

Nonruminant Nutrition: Amino Acids

256P Determining the effect of tryptophan to large neutral amino acids (LNAA) ratio on growth performance of finishing pigs. S. Nitikanchana^{*1}, M. D. Tokach¹, S. S. Dritz¹, J. Usry², J. M. DeRouchey¹, R. D. Goodband¹, J. R. Bergstrom¹, and J. L. Nelssen¹, ¹Kansas State University, Manhattan, ²Ajinomoto Heartland LLC, Chicago, IL.

Recent research indicates that the Trp:Lys requirement may be higher in finishing pig diets containing high levels of corn distillers dried grains with solubles (DDGS). Because LNAA are greatly increased in high DDGS diets, 96 pigs (PIC TR4 × 1050) were used in 2 14-d studies to determine the effect of standardized ileal digestible (SID) Trp:LNAA ratio on growth performance. Experimental diets were fed in early- (35 to 48 kg BW) and late-finishing (83 to 99 kg BW) with a common diet between periods. Dietary treatments in early finishing included: 1) a corn-soybean meal (SBM)-based diet without DDGS (3.8:1 Trp:LNAA), 2) a corn-SBM diet with 45% DDGS (3.0:1 Trp:LNAA), 3) a corn-SBM diet without DDGS but supplemented with similar amounts of LNAA as the diet containing 45% DDGS (3.0:1 Trp:LNAA), and 4) the LNAA-supplemented diet (treatment 3) with added L-tryptophan to increase the SID Trp:LNAA ratio (3.8:1). Diets in late finishing followed a similar format, but contained 30% DDGS and Trp:LNAA ratios of 4.1, 3.1, 3.1, and 4.1, respectively. Diets were formulated to 0.94 and 0.72% SID Lys in early and late finishing phase, respectively. Pens were allotted in a randomized complete block design with 4 pigs per pen (equal numbers of barrows and gilts) and 6 replications per treatment. From 35 to 48 kg, pigs fed 45% DDGS diet had poorer G:F ($P = 0.01$) compared with pigs fed other diets; however, no differences were found in other response criteria. From 83 to 99 kg, growth performance was not affected by dietary treatment. These results suggest that the high level of LNAA relative to Trp in diets containing 30% DDGS or greater may not be responsible for a higher tryptophan requirement in finishing pigs as suggested by previous research.

Table 1. Effect of tryptophan to LNAA ratio on the growth performance of early and late finishing pigs

	Corn-SBM	High DDGS	Corn-SBM + LNAA	Corn-SBM + LNAA+Trp	SE
SID Trp:Lys, %	16.5	16.5	16.5	21.0	
Early Finishing (35 to 48 kg)					
SID Trp:LNAA, %	3.8	3.0	3.0	3.8	
ADG, g	982	859	961	949	35.5
G:F	0.46 ^a	0.41 ^b	0.47 ^a	0.45 ^a	0.01
Late Finishing (83 to 99 kg)					
SID Trp:LNAA, %	4.1	3.1	3.1	4.1	
ADG, g	1066	1074	1128	1182	64.3
G:F	0.35	0.34	0.36	0.37	0.01

Key Words: large neutral amino acids, pig, tryptophan

257P Influence of dietary SID isoleucine:lysine ratio on the optimal tryptophan:lysine ratio for 6- to 11-kg pigs. S. Nitikanchana^{*1}, A. L. Chipman², M. D. Tokach¹, S. S. Dritz¹, and J. F. Patience², ¹Kansas State University, Manhattan, ²Iowa State University, Ames.

A total of 475 nursery pigs (initially 6.1 kg, and 5 d postweaning) were used to determine the effects of standardized ileal digestible (SID) Ile:Lys ratio on the optimal SID Trp:Lys ratio for growth performance. Pens were allotted to 1 of 12 treatments in a randomized complete block design. Treatments were arranged as a 2 × 6 factorial with main effects of SID Ile:Lys ratio (52 and 60% of Lys) and 6 SID Trp:Lys ratios (14.7, 16.6, 18.5, 20.4, 22.3, and 24.0% of Lys). Each treatment had 8 replications with 4 or 5 pigs per pen, with equal numbers of barrows and gilts within block and across treatments. Treatment diets contained 58% corn, 25% soybean meal, and 10% dried whey without any blood products. L-isoleucine and L-tryptophan were used to adjust Ile:Lys and Trp:Lys ratios. All diets were formulated to 1.30% SID Lys with SID leucine and valine to lysine ratios of 111 and 70%, respectively. Overall, no SID Ile:Lys or SID Trp:Lys ratio interactions ($P > 0.27$) were observed. For the main effect of SID Ile:Lys ratio, no differences ($P > 0.21$) were observed in growth performance among pigs fed the 52 or 60% SID Ile:Lys ratio. Increasing the SID Trp:Lys ratio also had no effect ($P > 0.30$) on growth performance. In conclusion, dietary SID Ile:Lys ratio did not influence the response to increasing SID Trp:Lys ratios in 6.1- to 10.8-kg pigs. Our results also suggested that the SID Ile:Lys ratio is not greater than 52% for pigs fed diets based on corn, soybean meal, and whey.

Table 1.

	SID Trp:Lys, %						SEM
	14.7	16.6	18.5	20.4	22.3	24.0	
52% SID Ile:Lys							
ADG, g	319	350	334	328	341	347	20.19
G/F	0.78	0.77	0.78	0.77	0.78	0.79	0.014
60% SID Ile:Lys							
ADG, g	344	360	327	321	362	335	20.19
G/F	0.76	0.79	0.78	0.78	0.79	0.78	0.014

Key Words: growth, isoleucine, nursery pigs, tryptophan

258P Determining the effect of lysine to calorie ratio on growth performance and blood urea nitrogen of growing barrows and gilts in hot season and cool season in a commercial environment. T. X. Zhou^{*}, L. Yan, and I. H. Kim, *Department of Animal Resource & Science, Dankook University, Cheonan, Choongnam, South Korea.*

Two experiments were conducted to determine an optimum Lys:calorie ratio (g of total dietary Lys/Mcal of DE) for growing barrows and gilts in cool and hot seasons in a commercial environment. In experiment 1 (Exp.1), 96 barrows and 96 gilts were allocated in 1 of 4 treatment respectively. Each treatment had 12 replicate pens with 4 pigs per pen. The experiment was lasted for 34 d in the cool season (March 12 to April 15, the average temperature is about 24°C). Lysine:calorie ratio were attained by adjusting the amount of corn and soybean meal and supplementation of crystalline Lys. In Exp. 1, total Lys intake (barrows, 15.1, 16.1, 17.3 and 19.4 g/d; gilts, 14.7, 17.1, 16.9 and 16.0 g/d) and available Lys intake (barrows, 13.0, 13.9, 15.0 and 16.9 g/d; gilts, 12.7, 14.8, 14.7 and 16.0 g/d) were increased ($P < 0.05$) as dietary Lys:calorie ratio increased. The blood urea nitrogen (BUN) concentration on d 34 for barrows and BUN change for barrows and gilts were linearly increased ($P < 0.05$) in response to increasing dietary Lys:calorie ratio. For gilts, backfat was decreased and then increased