

ADG and G:F were subjected to a broken line analysis and a quadratic analysis. The resulting SID Lys requirements for ADG and G:F were 1.18 and 1.29% for broken line analysis and 1.28 and 1.39% for quadratic analysis, respectively. A growth assay (Exp. 2) was conducted to develop diets using corn gluten meal (CGM) and field peas or high protein distillers dried grains (HP-DDG) as the main protein sources in corn-based diets. A corn-soybean meal control diet (1.20% SID Lys), 2 corn-CGM-field pea diets (1.20 and 1.35% SID Lys, respectively), and 2 corn-HP-DDG diets (1.20 and 1.35% SID Lys, respectively) were formulated. Pigs fed the control diet had greater ($P < 0.05$) ADG and G:F than pigs fed diets containing corn co-products. Pigs fed the corn-CGM-field pea diet and the corn-HP-DDG diet containing 1.35% SID Lys had greater ($P < 0.05$) G:F than pigs fed the diets with 1.20% SID Lys. Pigs fed the corn-CGM-field pea diet with 1.35% SID Lys also had greater ($P < 0.05$) ADG than pigs fed the same diet with 1.20% SID Lys. In Exp. 3, the requirements for Lys and Trp were determined in pigs fed diets containing corn, CGM, and field peas. Break point and quadratic analyses were conducted for ADG, G:F and plasma urea nitrogen (PUN). The requirements for SID Lys and SID Trp for maximum ADG, G:F, and PUN were 1.07 and 0.19%, 1.11 and 0.18%, and 1.10 and 0.20%, respectively, if the breakpoint analysis was used and 1.22 and 0.25%, 1.34 and 0.22%, and 1.30 and 0.25%, respectively, if the quadratic analysis was used. These data demonstrate that requirement estimates for Lys are influenced by the type of diet that is used and requirement estimates for both Lys and Trp are influenced by the response criteria and the type of analysis that is used to determine the requirement.

Key Words: amino acids, lysine, pigs, tryptophan

169 Effects of standardized ileal digestible (SID) tryptophan:lysine ratio in diets containing 30% dried distiller grains with soluble (DDGS) on finishing pig performance and carcass traits. J. A. Barnes,* M. D. Tokach, J. M. DeRouche, R. D. Goodband, S. S. Dritz, and J. L. Nelssen, *Kansas State University, Manhattan.*

The effects of SID Trp:Lys ratio in growing-finishing pig diets containing 30% DDGS were evaluated in 2 experiments. Within each experiment, crystalline Lys and Trp replaced soybean meal to alter the dietary SID Trp:Lys levels while maintaining minimum ratios of other AA. In Exp. 1, 638 pigs (36.3 kg BW) were used in a 105-d trial (6 pens/trt). Pens of pigs were randomly allotted to 1 of 4 dietary treatments with SID Trp:Lys ratios of 14.0, 15.0, 16.5, and 18.0%. From d 0 to 42, there was a tendency for increased ADG (0.78, 0.83, 0.88, 0.88 kg/d; quadratic $P < 0.06$) and ADFI (1.79, 2.01, 2.04, 2.07 kg/d; quadratic $P < 0.07$) with no changes in G:F as Trp:Lys ratio increased. Overall, ADG (0.79, 0.82, 0.86, 0.90 kg/d) and ADFI (5.22, 5.66, 5.87, 6.06 kg/d) increased linearly ($P < 0.001$) as Trp:Lys increased through 18% with no changes in G:F. As SID Trp:Lys ratio increased, final BW (117.3, 120.4, 125.0, 129.7 kg; linear, $P < 0.01$) and HCW (87.0, 88.7, 93.4, 95.1 kg; linear, $P < 0.01$) increased. The results indicated the optimal SID Trp:Lys ratio was 16.5% from 36.3 to 72.6 kg, but at least 18% from 72.6 to 120.2 kg. In Exp. 2, 1,214 pigs (66.3 kg BW) were used in a 73-d finishing trial (9 pens/trt). Pens of pigs were randomly allotted to 1 of 5 dietary treatments with SID Trp:Lys ratios of 15.0, 16.5, 18.0 and 19.5, and the 15.0% trp:lys diet with L-Trp added to achieve 18.0% SID Trp:Lys. Overall (d 0 to 73), ADG (0.73, 0.76, 0.79, 0.81 kg/d), ADFI (2.42, 2.43, 2.51, 2.53 kg/d), G:F (0.30, 0.31, 0.32, 0.32), final BW (118.2, 120.0, 122.7, 123.8 kg), and HCW (88.4, 89.8, 90.6, 93.0) improved (linear, $P < 0.03$) as dietary SID Trp:Lys increased through 19.5%. Overall, there were no differences between the diet with 18.0% SID Trp:Lys and the diet with 15.0% SID trp:lys

with added L-Trp to 18.0%. These results indicate a SID Trp:Lys requirement of 16.5% up to 72.6 kg and at least 19.5% in late finishing pigs for optimal growth performance in diets containing 30% DDGS.

