

increasing pellet conditioning temperature on pig growth performance. Experimental treatments consisted of a corn-soybean meal control diet (1.4% lysine and 15% dried whey) with no spray-dried animal plasma (SDAP) and fed in a meal form, or the control diet with 5% SDAP replacing soybean meal on a equal lysine basis also fed in a meal form. Additional treatments were the 5% SDAP diet pelleted (3.97 mm diameter) at conditioning temperatures of 60, 66, 71, or 77°C. Corresponding pellet exit temperatures were 68, 74, 77, and 80°C. The pelleted diets were conditioned with a ten second retention time and then pelleted using a Master Model HD 1000 series California Pellet Mill equipped with a 31.8 mm effective thickness die. Pigs were blocked by initial weight and allotted randomly to each of six dietary treatments with six pigs/pen and seven replications/treatment. From d 0 to 14 after weaning, pigs fed diets containing SDAP had greater ($P<.001$) ADG, G/F, and ($P<.08$) ADFI than pigs fed the control diet. No differences in performance were observed among pigs fed the meal diet containing SDAP and the mean of pigs fed the pelleted diets. Increasing pellet conditioning temperature up to 77°C did not adversely affect performance. These results suggest that conditioning temperatures up to 77°C do not adversely affect growth performance of pigs fed diets containing 5% SDAP from d 0 to 14 after weaning.

Key Words: Weanling Pigs, Spray-dried Animal Plasma, Pellet Conditioning Temperature

318 Effects of weaning diet on pig performance and intestinal morphology. K. J. Touchette^{*1}, R. L. Matteri², C. J. Dyer², J. A. Carroll², and G. L. Allee¹, ¹*University of Missouri-Columbia*, ²*Animal Physiology Research Unit, ARS, USDA*.

We evaluated the effect of feeding liquid versus dry diets after weaning on pig performance and intestinal morphology. At 14 d of age, 32 pigs (4.67±.06 kg) were assigned to 1 of 4 treatments in a RCBD: 1) cross-fostered to another sow (SOW); 2) weaned to a dry diet with 7% spray-dried plasma (SDP); 3) weaned to a dry diet with no SDP; 4) weaned to a liquid milk replacer (MR) diet. The 0 and 7% SDP diets contained 30% lactose and exceeded NRC (1998) recommendations for other nutrients. All pigs were killed after 4 d, and intestinal samples collected at 3 equidistant sites from the proximal jejunum to the distal ileum to measure villus heights, crypt depths and villus:crypt ratio (VCR). The stomach, heart, kidney, and liver were weighed. The final weight of pigs fed milk replacer were similar to the pigs cross-fostered to another sow (6.03 vs 5.83 kg). There was no difference between the pigs fed either 0 or 7% SDP (4.61 vs 4.59 kg), with both groups weighing less than either group on a liquid diet ($P \leq .001$). The villi for pigs fed either liquid diet were taller ($P \leq .001$) than pigs fed either dry diet. The crypt depth of the most distal section for the pigs that remained on the sow was reduced compared to all other crypt depth measurements ($P \leq .001$). The pigs fed either dry diet had a lower VCR than the pigs on a liquid diet ($P \leq .001$), and the most distal section for the pigs that remained on the sow had a higher VCR than all other VCR measurements ($P \leq .01$). Organ weights are shown below. This study shows that pigs weaned to a liquid milk replacer perform similar to pigs kept on a sow, while pigs weaned to a dry diet have reduced performance. There were also differences in intestinal morphology which may be related to pig performance.

Organ	SOW	0% SDP	7% SDP	MR	SEM
Heart ¹	9.87 ^a	9.40 ^{ab}	8.82 ^b	10.06 ^a	.035
Kidney ¹	10.85 ^a	9.68 ^a	9.90 ^a	13.47 ^b	.655
Stomach ¹	8.15 ^{ab}	8.64 ^a	7.98 ^{ab}	7.77 ^b	.238
Liver ¹	44.98 ^a	41.94 ^a	42.48 ^a	57.29 ^b	1.48

¹g/kg^{.75}BW, ^{a,b} $P < .05$

Key Words: Weaned pigs, Liquid diet, Intestinal morphology

319 Effect of source and level of dietary lysine on growth performance of 11 to 22 kg pigs. E. L. Hansen^{*}, M. D. Tokach, S. S. Dritz, R. D. Goodband, J. L. Nelssen, J. C. Woodworth, P. R. O'Quinn, M. De La Lata, and M. U. Steidinger, *Kansas State University*.

