pigs. Dietary treatments consisted of SID Trp:Lys ratios of 14.5, 16.5, 18.0, 19.5, 21.0, 22.5, and 24.5%. All experiments were 21 d in duration and used corn-soybean meal-based diets with 30% DDGS formulated to be deficient in Lys at the end of each experiment. A total of 1,166, 1,099, 1,132, and 975 gilts (PIC 337 × 1050, initially 29.9 ± 2.0, 55.5 ± 4.8, 71.2 ± 3.4, and 106.2 ± 3.1 kg BW ± SD) were used in Exp. 1 to 4, respectively. Within each experiment, pens of pigs were blocked by weight and assigned to 1 of the 7 dietary treatments in a randomized complete block design. Each experiment consisted of 6 pens/treatment with 20 to 28 pigs/pen. Data from all experiments were combined for analysis using general linear and nonlinear mixed models with random clustering effects of experiment and weight block within experiment and also with pen as the experimental unit. Competing models included quadratic polynomial (QP), broken-line linear (BLL), and broken-line quadratic (BLQ). Best fitting models were selected using Bayesian information criterion. Increasing Trp:Lys increased ADG and G:F in a quadratic manner ($P < 0.001$). For ADG, QP [Prediction equation: 189.5 + 6084 × (Trp:Lys) – 12878 × (Trp:Lys)^2] and BLQ [if SID Trp:Lys <22.9%, prediction equation: 900 – 15,000 × (0.229 – Trp:Lys)^2] had comparable fit and estimated SID Trp:Lys requirements at 23.6 (95% CI: 21.2 to 26.1%) and 22.9% (95% CI: 22.0 to 23.7%), respectively. For G:F, BLL [if SID Trp:Lys <16.9%, prediction equation: 0.4036 to 1.0 × (0.169 to Trp:Lys)] and BLQ [if SID Trp:Lys < 18.7%, prediction equation: 0.403 to 15.0 × (0.187 – Trp:Lys)^2] had comparable fit and estimated SID Trp:Lys requirements at 16.9 (95% CI: 16.0 to 17.9) and 18.7% (95% CI: 18.1 to 19.3%). Thus, the estimated mean requirements for SID Trp:Lys for 30 to 125 kg pigs ranged from 16.9% for G:F to 23.6% for maximum ADG. Furthermore, 95% of the maximum estimated ADG was obtained feeding 17.5% SID Trp:Lys and 98% of the maximum estimated ADG was obtained feeding 19.5% SID Trp:Lys.

Key Words: amino acids, finishing pigs, tryptophan

108 Effects of increasing crystalline amino acids in sorghum- or corn-based diets on finishing pig growth performance.

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A total of 288 pigs (PIC 327 × 1050; initially 45.9 kg) were used in a 90 d study to compare the effects of increasing crystalline AA in sorghum- and corn-bas ed diets on grow-finish pig growth performance. Treatments with 8 pigs per pen and 6 pens per treatment were arranged in a 2 × 3 factorial with main effects of grain source (sorghum vs. corn) and crystalline AA supplementation (low, medium, or high). Because replacing increasing amounts of soybean meal with crystalline AA changes the NE of the diet, all diets were formulated to the same standardized ileal digestible (SID) Lys:NE ratio. The Lys concentration in the diets was formulated at 95% of the pig's estimated requirement based on the NRC (2012) to ensure that the other AA, as a ratio to Lys, would not be underestimated. The grain sources and soybean meal were analyzed for AA profile and diets formulated from these concentrations. Suggested AA ratios to Lys as well as SID coefficients used were obtained from the NRC (2012). The low AA fortification contained L-lysine HCl and DL-methionine. The medium AA fortification contained L-lysine HCl, DL-methionine, and L-threonine, and the high AA fortification contained L-lysine HCl, DL-methionine, L-threonine, and L-valine to sorghum- or L-tryptophan to corn-based diets as Val was 5th limiting in sorghum-based diets and Trp 5th limiting in corn-based diets. Overall, no grain source × crystalline AA interactions were observed. Pigs fed corn-based diets tended to have greater ADG ($P < 0.072$) and had greater G:F ($P < 0.01$) than those fed sorghum-based diets. As crystalline AA concentrations increased, ADG tended to increase then decrease (quadratic; $P = 0.057$), and ADFI decreased (linear; $P = 0.019$). Pigs fed sorghum had decreased ($P < 0.01$) jowl iodine value (IV) in comparison with pigs fed corn. In conclusion, balancing to the 5th limiting AA using NRC (2012) suggested AA ratios in corn- or sorghum-based diets resulted in decreased ADG and G:F and pigs fed corn-based diets had greater G:F and IV than those fed sorghum.

Table 108.

Crystalline AA:	Grain source					
	Sorghum			Corn		
	Low	Medium	High	Low	Medium	High
d 0 to 90						
ADG, kg	0.90	0.91	0.87	0.92	0.93	0.90
ADFI, kg	2.66	2.63	2.55	2.62	2.63	2.54
G:F	0.340	0.347	0.342	0.350	0.353	0.353
Jowl IV	67.9	67.9	67.3	68.8	68.9	69.6

SEM was 0.013, 0.037, 0.003, and 0.59 for ADG, ADFI, G:F, and Jowl IV, respectively.

Key Words: corn, grow-finish pig, sorghum

109 Growing pigs' simulated amino acid requirements differs between actual factorial methods.

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The objective of this study was to compare actual factorial methods used to estimate phase-feeding growing pigs' lysine requirements with the method developed for precision feeding (PF) which provides individual pigs with daily tailored diets. Data from 36 high-performance pigs (25 kg initial BW, mean SE = 2.23) were used in a 28 d trial. Observed individual daily NE intake and BW gain were smoothed by linear regression and used to estimate individual and population standardized ileal digestible lysine (SIDLys) requirements. Body weight gain was assumed constant (regression slope) for every pig