Impact of Reducing Dietary Protein with Supplementation of 8 Essential Amino Acids and Functional Roles of Supplemental His or Glu on Growth Performance and Carcass Traits of Finishing Pigs.

Marcos Elias E. Duarte¹, Zixiao Deng¹, Jonathan Baker¹, Sung Woo Kim¹, ¹North Carolina State University

Abstract: This study evaluated the effects of reducing dietary protein with supplementation of 8 essential amino acids and functional roles of supplemental Glu or His on growth performance and carcass traits of finishing pigs. Pigs (n = 216; 98 ± 3.5 kg BW) were allotted (3 pigs/pen) to 4 treatments in a randomized complete block design (RCBD) with sex and initial BW as blocks. Pigs were fed for 14 d until 120 kg BW. Dietary treatments were CON (11.4% CP with L-Lys, L-Thr, and L-Trp); LCP (8.9% CP with L-Lys, Thr, Trp, Met, Val, Ile, Phe, and His); LCPG (9.1% CP; LCP+Glu to match % Glu in CON); and LCPH (9.2% CP; LCP+2x His requirement). Diets met or exceeded requirements with 2.7 Mcal/kg NE. Growth performance and backfat thickness (BFT) were measured at d 0 and d 14. Blood was collected to analyze BUN. At d 14, pigs with the median BW in each pen were slaughtered. Pigs fed CON had greatest (P < 0.05) BW, ADG, and G:F. Pigs fed LCP had greater (P < 0.05) BW, ADG, and ADFI than LCPG. BFT of pigs fed LCPG and LCPh was less (P < 0.05) than CON. Cold carcass weight in CON was greater (P < 0.05) than LCPG and LCPh, whereas it was greater (P < 0.05) in LCP than in LCPG. Chilling loss in LCP was less (P < 0.05) than LCPG. Drip loss at 48 h in LCPH was less (P < 0.05) than CON and LCPG, BUN in LCPG and LCPh was less (P < 0.05) than CON. In conclusion, reducing dietary protein by 2.5% using 8 supplemental amino acids reduced growth performance without affecting carcass yield. Supplemental His at 2x requirement to low protein diets meeting His requirement enhanced loin quality by reducing drip loss.

Keywords: amino acid, finishing pigs, low crude protein

263 Efficacy and Safety of a Novel Source of 25-Hydroxycholecalciferol in Performance and Tissue Deposition in Growing Pigs.

Jorge L. Sandoval¹, Diego E. Ventura¹, Orlando B. Fiállodos¹, Brian L. Anderson¹, J. Chris Sparks², Jessica D. Starkey¹, Charles W. Starkey¹, ¹Auburn University, ²Huvepharma, Inc.

Abstract: This study was conducted to determine the efficacy and safety of a dietary vitamin D source on growth performance and tissue deposition of 25-hydroxycholecalciferol (25OHD3) in growing swine. Dietary treatments were a control with vitamin D3 at NRC recommended concentrations (C) and 3 diets composed of C + increasing inclusions (25, 50, and 250 µg/kg BioD, Huvepharma) of 25OHD3 (C+25; C+50; and C+250 respectively). Pigs (n = 144) were assigned to 24 pens which were allotted to 1 of 4 dietary treatments and fed for 42 d. On d 0, 39, and 63, serum was collected for 25OHD3 concentration determination and individual BW were measured. At d 42, tissues from 48 pigs (12 pigs per treatment) were analyzed for 25OHD3 concentration, blood chemistry and hematology (BCH) analysis was conducted, and 1 femur from each pig was collected for dual-energy X-ray absorptiometry scanning. Data were analyzed with SAS PROC GLIMMIX and means separated at P ≤ 0.05. No differences among treatments were observed for growth performance (P ≥ 0.2239). Serum and tissue 25OHD3 concentrations increased linearly as dietary 25OHD3 inclusion increased (P < 0.0001). Following a 21-d withdrawal period, 25OHD3 serum concentrations decreased to that of or within 2.76 ± 0.89 ng/mL of C-fed pigs (P > 0.0005). All BCH variables measured were similar among treatments (P = 0.0967). At d 42, femurs from C+50 and C+250-fed pigs had the greatest bone mineral content (BMC) and density (BMD; P < 0.0326). Concentrations of 25OHD3 in serum and tissue increased and BMC and BMD were improved as dietary vitamin D supplementation increased, but pig growth performance was unaltered. Absence of gross abnormalities and changes in BCH as well return of circulating 25OHD3 concentrations to that of C-fed pigs following withdrawal indicate this source can safely improve vitamin D status in growing pigs.

Keywords: 25-hydroxycholecalciferol, swine, vitamin D