Two experiments were conducted at a commercial research site in order to evaluate the effects of high synthetic lysine inclusion on the growth performance of growing gilts. In Exp. 1, a total of 735 gilts (TR-4 × C22; 32.1 ± 0.15 kg) were used in a RCBD with 7 replicate pens/treatment and 21 pigs/pen (on test 21 d). Pigs were allotted to one of five dietary treatments containing 0.10, 0.20, 0.30, 0.40, and 0.50% added L-Lysine-HCl, respectively. Diets were formulated at a 0.60% true ileal digestible (TID) lysine with supplementation of only L-Thr and Alimet® feed supplement. For Exp.1, diets supplemented with 0.50% L-Lysine-HCl resulted in decreased (Treatment, P < 0.06; Quadratic, P < 0.05) ADG (942, 951, 946, and 907 g/d) and decreased (Treatment, P < 0.01; Linear, P < 0.001) G:F (0.484, 0.476, 0.478, 0.480, and 0.463) compared to diets with 0.10-0.40% L-Lysine-HCl inclusion. In Exp. 2, a total of 1,029 gilts (TR-4 × C22; 29.5 ± 0.20 kg) were used in a RCBD with 7 replicate pens/treatment and 21 pigs/pen (on test 23 d). Pigs were allotted to one of six dietary treatments containing 0.10, 0.20, 0.30, 0.40, 0.50, and 0.60% added L-Lysine-HCl, respectively. Diets were formulated at a 0.60% TID lysine and additional L-Thr, Alimet®, L-tryptophan, L-lysine, and L-Val were supplied as necessary to meet minimum amino acid ratios. For Exp 2, there were no differences in ADG (P = 0.21) with increasing L-Lysine-HCl inclusion (935, 948, 922, 929, 942, and 926 g/d). However, diets supplemented with 0.60% L-Lysine-HCl resulted in decreased (Treatment, P < 0.01; Linear, P < 0.01) G:F (0.481, 0.481, 0.476, 0.475, and 0.468) compared to diets with 0.10-0.51% L-Lysine-HCl inclusion. Collectively, these two experiments indicate that in practical diet formulations, up to 0.40% L-Lysine is a subject of debate. In Exp. 2, a total of 1,029 gilts (TR-4 × C22; 29.5 ± 0.20 kg) were used in a RCBD with 7 replicate pens/treatment and 21 pigs/pen (on test 23 d). Pigs were allotted to one of six dietary treatments containing 0.10, 0.20, 0.30, 0.40, 0.50, and 0.60% added L-Lysine-HCl, respectively. Diets were formulated at a 0.60% TID lysine and additional L-Thr, Alimet®, L-tryptophan, L-lysine, and L-Val were supplied as necessary to meet minimum amino acid ratios. For Exp 2, there were no differences in ADG (P = 0.21) with increasing L-Lysine-HCl inclusion (935, 948, 922, 929, 942, and 926 g/d). However, diets supplemented with 0.60% L-Lysine-HCl resulted in decreased (Treatment, P < 0.01; Linear, P < 0.01) G:F (0.481, 0.481, 0.476, 0.475, and 0.468) compared to diets with 0.10-0.51% L-Lysine-HCl inclusion. Collectively, these two experiments indicate that in practical diet formulations, up to 0.40% L-Lysine-HCl can be added in diets if supplemented with additional synthetic amino acids. (Alimet® is a trademark of Novus International, Inc., and is registered in the United States and other countries)

Key Words: Gilts, Lysine-HCl, growth
Effect of increasing true ileal digestible (TID) lysine and TSAA in 33 to 60 kg pigs

