

8 Influence of dietary lysine in barley-based diets performance and intestinal morphology in finishing T. Lutz*, K. J. Plaine, R. M. Weigl and J. E. Tilton, North Dakota University, Fargo.

hundred twenty pigs (70.7 ± 1.2 kg) were utilized to mine the effect of three levels of lysine in barley-based diets performance and intestinal morphology of finishing barrows gilts. Pigs were grouped by sex, weight and ancestry to one of treatments in a randomized block design. Treatments were a 100% corn-based diet (.75% lysine) and three barley-based diets containing .75, .85, and .95% lysine, respectively. Pig weight and consumption were recorded weekly to determine average gain, daily feed intake and feed efficiency. Pigs were weaned from the experiment at a mean pen weight of 118 ± 32 kg. One pig was randomly selected from each pen (32 pens) and injected with bromodeoxy uridine (BrdU; 5 mg/kg BW) and exsanguinated one hour post-injection. Jejunum and ileum sections (5 cm) were removed without stripping, washed in saline, weighed and placed in Carnoy's solution. Bromodeoxy uridine labelling index, a measure of cellular proliferation, was determined by counting labelled crypt cells by total crypt cells present. Gilts consuming the barley-based diet with increasing lysine concentration exhibited a linear increase in days on test (49.0, 50.8, 54.2 days; P<.04) and a linear decrease in average daily gain (-0.93, -0.88 ± .02 kg; P<.05). Conversely, barrows had a linear increase in average daily gain (P<.05) and feed efficiency (P<.06) in response to increasing lysine levels. Number of proliferating crypt cells increased (P<.10) with the increasing lysine levels in barley-based diets (5.8, 15.5, 18.4 ± .08%). Pigs consuming control diet had a larger percentage (P<.05) of jejunum crypt cells proliferating compared with the .75% lysine barley diet. Labelling index in ileal tissues was consistent across treatments. Results suggest that addition of lysine resulted in increased cellular proliferation in the jejunum but did not improve gain or efficiency of pigs.

Words: Lysine, Growth, Intestinal Morphology

59 Increasing dietary valine and isoleucine for the high-producing lactating sow. B. T. Richert*, R. D. Goodband, M. D. Tokach, J. L. Nelssen, Kansas State University, Manhattan.

hundred eighty-five (n=24 to 27) sows (PIC, Line C-15) were used to evaluate the interrelationship between isoleucine (Ile) and valine (Val) on sow and litter performance. Diets were formulated to .90% total lysine with amino acids other than Ile and Val at least 110% of their suggested intake relative to lysine. The control diet was formulated to .50% Ile and .50% Val; L-Val and L-Ile replaced corn starch to provide .72 or 1.07% dietary Val, combined with .50, .85, and 1.20% Ile. A seventh diet contained .50% Ile and 1.42% Val. Average number pigs weaned was 10.9, and average lactation length was 20.3 d. Number of pigs weaned was not affected (P>.05) by dietary Ile or Val. Sow ADFI decreased as dietary Val increased (.08). Litter weight and weight gain (LWG) at weaning (WN) increased with dietary Val (P<.07), Ile (linear, P<.07), and total branched chain amino acids (linear, P<.02) increased (see table below). Increasing dietary Val at 1.42% increased LWG (P<.08). Milk samples were collected on d 17 or 18 after lactation from 12 sows/treatment. Increasing dietary Val at .50% Ile decreased concentrations of milk DM and fat (linear, P<.01). Milk DM, CP, and fat increased (linear, P<.002) as dietary Ile increased. As a percentage of milk protein, the casein fraction increased (linear, P<.01) and the whey non-protein N fractions decreased (linear, P<.06, P<.01, respectively) as dietary Ile increased. Based on these results, when either Val or Ile are deficient, increasing levels of the other branched chain amino acid increase milk production. However, when Val is adequate in the diet (1.07%), the Ile requirement appears to be no greater than 94% of lysine.

	.72			1.07			1.42	CV	
	Val, %	.72	.85	1.07	.85	1.20	.50		
FI, kg		6.21	6.12	6.30	5.99	6.17	5.94	6.17	10.2
G d 0 to WN, kg		44.3	45.4	46.4	45.4	48.0	48.0	47.1	13.5
Milk DM, %		16.2	16.8	17.1	15.9	17.0	17.3	17.6	5.1
Milk CP, %		5.16	5.31	5.61	4.94	5.39	5.33	5.30	9.5
Milk fat, %		5.76	6.00	6.67	5.87	6.38	6.66	6.89	14.7

Key Words: Lactation, Sows, Branched chain amino acids

160 Effect of lysine intake on reproductive performance in first parity sows. M. E. Wilson¹, H. Stein², N. L. Trotter³, D. D. Hall¹, R. L. Moser¹, D. E. Orr¹, and R. A. Easter², ¹United Feeds, Sheridan, ²University of Illinois, Urbana, ³Michigan State University, East Lansing.

