

197 Diet nutrient digestibility and growth performance of weaned pigs fed chickpea.

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Using alternative feedstuffs to replace soybean meal (SBM) and cereal grains in swine diets is economically important for pork producers. Chickpea may serve as an alternative source of protein and energy; however, little information is available regarding its dietary inclusion for weaned pigs. The effects of increasing dietary inclusion of chickpea by substituting SBM and wheat grain on nutrient digestibility and growth performance of young pigs were evaluated. Three hundred pigs (initial body weight 9.6 kg) weaned at 20 ± 1 d of age and housed in pens with 4 pigs were involved. Pigs were fed a SBM diet or diets with 7.5, 15, 22.5, or 30% Kabuli chickpea in substitution for up to 20% SBM and 10% wheat grain for 3 wk starting 2 wk postweaning. The chickpea sample contained (DM basis) 23.9% CP, 4.7% ADF, 5.2 mg/g trypsin inhibitor activity, and 0.4% tannin. Diets were formulated to provide 2.34 Mcal NE/kg and 5.1 g standard ileal digestible (SID) Lys/Mcal NE and were steam-pelleted. Increasing dietary inclusion of chickpea quadratically increased ($P < 0.001$) diet apparent total tract digestibility (ATTD) of DM and GE by up to 2.5%-units, quadratically increased ($P < 0.001$) DE and predicted NE value by up to 0.13 and 0.21 Mcal/kg, respectively, but quadratically reduced ($P < 0.001$) ATTD of CP by 4.6%-units. Overall (d 1–21), increasing dietary chickpea quadratically increased ($P < 0.05$) ADFI, quadratically increased then decreased ($P < 0.001$) ADG, and quadratically decreased ($P < 0.001$) G:F and final BW. Pigs fed 15% chickpea had increased ADFI by 66 g/d and ADG by 55 g/d, but similar G:F and increased final body weight compared with pigs fed diet with 0% chickpea. In conclusion, increasing inclusion of up to 30% chickpea in diets for weaned pigs reduced growth performance. Dietary inclusion of 15% chickpea increased feed intake and growth performance of weaned pigs and sustained feed efficiency.

Key Words: growth performance, pig, chickpea

Table 198.

Item	Treatments			SEM	P-value
	Ctrl	RCP-ME	RCP-NE		
Overall ADG, kg	0.46	0.44	0.47	0.02	0.403
Overall ADFI, kg	0.73	0.70	0.72	0.03	0.651
Overall Gain:Feed	0.64	0.64	0.65	0.02	0.765
Final BW, kg	24.4	23.8	24.7	1.0	0.404

198 Effects of aggressive feed-grade amino acid supplementation in reduced CP diets formulated on ME or NE basis on growth performance of nursery pigs.

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Barrows and gilts (PIC 29 × 380, $n = 147$) were blocked by initial BW (6.42 ± 1.21 kg) at weaning (21 ± 3 d) and allotted to pens (7 pigs/pen) within each of 7 blocks to evaluate the effects of aggressive feed-grade AA supplementation with reduced CP (RCP) diets formulated on either a ME or NE basis on growth performance of nursery pigs. Pens within blocks were randomly assigned to 1 of 3 treatments: 1) corn-SBM-corn DDGS-based diets formulated to meet the Trp requirement without addition of feed-grade Trp (feed-grade Trp was added in phase 3 to increase the Trp:Lys ratio from 17 to 19; Ctrl); 2) RCP diets formulated to meet the His:Lys ratio requirement (His:Lys = 32) without added feed-grade His and formulated on a ME basis (RCP-ME); or 3) RCP diets to meet the His:Lys requirement without feed-grade His and formulated on a NE basis (RCP-NE). Feed-grade AA were added to diets to meet all SID AA:Lys ratio requirements (M+C:Lys, 58; Thr:Lys, 60; Trp:Lys, 17 in phase 1 and 2 and 19 in phase 3; Ile:Lys, 55; Val:Lys, 65 in phase 1 and 2 and 70 in phase 3; His:Lys, 32) during each phase. During phases 1 and 2, feed-grade AA in RCP diets completely replaced poultry byproduct and partially replaced SBM in Ctrl diets. In phase 3, feed-grade AAs were included at the expense of SBM. Poultry fat was reduced in NE compared to ME-based diets. Neither ADG, ADFI, G:F, nor BW at the end of phases 1 and 2, as well as the end of the study, were affected ($P \geq 0.40$) by high inclusion levels of feed-grade AA in either ME- or NE-formulated diets. These results indicate that similar performance can be achieved with either ME- or NE-based nursery diets formulated to meet the His:Lys ratio without adding feed-grade His when supplemented with high levels of essential feed-grade amino acids to meet the AA:Lys ratios.

Key Words: Reduced crude protein, Feed-grade amino acids, Nursery pigs

199 Effect of fish meal source on nursery pig performance.

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A total of 350 pigs (DNA Line 200 × 400; initially 6.5 ± 0.09 kg BW; 21 d of age) were used in a 14-d experiment to de-

Table 199.