<table>
<thead>
<tr>
<th>Item</th>
<th>TID Lysine, %</th>
<th>ADG, kg</th>
<th>G:F</th>
<th>TID TSAA, %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.79 0.87 0.94 1.02 1.10 SE</td>
<td>0.95 0.99 1.00 1.07 1.06 0.065 0.01 0.65</td>
<td>0.453 0.472 0.494 0.515 0.491 0.023 0.01 0.03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.53 0.57 0.61 0.66 0.70 SE</td>
<td>1.00 1.02 1.02 1.02 1.06 0.065 0.22 0.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.471 0.478 0.498 0.492 0.491 0.023 0.15 0.32</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Key Words: Sulfur amino acids, Lysine, Finishing pig

148 True ileal digestible (TID) isoleucine:lysine ratio of late-finishing barrows fed corn-bred cell or corn-amino acid diets. S. X. Fu1, D. C. Kendall1, R. W. Fent1, G. L. Allee1, and J. L. Usry2,1 University of Missouri-Columbia, Ajinomoto Heartland LLC.

Two experiments were conducted to determine the TID isoleucine:lysine ratio of late-finishing barrows fed corn-RBC (red blood cell) diets or corn-AA diets. In Exp. 1, 150 barrows (TR4 x C22, BW=89.9 kg) were allotted to six dietary treatments with five replicates of five pigs per pen. Dietary treatments included a five-point titration (TID isoleucine:lysine: 47, 54, 61, 68 and 75%) containing 3.9% RBC and a corn-SBM control diet. All diets contained 0.52% TID lysine and 3.40 Mcal/kg ME. Results indicated linear (P<0.001) and quadratic (P<0.001) improvement in ADG (0.628, 0.841, 1.074, 1.120 and 1.151 kg/d, respectively) and G:F (0.242, 0.300, 0.336, 0.337 and 0.327, respectively) to increasing isoleucine:lysine ratio. A linear increase (P<0.001) was observed in ADFI (2.575, 2.804, 3.262, 3.325 and 3.523 kg/d, respectively). Pigs fed the corn-RBC diet with an isoleucine:lysine ratio of 75% tended to have higher ADG (1.151 vs. 1.106 kg/d, P=0.06) and ADFI (3.325 vs. 3.293 kg/d, P=0.07) than pigs fed corn diet. In Exp. 2, 45 individually-housed barrows (96.9 kg) were used in a 5-point TID isoleucine:lysine titration (45, 51, 57, 63 and 69%) utilizing all-corn diets fortified with synthetic amino acids. All diets contained 0.52% TID lysine and 3.40 Mcal/kg ME. A quadratic response in ADG (0.811, 0.935, 0.892, 0.855 and 0.884 kg/d, respectively; P<0.001) and ADFI (3.254, 3.563, 3.574, 3.400 and 3.280 kg/d, respectively; P<0.01) was observed to increasing isoleucine:lysine ratio. No difference was observed in G:F (0.249, 0.262, 0.250, 0.251 and 0.256, respectively; P>0.10) among treatments. Based on these data, TID isoleucine:lysine ratio of late-finishing barrows was estimated to be 61.7% (ADG) and 57.9% (G:F) for pigs fed corn-RBC diets and 50.7% (ADG) and 53.0% (ADFI) for pigs fed all-corn diets fortified with synthetic amino acids.

Key Words: Isoleucine, Blood cell, Pigs

149 Effects of protein source on true ileal digestible (TID) isoleucine:lysine ratio of late-finishing barrows. S.X. Fu1, R.W. Fent1, P. Srichana1, G.L. Allee1, and J.L. Usry2,1 University of Missouri-Columbia, Ajinomoto Heartland LLC.

Two 22-day experiments were conducted to determine the effects of protein source on TID isoleucine:lysine ratio of late-finishing barrows. In Exp. 1, 114 barrows (TR4 x C22, BW=87.1 kg) were blocked by weight and allotted to one of nine dietary treatments with eight replicates of two pigs per pen. Treatment 1 was a corn-SBM control diet with an isoleucine:lysine ratio of 61% for ADG and 61% for G:F. In conclusion, TID isoleucine:lysine ratio of late-finishing barrows was affected by dietary protein source; pigs fed corn-RBC diets need a higher TID isoleucine:lysine ratio to maximize growth performance than pigs fed corn-SBM diets.

