166 Impact of soybean contaminants on growth performance and pork quality.

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The objective of the study was to compare the effects of dietary inclusion of various soybean contaminants (normally present in soybean meal), at various levels and combination on pig growth performance, carcass characteristics, and meat quality. The study was carried out as a completely randomized design with 7 dietary treatments with corn as the grain source: 1) control (soybean meal, no added contaminant), 2) gums (3% of the diet), 3) soapstock (1.5%), 4) weed seeds/trash (2%), 5) all contaminants (6.5%), 6) refined soybean oil (1.75, 1.20 and 0.80 % at each production phase, respectively), and 7) roasted whole soybeans. A total of 168 pigs were housed with 4 pigs/pen in single-sex pens. Diets were formulated to about 80% of the lysine requirement to cause dependence on the soybean amino acid source, to the same Lys:Energy ratio, and fed in three diet sequences for 84 d (Grower [35 to 55 kg BW, 21 d], Finisher I [56-95 kg BW, 42 d], and Finisher II [96-120 kg BW, 21d]). At the end of the study two pigs/pen were randomly selected for slaughter. For the overall period, there was no treatment effect ($P > 0.05$) on daily gain (1.01, 0.94, 0.96, 0.95, 0.97, 0.96, and 0.91 kg/d; SEM = 0.034; for treatments 1, 2, 3, 4, 5, 6, and 7, respectively), daily feed intake (2.58, 2.61, 2.57, 2.57, 2.44, 2.49, and 2.24 kg/d; SEM = 0.108), and gain:feed ratio (0.40, 0.36, 0.38, 0.37, 0.40, 0.39, and 0.41; SEM = 0.016). Compared to the control group, the hot carcass weight was lower ($P < 0.05$) for treatments 2 and 7 (92.3 vs. 84.2 and 81.4 kg). However, no differences were found ($P > 0.05$) for the 10th rib backfat thickness, longissimus muscle area, fat-free lean percentage, or for the meat quality measurements (pH, drip loss, subjective color, marbling and firmness, and Hunter L#42#, a#42#, and b#42# values). In conclusion, there was no effect of the soybean contaminants normally present in soybean meal when fed to growing-finishing pig on performance, carcass characteristics, or meat quality.

Key Words: Pig, Soy Contaminants, Meat Quality

167 Relative bioavailability of fermented soybean meal to spray dried plasma protein in nursery diets.

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A total of 175 pigs, weaned at d 21 of age, were used to determine the relative bioavailability (RBV) of fermented soybean meal (FS, Genebio Tech) as a protein source for young pigs in comparison to plasma protein (PP) using a classic slope-ratio design. Pigs were allotted to one of five dietary treatments representing basal group (BA, without PP and FS), 3.7% PP (PP1), 7.3% PP (PP2), 4.9% FS (FS1), and 9.8% FS (FS2). All experimental diets commonly contained 40% corn, and 20% SBM. Each diet had different combination of PP and corn starch or FS and corn starch. Corn starch to vegetable oil ratio was altered to match energy content among the treatment diets. Crystalline amino acids were added to FS treatment diets to match amino acid profiles to those of PP treatment diets. Each treatment had 5 replicates and 7 pigs per pen. Pigs were fed the experimental diets for 3 weeks and had free access to feed and water. Feed intake and body weight were measured weekly. Pigs fed the PP1, PP2, and FS2 diets had greater ($P < 0.05$) ADG than the BA pigs whereas feed intake was the same among the treatments. Gain/feed of the FS2 pigs was greater ($P < 0.05$) than those in other treatments. The BA pigs had the lowest ($P < 0.05$) gain/feed. Relative bioavailability (RBV) of FS to PP was 105.6% based on the changes of ADG of pigs as they received increased amount of lysine from the diets. The ADG was modeled as $Y = 204.07 + 32.81 \times PP + 34.65 \times FS$, where Y = ADG, PP and FS are lysine intake (g/d) above the basal diet, P value for the PP slope = 0.0010, P value for the FS slope = 0.0011, P value for the intercept = 0.0001, P value for the overall model = 0.0013, and P value for the difference between the slopes of PP and FS = 0.83. Thus, there was no difference between the slopes of PP and FS but the RBV of FS to PP was calculated based on $(34.65 / 32.81) \times 100 = 105.6\%$. Fermented soybean meal, when crystalline amino acids were added to match the amino acid profiles to those of spray dried plasma protein, can replace the use of spray dried plasma protein during the first 3 weeks after weaning.

