

**180 Effects of increased dietary lysine on sow and litter performance.** R.E. Musser\*, R.D. Goodband, J.L. Nelssen, M.D. Tokach, and S.S. Dritz, *Kansas State University, Manhattan.*

Three hundred and fifty three lactating sows were used to determine the effects of increased dietary lysine on sow and litter performance. At farrowing, sows were assigned to corn-soybean meal lactation diets (no crystalline amino acids) consisting of either 1.0 or 1.3% total lysine. Average sow parity was 2.85 and lactation length was 17 d. Both parity and lactation length were used as covariates in the analysis. Litters were standardized to 10.5 pigs on d 2 of lactation. A treatment by parity interaction was observed with first parity sows fed 1.3% lysine having heavier litter weaning weights than sows fed 1.0% lysine (48.4 vs 44.8 kg respectively;  $P < .03$ ). Surprisingly, third and fourth parity sows fed 1.3% lysine had decreased litter weaning weights than those fed 1.0% lysine (48.6 vs 52.3 kg respectively;  $P < .06$ ). No other treatment by parity interactions existed. No differences were observed in the number of pigs weaned (9.7 vs 9.8;  $P = .61$ ) or pig survivability (93.2 vs 93.5%;  $P = .77$ ). Sows fed 1.0% lysine consumed less feed the first week of lactation than sows fed 1.3% lysine (4.35 vs 4.54 kg/d;  $P < .02$ ), with no differences observed during week two or overall (4.85 vs 4.94 kg/d;  $P = .31$ ). No differences were observed in subsequent reproductive performance for days to estrus (6.0 vs 5.9 d;  $P = .80$ ), farrowing rate (71.5 vs 76.7%;  $P = .35$ ), or number of pigs born or born alive (10.5 vs 10.5;  $P = .84$ ) for sows fed either 1.0% or 1.3% lysine. This experiment observed that increasing dietary lysine from 1.0 to 1.3% increased litter weaning weights for parity one sows, but not for older sows. Increasing dietary lysine from 1.0 to 1.3% did not influence subsequent reproductive performance.

**Key Words:** Lysine, Lactation, Weaning weight

**181 Valine is a Limiting Amino Acid in Low-Protein Nursery Diets.** I. Mavromichalis<sup>1</sup>, D. M. Weibel<sup>1</sup>, J. L. Emmert<sup>1</sup>, R. L. Moser<sup>2</sup>, and D. H. Baker<sup>1</sup>, <sup>1</sup>*University of Illinois, Urbana, IL*, <sup>2</sup>*United Feeds, Inc., Sheridan, IN*.

Three trials were carried out with pigs between 5 and 8 wk of age to determine the limiting order of amino acids in a 13.5% CP corn-soybean meal-based diet containing 8% dried whey. The positive-control diet was a 19.2% CP corn-soybean meal-based diet (1.15% Lys), also with 8% dried whey. Amino acid additions to the low-protein, negative-control diet were based on levels needed to accomplish 110% of ideal ratios (to Lys, set at 1.15%). In Exp. 1, addition of an amino acid mixture containing Lys, Trp, Thr, Met, Ile, and Val to the low-protein diet increased ( $P < .05$ ) gain and gain:feed ratio, and these response traits were not different from those of pigs fed the 19.2% CP positive-control diet. Single deletion of Lys from the supplemental amino acid mixture depressed performance to a greater ( $P < .05$ ) extent than single deletion of any of the other amino acids. Single deletions of Trp, Thr, Met, or Val decreased ( $P < .05$ ) performance in a similar but lesser magnitude than the decrease caused by Lys deletion, whereas Ile deletion was without effect. Exp. 2 and 3 were designed to evaluate the limiting order of AA beyond Lys in the low-protein diet. Neither His nor Glu were found to be deficient, and as in Exp. 1, Trp, Thr, Met, or Val deletion from the supplemental amino acid mixture resulted in performance depressions ( $P < .05$ ) that were similar. These results suggest that Lys is first limiting and Trp, Thr, Met, and (surprisingly) Val are equally second limiting in a reduced protein (13.5% CP) corn-soybean meal-based diet with 8% whey for 10-kg pigs.

**Key Words:** Low-Protein Diet, Limiting Amino Acids, Valine

**182 Effect of variable net energy content of low crude protein, crystalline amino acid-supplemented diets for growing-finishing pigs.** K. G. Friesen<sup>1</sup>, B. J. Kerr<sup>2</sup>, L.L. Southern<sup>3</sup>, and T.D. Bidner<sup>3</sup>, <sup>1</sup>*The Pork Group - Tyson Foods, Inc., Springdale, AR*, <sup>2</sup>*Nutri-Quest, Inc., Chesterfield, MO*, <sup>3</sup>*LSU Agricultural Center, Baton Rouge, LA*.