Key Words: tryptophan, DDGS, finishing pigs

170 Determination of standardized ileal digestible (SID) valine and isoleucine requirements in corn and soybean meal (C-SBM) diets for 20- to 50-kg pigs. A. M. Waguespack*¹, T. D. Bidner¹, R. L. Payne², and L. L. Southern¹, ¹Louisiana State University, Agricultural Center, Baton Rouge, ²Evonik-Degussa Corp., Kennesaw, GA.

Three experiments were conducted to determine the SID Val and Ile requirements for 20- to 50-kg pigs fed C-SBM-based diets. In all experiments (26 to 27 d), diets contained 0.83% SID Lys, which is the determined Lys requirement of the pigs used. All diets were supplemented with 0.335% L-Lys, 0.14% DL-Met, 0.19% L-Thr, 0.05% L-Trp, 0.53% Gly, and 1.03% L-Glu to meet ratios of SID AA:SID Lys of 0.62 TSSA, 0.71 Thr, and 0.20 Trp and to achieve 1.66% Gly+Ser and 3.284% Glu. Treatments were replicated with a minimum of 5 pens with 3 to 4 pigs each in randomized complete block designs. In Exp. 1, all diets contained 0.065% L-Ile to maintain 0.498% SID Ile (0.60 SID Ile:Lys). L-Val was added to the diets at 0.02% increments from 0 to 0.10% to achieve 0.51 to 0.61% SID Val. Valine addition increased ADG (720, 776, 784, 814, 829, and 803 g), ADFI (1,788, 1,956, 1,903, 1,949, 2,011, and 1,908 g), and G:F (0.40, 0.40, 0.41, 0.42, 0.42, 0.42 g/g) in pigs fed 0.51 to 0.59% SID Val (linear, $P < 0.08$), but ADG, ADFI, and plasma urea nitrogen (6.91, 7.49, 7.47, 7.69, 7.94, and 6.70 mg/dL) were decreased at 0.61% SID Val (quadratic, $P < 0.10$). The SID Val requirement was estimated to be between 0.56 and 0.58% using ADG and G:F, or Val:Lys of 0.67 and 0.70. In Exp. 2 and 3, diets contained 0.61% SID Val and L-Ile was added at 0.02% increments from 0 to 0.08% to achieve 0.43 to 0.51% SID Ile. In Exp. 2, Ile addition increased ADG (792, 747, 766, 807, and 799 g) from 0.45 to 0.49% SID Ile (linear, $P < 0.06$), but plateaued at 0.51% SID Ile (quadratic, $P < 0.06$). Daily feed intake (1,999, 1,883, 1,914, 2,027, and 1,929 g) was not affected ($P > 0.10$) by Ile addition to the diet. Isoleucine addition tended to increase G:F (0.397, 0.399, 0.401, 0.399, and 0.415 g/g) in pigs fed 0.43 to 0.51% SID Ile (linear, $P < 0.11$). In Exp. 3, ADG, ADFI, and G:F were not affected by Ile addition to the diet. The results of this research indicate that the SID Val requirement is between 0.56 to 0.58% (0.67 to 0.70 SID Val:SID Lys), and the Ile requirement is adequate at 0.43% SID Ile (0.52 SID Ile:SID Lys) for 20- to 50-kg pigs.

Key Words: pigs, valine, isoleucine

171 Impact of varying dietary lysine and sulfur amino acids on growth performance of 10 to 20 kg pigs. J. K. Htoo*¹ and J. Morales², ¹Evonik Degussa GmbH, Hanau-Wolfgang, Germany, ²PigChampPro Europa, S. A., Segovia, Spain.

Lysine requirement of today's high lean pigs may be higher than currently assumed. Methionine is considered the second or third limiting amino acid (AA) in typical swine diets. A 21-d growth assay was conducted with 324 PIC pigs [GP1050; initial body weight (BW) = 9.6 kg] to estimate the optimal standardized ileal digestible (SID) sulfur amino acids (SAA):Lys ratio for 10 to 20 kg pigs. Pigs were blocked by BW and allotted to 9 dietary treatments with 6 pigs (3 barrows and 3 gilts) per pen and 6 replicates per treatment. Diets 1 to 4 and 9 were formulated to contain SID SAA of 0.55, 0.63, 0.71, 0.78, 0.86%,