

viability (VIAB) showed no significant effects on the related periods. Considering the experimental period, it was observed that post-hatching supplement used positively influence the feed consumption and consequently weight gain.

**Key Words:** nutrition, gastrointestinal tract, post-hatching phase, average weight gain, feed intake

**452P The effect of dietary apparent metabolizable energy during the finishing phase on broiler carcass yields.** V. S. de Avila\*, E. L. Krabbe, C. H. Klein, L. dos S. Lopes, and D. Surek, *Embrapa Swine and Poultry, Concordia, SC, Brazil.*

Nine hundred d-21 broiler chicks were used to evaluate the effects of increasing dietary apparent metabolizable energy (AME) by added refined soybean oil on broiler carcass parameters. A basal diet (AME 2,980 kcal/kg, 21.4% crude protein) was given from d-old to 21 d. The experimental diets were based on corn, soybean meal, and refined soy oil and were produced and formulated to achieve calculated (AME) values of 2,850, 2,950, 3,050, 3,150, and 3,250 kcal/kg and 18.5% crude protein (22 to 42 d) by replacing the inert material (kaolin) by refined soybean oil. Diets were fed as pellets/crumbled. At d 21, all birds were weighed and distributed equally according to 5 treatments with 9 replicates per treatment and 20 birds per experimental unit (floor pens). Two birds were randomly taken from each pen at d 42 for processing. Data were submitted to polynomial regression. There was no significant difference in 42-d live body weight (g). Dietary AME did not influence the hot carcass, cold carcass, breast, wings, thighs and drumstick yields. There were no significant effects of dietary AME on abdominal fat, liver, heart and gizzard weight. It is concluded that dietary AME did not significantly affect the live body weight, carcass yield, abdominal fat and organs weight under the applied conditions.

**Key Words:** kaolin, soy oil, pellet, poultry

**453P Effects of immunomodulatory nutrients on growth performance and cytokine expression in layer chicks challenged with lipopolysaccharide.** E. L. Wils-Plotz\* and K. C. Klasing, *University of California, Davis, CA.*

Immunomodulatory nutrients alter the immune response to pathogens; modulating individual immune status. The objective of this study was to characterize the immune response of layer chicks treated with known immunomodulatory nutrients: fish oil, CLA, corn oil, lutein or vitamin E, during a LPS challenge. Four-week-old, mixed-sex layer chicks (n = 100), were weighed and randomly allotted to 1 of 5 dietary treatments (TRT). The study was a 5 × 5 × 4 factorial with 5 dietary treatments and 5 replicate pens of 4 chicks (2 male and 2 female). After 2 weeks of TRT, all birds were injected with 1.5 mg/kg BW LPS in 1 mL of PBS. Samples were collected at 12 h post-challenge. Liver and spleen weights were recorded and samples were analyzed for cytokine gene expression using rtPCR. Males and females lost the same % BW with no effect of dietary TRT. FI was reduced ( $P = 0.002$ ) in the lutein TRT when compared with all other TRT's. There was no effect of LPS challenge on liver weight, but the spleens of the fish oil TRT were heavier ( $P < 0.05$ ), than the CLA TRT. In the duodenal mucosa, the corn oil and lutein fed birds had higher ( $P = 0.02$ ) TLR-4 expression than the fish oil TRT, with females having higher ( $P < 0.0001$ ) TLR-4 expression than males. In the liver, females had higher ( $P < 0.05$ ) IL-1B, IL-10, IL-12 and iNOS expression than males, but males had higher ( $P = 0.04$ ) IL-6 expression. Both IL-10 and iNOS expression was higher in the fish oil TRT than the corn oil or CLA TRTs. Females fed either Lutein

or Vitamin E had greater IL-12 expression compared with all male birds regardless of TRT. In the spleen, IL-4 and IL-6 expression were increased ( $P < 0.05$ ) in females compared with males. For IL-1B, the CLA TRT had higher ( $P = 0.006$ ) expression than the fish and corn oil TRT. Interleukin 10 expression was increased ( $P = 0.009$ ) in both the lutein and CLA TRT when compared with the corn oil TRT. Therefore, each immunomodulatory nutrient added to the diets of layer chickens results in a different immune response to an LPS challenge.