An experiment was conducted to evaluate varying CP and(or) NE levels for pigs. Gilts were allotted on the basis of BW to six treatments with nine reps of 13 gilts each in a RCB. Digestible Lys levels of .96 (25 to 41 kg BW), .75 (41- 59 kg BW), .60 (59 to 82 kg BW), and .48% (82 to 110 kg BW) were fed in the four phase growing-finishing period. The digestible TSAA, Trp, and Thr levels fed at each Lys level were .60,

.20, .64; .50, .16, .50; .46, .13, .42; and .41, .10, .34%. The six dietary treatments were three levels of NE within two levels of CP. The high CP diet was formulated to provide all amino acids from intact protein (except crystalline Thr was used in some diets). The low CP diet was formulated to meet the Ile requirement at each phase of growth and crystalline Lys, Thr, Trp, and Met were added. The low CP diet was approximately 4% lower in CP than the high CP diet. The three NE levels (by changing dietary levels of tallow and wheat middlings) at each level of CP were 2,536, 2,474, and 2,412 kcal/kg in Phase 1; 2,585, 2,526, and 2,467 kcal/kg in Phase 2; 2,429, and 2,391, 2,353 kcal/kg in Phase 3; 2,466, 2,421, and 2,376 kcal/kg in Phase 4. Gain was not affected by CP level, but GF was decreased ( $P < .01$ ) by the low CP level. Gain/feed also was decreased ( $P < .01$ ) as NE level decreased. Gain/feed was highest in pigs fed the high CP, high NE diet, and GF was lowest in pigs fed the low CP, low NE diet (CP x NE,  $P < .06$ ). Loin eye area (LEA) was reduced ( $P < .08$ ) by the low CP diet, but percentage muscling (NPPC), lean gain, and fat free lean (TOBEC; carcass and ham) were not affected by CP. Tenth rib 3/4 fat, lean:fat, total fat (TOBEC) were not affected by diet. Pigs fed the intermediate level of NE had the highest LEA and lean gain (NE quadratic,  $P < .05$ ). Low protein, amino acid supplemented diets fed throughout the growing-finishing period decreased GF, but they had very little effect on carcass traits of gilts.

**Key Words:** Pigs, Amino acids, Carcass traits

**183 Effects of increasing L-lysine HCl in corn-soybean meal diets on finishing pig growth performance and carcass characteristics.** M. De La LLata\*, M.D. Tokach, R.D. Goodband, J.L. Nelssen, S.S. Dritz, and J.A. Loughmiller, *Kansas State University, Manhattan.*

One hundred and sixty growing pigs (PIC L326 x C22) with an initial weight of 63 kg were used in a 54 d growth trial to determine the effects of increasing L-lysine HCl in corn-soybean meal based diets for finishing pigs. Treatments consisted of a control diet, (no L-lysine HCl) or .15, .225, and .30% L-lysine HCl replacing the lysine provided by soybean meal. Dietary treatments fed in a grower (60 to 80 kg) and a finisher (80 to 110 kg) phase were formulated to contain .70 and .55% total lysine, respectively. During the grower phase increasing L-lysine HCl from 0, .15 or .225% to .30% decreased ADG ( $P < .05$ ) and reduced ( $P < .05$ ) feed efficiency (G:F). During the finishing phase, increasing L-lysine HCl from 0, .15 or .225% to .30% decreased ( $P < .05$ ) ADG. Feed efficiency was decreased ( $P < .05$ ) when L-lysine HCl increased from 0 or .15% to .225 or .30%. For the overall experiment increasing L-lysine HCl from 0 or .15% to .225 or .30% decreased ( $P < .05$ ) feed efficiency (.30, .30, .28 and .26, respectively) and ADG (943, 912, 853 and 853 g, respectively). Carcass characteristics were not affected by dietary treatment, however, backfat depth numerically increased for the .30% L-lysine HCl treatment (15.5, 15.0, 15.0 and 17.1 mm, respectively). Based on the results of this experiment, no more than .15% L-lysine HCl should be added to replace lysine from soybean meal in a corn-soybean meal based diet to avoid deficiencies of other amino acids that limit the growth performance of finishing pigs.

**Key Words:** Lysine, Corn, Finishing pigs

**184 Effect of reducing protein level and adding amino acids on growth performance and carcass characteristics of finishing pigs.** H. Liu\*, G. L. Allee, J. J. Berkemeyer, K. J. Touchette, J. D. Spencer, and I. B. Kim, *University of Missouri-Columbia.*

A total of 156 high-lean-growth gilts were used in two experiments to evaluate the effect of reducing dietary CP level and adding synthetic amino acids (AA) on growth performance and carcass characteristics of finishing pigs. In Exp. 1, 96 pigs (initially 52.3 kg) were used in a 35 d growth trial to evaluate the effect of reducing CP and adding AA on early-finishing performance. There were 4 treatments in a RCB design with six replicate pens/treatment containing 4 pigs/pen. The control diet was formulated with corn and soybean meal and 3% added fat to contain .76% true ileal digestible lysine (TDL) and 16.8% CP with no AA added. All the other diets were formulated to contain the same levels of TDL and NE as the control diet by adding variable levels of lys and fat. Protein levels in trt 2 and 3 were reduced by 3 and 4%, respectively, with thr, trp, and met added to the ideal ratio. Trt 4 was similar to trt 3, except ile and val were added to meet the ideal ratio.