160 Determining the optimal lysine:calorie ratio for growth performance of 10 to 25 kg nursery pigs. J. D. Schneider*, M. D. Tokach, S. S. Dritz, R. D. Goodband, J. L. Nelssen, and J. M. DeRouchey, *Kansas State University*.

Two studies were conducted to evaluate the effects of increasing dietary lysine and energy density on performance of Genetiporc nursery pigs. Experiment 1 was organized as a combination of two simultaneous experiments with one set of diets consisting of five treatments with increasing true ileal digestible (TID) lysine (0.99, 1.07, 1.14, 1.22, and 1.30%) and the second set of diets consisting of five treatments with increasing energy density (2,952, 3,093, 3,236, 3,377, and 3,520 kcal of ME/kg). The highest level of both lysine and energy (1.30% and 3,520 kcal/kg, respectively) was combined as one diet for a total of 10 treatments. Pigs were randomly allotted to 8 replications with 5 pigs per pen. Increasing TID lysine linearly (P<0.01) improved ADG and G:F. While increasing energy density had no effect on ADG, ADFI decreased (linear, P<0.01) which resulted in a quadratic (P<0.08) improvement in G:F. Regression analysis of the response surface indicated the optimal lysine:calorie ratio was 3.7 g lysine/Mcal ME. In Exp. 2, pigs were fed diets with two different energy densities (2.95 or 3.28 Mcal ME/kg) with TID lysine:calorie ratios ranging from 3.1 to 4.1 g/Mcal ME. There was an energy density by TID lysine:calorie ratio interaction (P<0.03) for ADG. The greatest ADG was achieved for pigs fed a lysine:calorie ratio of 3.60 for pigs fed the low energy diets and 3.36 for pigs fed the high energy diets. Feed efficiency improved (quadratic, P<0.01) as lysine:calorie ratio increased for pigs fed the low energy diet with the best G:F observed at 3.87. Pigs fed the high energy diets had a quadratic (P < 0.07) improvement in G:F as the lysine:calorie ratio increased with the best feed efficiency at 4.07; however, little improvement were observed when the ratio was increased above 3.36. Based on these results, the optimal lysine to calorie ratio seems to be 3.30 to 3.87 g of TID lysine/Mcal ME for pigs in these facilities.

Key Words: Lysine, Energy, Nursery pigs

161 Comparison of the relative bioefficacy of Alimet® feed supplement and DL-methionine in nursery pigs. A. M. Gaines*[1], G. F. Yi[2], B. W. Ratliff[1], P. Srichana[1], G. L. Allee[1], C. D. Knight[2], and K. R. Perryman[2], [1]*University of Missouri,* [2]*Novus International Inc*.

A 21 d growth assay experiment was conducted under commercial research conditions to compare the relative bioefficacy of Alimet feed supplement and DL-methionine. A total of 1,232 pigs (TR-4 × C22; initial BW 10.9 ± 0.37 kg) were allotted to 7 dietary treatments in a RCBD with 8 replicate pens (22 pigs) per treatment. The basal diet (Diet 1) was a corn-soybean meal-amino acid based diet formulated to contain 0.50% true ileal digestible (TID) methionine + cystine (SAA) with no supplemental Alimet® or DL-methionine. Diets 2-7 consisted of the basal diet supplemented with three equimolar levels of Alimet® or DL-methionine that corresponded to TID SAA concentrations of 0.56, 0.62, and 0.68%, respectively. The highest level of TID SAA was below the requirement estimate for pigs of this weight range. There was no effect of methionine source (P = 0.13) or methionine source × TID SAA level interactions (P = 0.66) for any of the growth performance parameters measured. Increasing the TID SAA level from 0.50 to 0.68% resulted in linear increase in ADG (P < 0.001), ADFI (P < 0.05), and G:F (P < 0.001). Using the slope ratio method, the relative bioefficacy of Alimet® vs. DL-methionine on an equimolar basis was determined to be 122% and 110% for ADG and G:F, respectively. These results indicate that no difference exists in the biological activity of DL-methionine or Alimet® when diets are formulated on an equal molar basis, confirming the 88% bioefficacy value for Alimet® feed supplement. (Alimet® is a trademark of Novus International, Inc, and is registered in the United States and other countries).

Key Words: Nursery pigs, Alimet® feed supplement, DL-methionine

162 Estimation of the ideal ratio of true ileal digestible sulfur amino acids:lysine in 12 to 24 kg pigs and comparison of methionine sources. A. M. Gaines[1], G. F. Yi*[2], B. W. Ratliff[1], P. Srichana[1], G. L. Allee[1], C. D. Knight[2], and K. R. Perryman[2], [1]*University of Missouri,* [2]*Novus International Inc*.

