 21 TIU/mg) on pellet quality and live performance. In Experiment 3 particle size (coarse: 745 µm and fine: 482 µm) and inclusion level (15 and 30%) of DDGS were evaluated. The starter diets were fed in crumbled form and the grower and finisher diets in pelleted form. Feed intake and BW were determined at 14, 35, 42, and 49 d of age and feed conversion ratio (FCR) was calculated including mortality BW. Data were analyzed using PROC GLM and treatment means were partitioned by Tukey’s test. ESBM had higher TI level than SSBM (22.1 vs. 3.8 TIU/mg). Although grinding SBM improved pellet quality (P < 0.05), coarse SBM improved (P < 0.05) tolerance to TI as coarse SSBM and ESBM and fine SSBM resulted in heavier BW at 49 d than fine ESBM. Birds fed fine DDGS had greater BW (P < 0.05) and feed intake (P < 0.05) than birds fed coarse DDGS, likely due to higher gross energy digestibility (P < 0.05) and AMEn (P < 0.05). The weight of the pancreas increased linearly as TI level increased (P < 0.05). Birds fed 30% DDGS had greater proventriculus weight (P < 0.05) than birds fed 15% DDGS. Birds fed coarse DDGS had greater gizzard weight (P < 0.05) than birds fed fine DDGS. The results of these experiments indicated that coarse SBM could ameliorate the negative effects of high TI levels. Grinding DDGS increased feed intake and BW without affecting feed efficiency.

**Key Words:** SBM, DDGS, pellet quality, trypsin inhibitors, digestibility

### 71 Effect of processing conditions on the nutritive value of canola meal for poultry. D. I. Adewole*1, A. Rogiewicz1, B. Dyck2, and B. A. Slominski1, 1University of Manitoba, Winnipeg, MB, Canada, 2Canola Council of Canada, Winnipeg, MB, Canada.

Studies have shown that the nutritive value of canola meal (CM) can be enhanced or diminished by the processing conditions used in the canola processing plants. Excessive heating during pre-press solvent extraction may result in reduced digestibility of some amino acids (AA), particularly Lys. Thus, 3 surveys involving 11 Canadian crushing plants were conducted to determine the effect of processing and meal pelleting on the chemical composition of CM. As expected, some variations were observed in the contents of AA, glucosinolates, and dietary fiber, the components known to be affected by heat treatment. Based on their levels, 6 representative samples were selected and used in an AA digestibility study involving 240 1-d old broiler chicks. Chicks were randomly assigned to 8 semipurified diets (including 2 additional diets containing pelleted CM from 2 plants) formulated to contain 22% CP and 0.3% Cr2O3 as an indigestible marker. Data were subjected to ANOVA using the GLM procedure of SAS. Standardized ileal digestibility values for Arg, Lys, Met, and Thr averaged 88.0, 79.1, 89.9, and 74.9%, respectively, with very little difference observed between the plants. The standardized ileal digestible contents of Arg, Lys, Met, and Thr averaged 2.29, 1.82, 0.56, and 1.10%, respectively, and ranged from 2.18 to 2.50% for Arg, 1.74 to 2.00% for Lys, 0.49 to 0.65% for Met, and 1.00 to 1.38% for Thr. Meal pelleting reduced (P < 0.05) the standardized ileal digestible content of all AA in one of the 2 pelleted CM samples analyzed. Canola meals from 3 different plants were also used in a TME assay. There was no difference in the TME values which averaged 2227, 2297 and 2200 kcal/kg DM indicating no effect of processing conditions on available energy content of CM.