**Key Words:** layer chicken, LPS, immunomodulatory nutrients, lutein, fish oil

**454P Dietary calcium and phosphorus requirements in the finisher phase from 1,280 to 2,200 g of body weight in broiler chickens.** E. Jimenez-Moreno<sup>1</sup>, C. R. Angel\*<sup>1</sup>, W. Li<sup>1</sup>, S.-W. Kim<sup>1</sup>, M. Proszkowiec-Weglarz<sup>1</sup>, and N. E. Ward<sup>2</sup>, <sup>1</sup>University of Maryland, College Park, MD, <sup>2</sup>DSM Nutritional Products, Parsippany, NJ.

More closely defining the calcium (Ca) and phosphorus (P) requirements of broilers in the finisher phase is essential to optimize performance. An experiment was done to determine the Ca and nonphytate P (nPP) requirements for Hubbard 99 male × Cobb 500 female male broilers from 27 to 36 d of age (finisher phase). Birds were fed at requirements until 27 d of age. A central composite rotatable design was used, such that the 9 resulting treatments (Trt) contained, by formulation, Ca and nPP of 0.67 and 0.09%, 0.55 and 0.14%, 0.79 and 0.14%, 0.50 and 0.25%, 0.67 and 0.25%, 0.84 and 0.25%, 0.55 and 0.36%, 0.79 and 0.36%, 0.67 and 0.40%; respectively. Two extra Trt were included in the design containing the lowest nPP (0.09%) and the lowest (0.50%) or highest Ca (0.84%). Ratios of Ca to nPP arranged from 1.53:1 to 9.33:1. Statistical analysis was run on analyzed values. Starting BW was 1,277 g, and ending BW ranged between 2,150 and 2,330 g depending on Trt. Each Trt was replicated 9 times (3 birds/battery pen). Requirement ranges were determined and estimated recommendations are shown below in parenthesis. Based on BWG, Ca requirements ranged from 0.66 to 0.82% (0.70%) and nPP, from 0.27 to 0.44% (0.30%). Calcium requirements as mg Ca consumed per g BWG, ranged from 10.27 to 12.70 (11.42 mg Ca consumed/g BWG), and nPP as mg nPP consumed per g BWG, from 4.16 to 6.77 (4.62 mg nPP consumed/g BWG). Based on femur ash in mg/kg BW, Ca requirement was 0.50 to 0.82% (0.64%) and nPP, 0.27 to 0.44% (0.32%). Calcium requirements as mg Ca consumed per g BWG, ranged from 7.82 to 12.70 (9.97) and nPP as nPP consumed per g BWG, from 4.16 to 6.77, and nPP as mg nPP consumed per g BWG, 4.95. Calcium to nPP ratios expressed as g Ca consumed per g nPP consumed, based on requirement estimates for broilers in the finisher phase were 2.47:1 for BWG and 2.01:1 for femur content relative to BWG.

**Key Words:** calcium, phosphorus, performance, finisher phase, broiler

**455P Broiler carcass composition determined by NIR-Food-Scan.** E. L. Krabbe\*<sup>1</sup>, V. S. de Avila<sup>1</sup>, V. L. Kawski<sup>1</sup>, W. A. Marcon<sup>2</sup>, and R. M. Belló<sup>3</sup>, <sup>1</sup>Embrapa Swine and Poultry, Concordia, SC, Brazil, <sup>2</sup>FACC, Concordia, SC, Brazil, <sup>3</sup>FOSS, São Paulo, SP, Brazil.

Nine hundred broiler chicks, male, Cobb 500, were used to evaluate the effect of increasing dietary apparent metabolizable energy (AME) by adding vegetable fat on carcass composition using FOSS FoodScan analysis (AOAC Official Method 2007.04: Fat, moisture, and protein in meat and meat products). FOSS FoodScan is a near infrared spectrophotometer analysis with artificial neural network calibration model and