Item	CTRL	IPC 790		Special Select		LT Prime		Source × Level	
		3%	6%	3%	6%	3%	6%	Lin.	Quad.
D 0–14									
ADG, g	249	266	288	279	239	268	264	0.003	0.059
ADFI, g	329	344	354	353	330	332	335	0.247	0.323
G:F	0.76	0.78	0.81	0.79	0.73	0.81	0.79	0.005	0.130
Final BW, kg	9.98	10.23	10.52	10.40	9.87	10.26	10.19	0.034	0.192

termine the effects of fish meal source on nursery pig performance. Pigs were randomly allotted to pens at weaning (d 0) and were fed a common starter diet for 7 d. On d 7, pens of pigs were randomly allotted by BW to 1 of 7 dietary treatments (10 pens/treatment and 5 pigs/pen) in a 2 × 3 + 1 factorial. Diets were corn-soybean meal-based that contained 10% dried whey and none (Control) or 3 or 6% fish meal from 1 of 3 sources (IPC 790 Fish Meal, The Scoular Company, Minneapolis, MN; Special Select Menhaden Fish Meal, Omega Proteins, Houston, TX; and Daybrook LT Prime Menhaden Fish Meal, Daybrook Fisheries, Morristown, NJ). All fish meal sources were from the 2014 catch year. All samples of fish meal contained less than 0.15% total volatile N suggesting high quality. A source × level interaction ($P < 0.05$) for ADG and final BW was observed as increasing levels of IPC 790 improved ADG; however, pigs fed Special Select and LT Prime fish meal only saw improvement when 3% was included. While no differences were observed between treatments for ADFI, there was a source × level interaction for G:F (Linear $P = 0.005$). This was a result of G:F linearly improving as IPC 790 increased, with pigs fed 3% Special Select or LT Prime having similar performance to 6% IPC 790, but no further improvement thereafter. In conclusion, adding 3% of any fish meal source improved ADG and G:F; however, only pigs fed IPC 790 had a further improvement in ADG when 6% was fed.

Key Words: fish meal, growth, nursery pig

200 Effect of corn germ meal inclusion level on the growth performance and carcass characteristics of wean-to-finish pigs.

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The effect of corn germ meal (CGM) inclusion level on the growth performance and carcass characteristics of pigs reared under commercial conditions was evaluated with 2 studies. Both studies used RCBD with 2 CGM inclusion levels: 0 and 20%, and 0 and 25% for Study 1 and 2, respectively. A total of 952 (14 replicates) and 680 (10 replicates) barrows and gilts were used in Study 1 and 2, respectively, housed in mixed-sex groups of 34 pigs in Study 1, and single-sex groups of 34 pigs in Study 2. The studies were performed from weaning (6.4 ± 0.57 and 6.6 ± 0.53 kg BW for Study 1 and 2, respectively) to a final BW of $133.3 \pm$

1.62 and 127.1 ± 1.71 kg, respectively. An 8-phase dietary program was used with diets formulated to the same SID-lysine to calorie (ME) ratio within each phase and to meet or exceed nutrient requirements proposed by NRC (2012). Calculated NDF levels, averaged across all phases, were 6.91 and 12.47% for 0% and 20% CGM diets, respectively, in Study 1 and 7.98 and 13.48% for 0 and 25% CGM diets, respectively, in Study 2. Pigs had ad libitum access to feed and water. At the end of each study, pigs were harvested at a commercial facility and standard carcass grading measurements were collected. The pen of pigs was the experimental unit for all measurements; data were analyzed using PROC MIXED of SAS with the model accounting for the effects of CGM level, block, and replicate. For both studies, there was no effect ($P > 0.05$) of CGM inclusion level in the diet on overall ADG and ADFI. There was no effect of CGM on G:F in Study 1; however, in Study 2 G:F was decreased ($P < 0.05$) for pigs fed diets with 25% compared to 0% CGM (0.414 vs. 0.428 kg:kg, respectively). Carcass yield was reduced ($P < 0.05$) by feeding CGM (0.7 and 1.6% units in Study 1 and 2, respectively), which resulted in reductions in overall average daily carcass weight gain (2.4 and 4.7% lower in Study 1 and 2, respectively), and overall carcass weight G:F (2.3 and 6.2% for Study 1 and 2, respectively). The results of these studies suggest that inclusion levels of CGM of 20 and 25% in diets for wean-to-finish pigs reduces carcass yield and has a negative effect on growth rate and feed efficiency when measured on a carcass weight basis.

Key Words: Corn Germ Meal, Pigs, Carcass

201 Lysine requirement titration for barrows and gilts from 25- to 75-kg.

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Lysine is the first limiting amino acid in practical swine diets, so it is important to optimize the dietary digestible lysine to maximize growth and profitability. Two experiments were conducted to estimate the standardized ileal digestible (SID) Lys requirement for pigs from 25- to 50-kg BW (Exp. 1) and 50- to 75-kg BW (Exp. 2) using ADG and G:F as criteria responses. A total of 1050 barrows and gilts (FAST F1 female × PIC380 boar line) were used in each experiment, blocked