**Key Words:** canola meal, processing, amino acid, dietary fiber, broiler chicken


The present study was conducted to explore the potential for the production of high-energy, high-protein and low-fiber canola meal fractions to be used in high-nutrient density pre-starter diets for broiler chickens. Three pre-press solvent extracted canola meals (CM) from conventional (black) and yellow-seeded *B. napus* canola, and canola-quality *B. juncea* were subjected to sieving technology. The use of sieves from 250 to 600 µm resulted in the production of low-fiber fractions Fine 1 and Fine 2. Compared with parent meals, the content of total dietary fiber of fractions Fine 1 and Fine 2 decreased from 30.0 to 21.4 and 26.7% for conventional CM, from 25.5 to 15.3 and 18.7% for yellow-seeded CM, and from 27.0 to 21.6 and 23.4% for *B. juncea* meal, respectively. Likewise, crude protein increased from 36.8 to 42.0 and 39.6% for conventional CM, from 41.0 to 43.6 and 43.0% for yellow-seeded CM, and from 42.3 to 47.9 and 46.8% for *B. juncea* meal. One-day-old male Ross 308 broiler chicks were randomly assigned to 10 dietary treatments of 8 replicate cages of 5 birds each to evaluate the effect of 3 parent CM and their respective Fine 1 and Fine 2 fractions at 15% of a diet on growth performance of broilers from 1 to 10 d of age. A corn/SBM-based diet served as a control. All diets were formulated based on the determined nutritional composition and were balanced for energy, CP and amino acids. There was no significant difference between treatments for feed intake, body weight gain and feed efficiency indicating that CM and its low-fiber fractions could effectively replace SBM in the broiler pre-starter diets. The benefits from using the dehulled meals could also be reflected in the cost of feed production which for diets containing low-fiber fractions averaged $0.60 per 1 kg of live chicken weight when compared with $0.65 for the corn/SBM-based diet. It could also be concluded that canola fiber has minimal effect on nutrient utilization as evidenced by similar growth performance of young broiler chickens fed diets containing CM of different fiber content.

**Key Words:** canola meal, dehulling, dietary fiber, broiler chicken

---

Poult. Sci. 93(E-Suppl. 1)
recorded at 10 and 21 d with excreta collected over 3 d and sampled on d 21 to determine AMEn. Increased soy inclusion had a negative effect on feed consumption, resulting in reduced \((P = 0.05)\) feed intake in high soy diets compared with low and middle inclusions (721, 709, 684 g/chick respectively). No significant differences were observed for body weight gain, feed efficiency, and AMEn (467 g/chick, 775 g/kg, 3,135 kcal/kg respectively). Although feed intake was higher in birds fed low soy compared with high soy diets, these diets did not generate significant differences in weight gain, feed efficiency or AMEn suggesting further differences in dietary soy content may be needed.

Key Words: broiler, soy, performance, metabolizable energy

74 The effect of dietary corn particle size and post-pellet liquid fat application on broiler live performance. S. Auttawong*, A. C. Fahrenholz, and J. Brake, Prestage Department of Poultry Science, North Carolina State University, Raleigh, NC.

A floor pen experiment with new wood shavings litter was conducted to evaluate the effect of corn particle size and post-pellet liquid fat application on broiler live performance from 1 to 35 d of age. The 640 Ross 344 × Ross 708 male chicks were assigned to a factorial arrangement of treatments consisting of 2 dietary inclusions of coarse corn (CC; 0 and 10% or 0 and 20% of total dietary corn in starter and grower diets, respectively) and 4 liquid fat applications (0.75, 1.50, 2.25, and 3.00% in mixer plus 2.50, 1.75, 1.00, and 0.25%, respectively added post-pellet to give a total added fat content of 3.25%). Each of the 8 treatment combinations was replicated with 5 pens of 16 birds each. Fine corn (FC) was ground with a hammermill to 287 μm (2.4-mm screen) while coarse corn (CC) was ground with a roller mill to 806 μm. The FC and CC were blended to create the CC inclusion levels. Feed intake and BW were determined at 14, 28, and 35 d of age and adjusted feed conversion ratio (AdjFCR) was calculated by including BW of mortality. Feed intake and BW were not affected in broilers fed CC. AdjFCR was improved by CC at 28 d but the effect was no longer observed at 35 d. The quantity of post-pellet fat applied had no effect on feed intake and BW. However, 3.00% mixer fat addition produced poorer AdjFCR at 28 d but the effect diminished by 35 d. In the presence of 3.00% mixer fat addition, AdjFCR was poorer in broilers fed CC but improved in broilers fed FC. Based upon these and other data, approximately 800 microns CC was appropriate for broilers under 28 d of age and CC should be larger thereafter. The AdjFCR suggested the optimum mixer fat addition to be approximately 1.50–2.25% at 28 d. The interaction between CC and mixer fat addition suggested that even though CC improved AdjFCR, pellet quality was still important. Therefore, in the presence of CC, high mixer fat addition should be avoided.

Key Words: broiler live performance, corn particle size, post-pellet liquid fat application