The objective of this research was to validate our previous sulfur amino acid:lysine (SAA:LYS) ratio estimate for 12 to 24 kg nursery pigs under commercial conditions and compare Alimet® feed supplement and DL-methionine as methionine sources. A total of 1,544 nursery pigs (TR4 × C22; 12.4 ± 0.13 kg) were allotted to one of nine dietary treatments in a RCBD with 8 replicate pens (22 pigs/pen) per treatment. The basal diet (Diet 1) was a corn-soybean meal based diet with no supplemental Alimet® or DL-methionine (TID SAA:LYS 49%). Diets 2-9 consisted of the basal diet supplemented with four equimolar levels of Alimet® or DL-methionine to deliver TID SAA:LYS ratios of 54, 59, 64, and 69%, respectively. There were no effect of methionine source (P = 0.60) or methionine source × TID SAA:LYS ratio interactions (P = 0.10) for any of the growth performance parameters. Increasing the TID SAA:LYS ratio increased ADG (quadratic, P < 0.01) and improved G:F (quadratic, P < 0.01), but had no effect on ADFI (P = 0.87). The current data were pooled with a previous study and fitted with a two-slope broken-line regression model and a quadratic regression model. The breakpoint of the broken-line regression model, the intercept of the broken-line and quadratic regression curve, and the 95% upper asymptote of the quadratic response indicated that the optimum TID SAA:LYS ratios were 59.1, 60.0, and 58.7% for ADG, respectively and 60.6, 61.5 and 61.3% for G:F, respectively. Collectively, these data suggest that the optimum sulfur amino acid:lysine ratio for late nursery pigs is approximately 60% and there is no difference in the methionine sources (DL-methionine vs. Alimet®) when expressed on the same molar equivalency. (ALIMET® is a trademark of Novus International, Inc, and is registered in the United States and other countries).

Key Words: Nursery pigs, Growth, Methionine source

163 Effects of feeding diets containing spray dried corn condensed distillers solubles and associated fractions to early-weaned pigs on intestinal morphology, immune status, circulating IGF-1 concentrations, and organ weights. J. Knott*, G. Shurson, M. Hathaway, and L. Johnston, *University of Minnesota*.

Intestinal morphology and serum acute phase protein and insulin-like growth factor 1 (IGF-1) concentrations were measured to determine the effectiveness of corn distillers solubles by-products as potential replacements for carbadox and porcine plasma in diets for early-weaned pigs. Barrows (n=560; 5.06 kg) were blocked by initial weight, and randomly allotted to one of 56 pens (10 pigs/pen). Pigs were fed one of seven experimental diets consisting of a negative control (NC), NC + 15% spray dried distillers solubles (DS), NC + 7.5% spray dried yeast cream (YC), NC + 15% spray dried residual solubles (RS), NC + 55 ppm carbadox (AB), NC + 6% spray dried porcine plasma (PP), and NC + AB + PP (PC) for the first 10-d post-weaning. On d 10, one pig from each pen (n=56) was sacrificed to determine villi height (VH) and crypt depth (CD) at 25, 50, and 75% of the small intestine (SI) length. Blood samples were collected on d 0, 3, 7, 10, 14, 21, 28, 35, and 42, and used to measure serum α_1-acid glycoprotein (AGP), serum haptoglobin (Hp), and IGF-1 concentrations. Pigs fed the RS and PC diets had longer villi (P<0.05) and greater villi height:crypt depth ratio (VCR; P<0.05) in the upper 25% of the SI compared to pigs fed the NC, DS, YC, and AB diets. There was no effect of diet on VH, CD, or VCR in the 50% and 75% portions of the SI length or overall. Small and large intestine length and weight were not affected by diet. Serum AGP concentration was not affected by diet on d 3 or d 10. However, Hp concentrations were lower (P<0.05) on d 10 for pigs fed AB and PC diets indicating a lower immune system activation. Circulating IGF-1 levels were not affected by treatment. These results suggest that feeding diets containing RS and PC promotes greater villi height and VCR compared to pigs fed diets containing carbadox. However, pigs fed diets containing carbadox appeared to have lower immune system activation compared to pigs fed diets that did not contain carbadox.

Key Words: Distiller's solubles, Early-weaned pigs, Antimicrobial alternatives