Two hundred and seventy two first parity sows were used to evaluate the effect of lysine intake and sources of lysine on lactation and reproductive performance. At parturition, litters were standardized to greater than nine pigs, and sows were allotted to one of three dietary treatments. Treatment 1 (T1) was a corn-SBM diet containing .9% lysine. Treatment 2 (T2) was a 1.2% lysine diet, formulated by adding .37% L-lysine, .13% L-threonine, .08% DL-methionine, and .05% L-tryptophan to diet 1. Treatment 3 (T3) was a 1.2% lysine diet, formulated by adding 1% fish meal, 5.5% SBM, .15% lysine and .025% threonine to diet 1. Sows were given ad libitum access to feed during lactation. Daily feed intake, birth weights, litter weights, and the weaning to estrus interval were measured. Daily maximum temperature data were obtained from the National Climatic Data Center (Indianapolis, IN). Daily lysine intake (g) was lower (P<.001) in sows given T1 (50.02 ± .59) compared to T2 (66.23 ± .64) and T3 (66.36 ± .59). Daily feed intake (kg) (T1, 5.56 ± .05; T2, 5.52 ± .06; T3, 5.53 ± .05), sow weight change (kg) (T1, 5.44 ± .82; T2, 6.57 ± .89; T3, 5.44 ± .82), and adjusted litter weaning weight (kg) (T1, 53.27 ± .84; T2, 51.6 ± .91; T3, 51.8 ± .83) were not different among dietary treatments. Weaning to estrus interval (d) was higher (P<.05) in T1 sows (14.95 ± 1.29) compared to T2 (11.13 ± 1.40) and T3 (10.56 ± 1.29). Regression analysis of environmental temperature on weaning to estrus interval in T1 was positive (b=.42, P<.05) while no relationship was found for T2 and T3. In this experiment, no positive effect on lactation performance was obtained by increasing the daily lysine intake from 50 to 66 g. However, these data suggest that in first parity sows, reproductive performance is improved by increasing daily lysine intake above that required to maximize lactation performance.

Key Words: Lysine, First parity sow, Wean to estrus interval

161 Lysine requirement of the lactating primiparous sow. K. J. Touchette^a, G. L. Allee^a, M. D. Newcomb^a, K. M. Halpin^b, and R. D. Boyd^c, ^aUniversity of Missouri, Columbia, ^bArcher Daniels Midland Co., Decatur, IL, ^cPig Improvement Co., Franklin, KY.

The effects of lysine intake during lactation on litter growth and sow characteristics were evaluated at a commercial farm in Missouri from June to September. Primiparous sows (N=289), initially weighing 181.0 kg, with 22.4 mm backfat (BF) and 37.5 cm² loin eye area (LEA), were randomly assigned to one of five corn-soybean meal lactation diets. The first four diets contained 0.80, 1.04, 1.28, and 1.52% lysine, from intact protein sources. These diets were formulated to contain the same ratios to lysine for valine (101%), threonine (69%), sulfur amino acids (67%) and tryptophan (19%), using synthetic valine, threonine and methionine. The fifth diet contained 1.28% lysine with no synthetic amino acids. All diets contained 4% linseed meal, 3400 kcal/kg ME, and exceeded NRC (1988) requirements for other amino acids, vitamins, and minerals. Dietary lysine did not affect ADFI. Dietary lysine had no effect on litter ADG or sow BF change. Increasing dietary lysine reduced sow weight loss (P<.05) and LEA loss (P<.01). Litters from sows fed the 1.28% lysine diet with synthetic valine, threonine, and methionine had a lower ADG than those from sows fed the 1.28% lysine diet with no synthetic amino acids (P<.05). There were no differences between these two treatments for sow weight, LEA, or BF change. Lysine intake had no effect on percent of sows mated by day 7 postweaning. While a high lysine intake may not increase milk production, it does minimize weight and LEA loss for primiparous sows nursing 10 pigs per litter in a 17 day lactation.

Lysine, %	1.28 no					SE
	0.80	1.04	1.28	1.52	aa	
Number of sows	56	58	60	59	56	
ADFI, kg/d	4.02	4.00	3.88	3.83	4.06	0.09
Litter ADG g/d	2026	2063	1936	2005	2135	57
Sow weight change, kg ^a	-15.6	-11.5	-7.4	-9.2	-9.4	2.2
LEA change, cm ^{2b}	-5.74	-5.52	-3.99	-3.91	-4.44	0.55
BF change, mm	-1.52	-1.03	-2.30	-2.01	-2.28	0.55
% mated by day 7	57.6	60.0	58.4	54.1	56.6	

LS means adjusted to mean weaning age of 17 days.

^aLinear effect P<.05. ^bLinear effect P<.01.

Key Words: Primiparous Sows, Lactation, Lysine