

144 Determining the fourth-limiting amino acid in swine diets containing NutriDense® corn. A. W. Duttlinger^{*1}, J. R. Bergstrom¹, M. D. Tokach¹, J. L. Nelssen¹, S. S. Dritz¹, R. D. Goodband¹, J. M. DeRouchey¹, and J. Snow², ¹Kansas State University, Manhattan, ²BASF Plant Science, Research Triangle Park, NC.

Two, 28-d studies were conducted to determine the fourth-limiting amino acid in finishing diets containing NutriDense® corn. A total of 1,134 (37.2 kg) and 1,090 (77.3 kg) PIC pigs were used in Exp. 1 and 2, respectively. Pigs were blocked by BW and randomly allotted to one of six diets with 7 replications in each experiment. Dietary TID lysine was 0.91% in Exp. 1 and 0.72% in Exp. 2. Treatments were 1) positive control containing 0.15% L-Lys HCl; 2) negative control with 0.45% L-Lys HCl, 0.085% DL-Met, and 0.15% L-Thr; 3) diet 2 with 0.05% L-Ile; 4) diet 2 with 0.05% L-Val; 5) diet 2 with 0.05% L-Trp and 6) diet 2 with 0.05% L-Ile, 0.05% L-Val, and 0.05% L-Trp. In Exp. 1, ADG was 0.87, 0.77, 0.82, 0.80, 0.82, and 0.87 kg/d and G:F was 0.39, 0.37, 0.37, 0.38, 0.38, and 0.38 for treatments 1 to 6, respectively. Pigs fed the positive control and the diet with the combination of added Ile, Trp, and Val had greater ADG ($P < 0.05$) than all other treatments. Pigs fed added Ile or Trp had greater ADG ($P < 0.05$) than pigs fed the negative control. Pigs fed the combination of added Ile, Trp, and Val had greater ADFI ($P < 0.05$) than pigs fed the negative control. There were no differences in G:F. In Exp. 2, ADG was 0.88, 0.74, 0.78, 0.75, 0.84, and 0.85 kg/d and G:F was 0.33, 0.28, 0.29, 0.29, 0.31, and 0.31 for treatments 1 to 6, respectively. Pigs fed the positive control, added Trp, or the combination of added Ile, Trp and Val had greater ($P < 0.05$) ADG than pigs fed the negative control or pigs fed either Ile or Val. Pigs fed the positive control had greater ($P < 0.05$) G:F than pigs fed all other diets. Pigs fed the combination of added Ile, Trp, and Val had greater ($P < 0.05$) G:F compared to pigs fed the negative control or added Val. These results suggest that, in diets containing NutriDense® corn, Trp and Ile are the co-fourth limiting amino acids for 36 to 59 kg pigs, while Trp is fourth limiting for 77 to 100 kg pigs.

Key Words: Amino acids, Corn, Swine

145 Effect of increasing lysine/net energy concentration on growth performance and plasma urea nitrogen concentration of late-finishing barrows fed low-protein amino acid-supplemented diets and Paylean. R. Moreno^{*}, P. S. Miller, and T. E. Burkey, *University of Nebraska, Lincoln.*

A study was conducted to evaluate the effects of increasing the lysine (lys):NE ratio on growth performance and plasma urea nitrogen concentration (PUN) of late-finishing barrows fed low-CP AA-supplemented diets and Paylean (ractopamine HCl; RAC). Twenty-four late-finishing barrows (83.6 kg) were used in a 28-d experiment. Pigs were individually penned and had ad libitum access to feed and water. The pigs were randomly allotted to 1 of 6 dietary treatments consisting of 1 corn-soybean meal diet (5.24 g lys/Mcal NE; 20% CP) and 5 low-CP AA-supplemented diets with increasing lys/NE concentration (16% CP; 3.35 to 5.83 g lys/Mcal NE) and RAC inclusion (0 and 5 ppm). Body weight and feed disappearance were measured and ADG, ADFI, and G:F were calculated. Blood samples were collected weekly. Backfat depth (BF) and LM area (LMA) were measured at the 10th rib by ultrasound. There were no differences among treatments for final weight ($P = 0.62$). No effect of lys/NE was detected for ADG, ADFI or G:F ($P = 0.41, 0.33$, and 0.55). Increasing dietary lys/NE concentration resulted in a linear