Key Words: Isoleucine, Blood cell, Pigs

150 Evaluation of the true ileal digestible (TID) tryptophan requirement for late nursery pigs fed high L-lysine HCl diets. R. W. Fent*, A. M. Gaines, S. X. Fu, B. W. Ratliff, P. Srichana, and G. L. Allee, University of Missouri-Columbia.

Two experiments were conducted to determine the effect of dietary TID tryptophan concentration on the growth performance of late nursery pigs fed diets containing high levels of L-lysine HCl. In Exp. 1, 135 pigs (TR-4, C22: 13.4 ± 0.01 kg) were allotted to one of five dietary treatments in a randomized complete block design with six replicate pens per treatment. These pigs were housed in a segregated early weaning facility. In Exp. 2, a commercial nursery facility was utilized in which 922 pigs (TR-4, C22: 14.8 ± 0.15 kg) were allotted to the same dietary treatments as Exp. 1 in a randomized complete block design with six replicates per treatment. All diets contained 0.7% L-lysine HCl and were formulated to 1.30% TID lysine with a lysine:CP ratio maintained at 7.0%. Treatments consisted of a titration of dietary TID tryptophan concentration including 0.165, 0.185, 0.205, 0.225, and 0.245% achieved through the addition of L-tryptophan to the basal diet. Exp. 1 and 2 were conducted on a 17-d or 15-d growth period, respectively, with ADG, ADFI, and G:F calculated at the conclusion of the experiments. Similar growth responses were observed for the two nursery experiments. Average daily gain, ADFI, and G:F were similar (P>0.05) across all dietary treatments as TID tryptophan concentration increased in the diet. Average daily gain for Exp. 1 and 2 were 603, 621, 631, 621, and 626 g/d (SE=19.1) and 549, 572, 572, 576, and 576 g/d (SE=13.6), respectively, for the five dietary treatments. Gain:feed for Exp. 1 and 2 were 0.711, 0.733, 0.720, 0.728, and 0.708 (SE=0.011) and 0.654, 0.671, 0.676, 0.667, 0.676 (SE=0.009). These data indicate that the TID tryptophan requirement for late nursery pigs may not be greater than 0.165% when pigs are consuming a diet containing 0.7% L-lysine HCl.

Key Words: Tryptophan, Pigs, L-Lysine HCl

151 Body weight has no effect on the therophy requirement in growing pigs. J. van Milgen*, J. Noblet*, and L. Le Bellego*,1 INRA - UMR VP, 2Ajinomoto Eurolysine SAS.

Threonine is generally the second or third limiting amino acid in cereal-based diets. Relative to other amino acids, endogenous losses of threonine are quite high. Consequently, the contribution of maintenance to the total requirement is higher for threonine than for most other amino acids. Total ileal digestible threonine requirements are usually expressed relative to that of lysine (thr:lys). If the contribution of maintenance to the total amino acid requirement changes during growth, the optimum thr:lys ratio will vary. A series of experiments was conducted to determine the effect of BW on the optimum thr:lys ratio in growing pigs. In experiment 1, fifteen blocks of four pigs each (initial BW 55 kg) were fed one of four diets in which the thr:lys ratio varied between 55 to 70% for the three stages. The hypothesis that lysine was the second-limiting amino acid in the experiment was confirmed in a separate experiment in which additional lysine was added to the diet with the highest thr:lys ratio. Ileal digestibility of the diets without added threonine was determined in 40-kg pigs with an ileo-rectal anastomosis. Performance was analyzed using either a linear-plateau (LP) or a curvilinear-plateau model (CLP). Average daily gain ranged from 720 g/day (BW linearly to 20 kg) to 734 g/day (BW linearly to 90 kg). Using CLP, the optimum thr:lys ratio was 65% with no significant effect of BW on this ratio. The estimate when using model LP was about 3%-point lower.