Three hundred-twenty PIC (C22 X 355 barrow and gilt) nursery pigs (10.89 kg) were used to compare the effects of increasing dietary lysine from L-Lysine HCl (L-LYS) or Peptide PlusTM (PP). Peptide Plus is a hydrolyzed bovine muscle protein source. L-LYS was added at .1595,

.3185 and .4775% or PP at 2.39, 4.78, and 7.16% to a basal corn-soybean meal diet (0.90% lysine; negative control, NEG) to achieve diets with 1.025, 1.15 and 1.275% total LYS, respectively. A positive control (POS) diet was formulated to 1.275% LYS with corn and soybean meal. Ideal ratios of other amino acids were maintained in all diets with synthetic amino acid additions. All diets were formulated to maintain similar dietary Ca, P, Na, Cl and ME. There were eight replications of the eight treatments with five pigs/pen. Data were analyzed as a randomized complete block design with seven single df contrast comparisons; POS vs NEG, POS vs other 1.275% LYS, L-LYS linear, L-LYS quadratic, PP linear, PP quadratic and L-LYS vs PP. For the 19-d study period, ADG increased linearly ($P < .001$) with increasing dietary LYS. Feed intake tended to decrease linearly ($P = .12$) and G/F increased ($P < .01$) with increasing PP. Increasing dietary LYS with L-LYS resulted in linear ($P < .001$) and quadratic ($P = .011$) improvements in G/F. Pigs fed diets containing L-LYS vs PP had increased ADG ($P < .05$) and G/F ($P<.001$). Pigs fed the POS diet had decreased ($P < .05$) ADFI and increased ($P < .001$) G/F compared to pigs fed the other 1.275% LYS diets. These data suggest that PP is less bio-available than L-LYS and that high levels of synthetic amino acids or PP do not promote the same degree of feed utilization as soybean meal.

	NEG	L-LYSINE HCl	PEPTIDE PLUS	POS	
Lysine,%	.90	1.025	1.15	1.275	1.025 1.15 1.275 1.275 SEM
ADG,g/d	538	563	599	613	566 558 592 611 10.08
G/F	.557	.590	.652	.644	.591 .597 .631 .683 .008

Key Words: Lysine, Peptide Plus, Pigs

320 Effects of free fatty acids in choice white grease on growth performance of nursery pigs. J. M. DeRouchey^{*}, J. D. Hancock, C. A. Maloney, H. Cao, D. J. Lee, J. S. Park, D. W. Dean, and R. H. Hines, *Kansas State University, Manhattan, KS*.

A total of 120 crossbred barrows and gilts (average initial BW of 6.2 kg) were used to determine the effects of free fatty acids (FFA) in choice white grease (CWG) on growth performances of nursery pigs. The pigs were blocked by weight and allotted to pens based on sex and ancestry for the 33-d growth assay. The pigs (five per pen) were housed in an environmentally controlled room and fed diets formulated to 1.7% lysine for d 0 to 5, 1.55% lysine for d 5 to 19, and 1.40% lysine for d 19 to 33. Treatments were a corn-soybean meal-based control with no added fat, 6% CWG, and 6% CWG that had been heated at 35 °C and treated with 1872, 1,1752 and 2,248 lipase units/g of fat. The FFA concentrations in the CWG were increased from 1.8% to 18.3, 35.4 and 53.3% with increasing lipase concentrations. As for pig growth, those fed the control diet (no added fat) had the same ADG ($P < .30$) but lower gain/feed ($P < .04$) than pigs fed diets with added fat. There were no effects of FFA concentration on ADG or gain/feed ($P < .36$) and ADFI increased as FFA concentration was increased (linear effect, $P < .04$). In conclusion, our data suggest that concentrations of FFAs up to 53.3% in CWG do not adversely affect growth performance of nursery pigs.

Item	Free Fatty Acids, %					SE
	Control	1.8	18.3	35.4	53.3	
ADG, g	473	489	487	475	494	11
ADFI, g	737	687	712	718	716	9
G/F, g/kg	642	712	684	662	690	18

Key Words: Pigs, Free fatty acids, Fat quality

321 Influence of different vegetable oils on the exocrine pancreatic secretion in piglets. S. Jakob^{*1}, R. Zabielski², S. G. Pierzynowski^{3,5}, M. Sorhede Winzell⁴, C. Rippe⁴, L. Evilevitch³, M. Kuria³, and R. Mosenthin¹, ¹*Inst. Anim. Nutr., Hohenheim Univ., Germany*, ²*Dept. Anim. Physiol., Warsaw Agricultural Univ., Poland*, ³*Dept. Anim. Physiol., Lund Univ., Sweden*, ⁴*Dept. Cell and Molecular Biol., Lund University, Sweden*, ⁵*R&D Gramineer Int. AB, Lund, Sweden*.

The influence of intraduodenal (id) application of vegetable oils on the spontaneous reaction of the exocrine pancreas of piglets has not yet been studied. Six growing pigs (BW 13.3 kg) were prepared with a pancreatic duct catheter and a duodenal re-entrant T-cannula. The animals were fed twice daily (10.00 and 16.00 h), a commercial weaner diet at a level of 2% of BW. Beginning with the morning feeding, olive oil, coconut oil