decrease in BF ($P = 0.01$). The greatest BF (2.26 cm) was recorded for the 3.35 g lys/Mcal NE treatment and the lowest (1.65 cm) corresponded to the 5.2 g lys/Mcal NE treatment; treatments did not affect final LMA ($P = 0.69$). We observed treatment effect for PUN on d 21 and 28 ($P = 0.01$ and 0.03 respectively), which indicates that feeding low-CP AA-supplemented diets and RAC resulted in decreased AA deamination and catabolism, especially at the end of the experimental period. The results of this experiment indicate that growth performance was not affected by increasing lys/NE concentration in low-CP AA-supplemented diets with 5 ppm of RAC inclusion; however, increasing lys/NE concentration results in decreased BF and decreased AA breakdown.

Key Words: Ractopamine, Pigs, Protein

146 True ileal digestible lysine requirement of finishing pigs fed low or high synthetic amino acid Paylean® diets. R. Hinson^{*1}, A. Gaines², J. Usry³, and G. Allee¹, ¹University of Missouri, Columbia, ²The Maschhoffs Inc., Carlyle, IL, ³Ajinomoto Heartland LLC, Chicago, IL.

Two experiments were conducted to determine the true ileal digestible (TID) Lys requirement of finishing pigs fed low or high synthetic amino acid Paylean® diets. In Exp. 1, 840 barrows and gilts (TR-4 × C22; 104 ± 0.27 kg BW) were fed a diet containing Paylean® (7.15 ppm) with 0.75, 0.85, 0.95, 1.05, or 1.15% TID Lys for 21 d with 8 replicate pens/treatment and 21 pigs/pen. All diets were formulated to be isocaloric (3405 kcal/kg ME) and contained 0.075% L-Lys•HCl. In Exp. 2, 840 barrows and gilts (TR-4 × C22; 105 ± 0.23 kg BW) were fed a diet containing Paylean® (7.15 ppm) with 0.75, 0.85, 0.95, 1.05, or 1.15% TID Lys for 21 d with 8 replicate pens/treatment and 21 pigs/pen. All diets were formulated to be isocaloric (3405 kcal/kg ME) and contained 0.325% L-Lys•HCl. Additional synthetic amino acids were included in the diets in order to maintain proper ratios in respect to TID Lys. In each experiment, pen weights and feed disappearance were measured at d 21 and intact pens were marketed in order to obtain carcass data. In Exp. 1, increasing the TID Lys resulted in a linear ($P < 0.001$) increase in ADG (1003, 1007, 1044, 1062, and 1030 g/d) and a linear increase ($P < 0.001$) of G:F (0.353, 0.370, 0.370, 0.384, 0.383). The TID Lys level had no effect on any of the carcass measurements. In Exp. 2, increasing the TID Lys resulted in a linear ($P = 0.01$) increase in ADG (948, 980, 1021, 1012, and 1039 g/d) and a linear increase of G:F (0.337, 0.355, 0.370, 0.380, 0.377). The TID Lys level had no effect on any of the carcass measurements. These studies would indicate that when feeding 7.15 ppm Paylean® for 21 d in diets containing either low or high levels of L-Lys•HCl, diets should be formulated to at least a 0.95% TID Lys.

Key Words: Pigs, Lysine, Paylean®

147 Dietary inclusion of colicin E1 prevents post weaning diarrhea in a seeder challenge model. S. A. Cutler^{*1}, N. A. Cornick¹, S. M. Lonergan¹, and C. H. Stahl², ¹Iowa State University, Ames, ²North Carolina State University, Raleigh.

Post-weaning diarrhea (PWD) continues to cause significant economic losses to the swine production industry. The efficacy of Colicin E1 (Col E1) as an alternative to dietary antibiotics to prevent PWD has been demonstrated. A pure Col E1 was included at 20 mg/kg diet for the