Key Words: Pigs, Fermented Soybean Meal, Relative Bioavailability

168 Effect of different soy protein concentrate sources on growth performance of weanling pigs.

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Three experiments were conducted using 486 weanling pigs (216 in Exp. 1; 210 in Exp. 2; 60 in Exp. 3) to determine the effects of soy protein concentrate (SPC) source on performance of weanling pigs compared with a milk protein-based diet, or a diet containing 40% soybean meal (SBM). There were 6 pigs/pen with 9, 7, or 10 reps/treatment in Exp. 1, 2, and 3, respectively. Experimental diets were fed from d 0 to 14. A common diet was fed from d 14 to 28. In Exp.1, SBM was replaced on a lysine basis by 28.6% of each SPC source (Source 1-Soycomil P®, ADM; Source 2-Profine E, Solae/Central Soya). Pigs fed the diet containing 40% SBM had similar ADG and ADFI as pigs fed the milk protein-based diet from d 0 to 14, and both were greater than pigs fed either SPC source. In Exp. 2, either all or half of the SBM was replaced by 28.6 or 14.3% SPC from Source 1 and 2. From d 0 to 14 and 0 to 28, there was SPC source by level interaction for ADG ($P<0.01$) and ADFI ($P<0.07$). Replacing SBM with SPC from Source 1 did not influence pig performance. However, replacing SBM with SPC from Source 2 resulted in a quadratic ($P<0.05$) change in ADG with performance being improved for the diet containing 14.3% SPC, but no benefit to replacing all the SBM with SPC. Replacing SBM with SPC from either source improved gain:feed (G/F; quadratic, $P<0.01$) with the best G/F for pigs fed the diets with 14.3% SPC. To test whether the poor ADG of pigs fed 28.6% SPC was a result of decreased palatability; Exp. 3 was a preference test to examine the feed intake response of pigs offered a choice of consuming the diets containing 40% SBM or 28.6% SPC from Source 2. Daily feed intake was 0.19 and 0.005 kg for the 40% SBM and 28.6% SPC diets, respectively ($P<0.0001$). The poor intake of the SPC diet may indicate a palatability problem when high levels of SPC are included in the diet. Our results suggest replacing a portion, but not all, of the SBM in the diet with SPC from Source 2 improves pig performance.

Key Words: Weanling Pigs, Soy Protein Concentrate, Growth

169 Effects of lactic acid and lactose on growth performance of nursery pigs.

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The objective of this study was to measure the effects of lactic acid (ACID) and lactose (LAC), separately and combined, on growth performance of young pigs in a commercial nursery during a 6-wk growth assay. A total of 1584 pigs, sorted by sex into four separate rooms, were used in this study. Each room consisted of 12 pens of barrows or 12 pens of gilts. The study was conducted as a 2 x 2 factorial arranged in a randomized complete block design. Within each room, pigs were allotted visually by body weight to each of three blocks for a total of 12 blocks. A four-phase feeding program was employed for this study, with Phases 1, 2, 3, and 4 corresponding to Week 1, Week 2, Weeks 3 and 4, and Weeks 5 and 6 of the study, respectively. Experimental diets were fed during Phases 1, 2, and 3, and a common diet was fed to all pigs during Phase 4. Diets fed during Phase 1, Phase 2 and Phase 3 consisted of 1) the negative control (NC), 2) the NC + ACID, 3) the NC + LAC, and 4) the NC + ACID + LAC. The diets used as the negative control in Phase 1, Phase 2, and Phase 3 were formulated using corn, soybean meal, fish meal, blood plasma, and soy protein concentrate as sources of protein; and corn starch as a replacement for both LAC and ACID. The ACID was included at 0.75% of the diet, and LAC was included at 21, 14, and 7% respectively during Phase 1, Phase 2, and Phase 3. Performance criteria including ADG, ADFI, and G:F were measured for each phase of the experiment. In addition, medical treatments, and pig removals were recorded daily as measures of health status. The experimental treatments, did not affect ADG, ADFI, or health status. However, G:F was decreased ($P < 0.05$) in Phase 1, in Phase 2 and overall by inclusion of LAC. Neither lactic acid nor lactose improved growth performance in this study.

Diet	NC	ACID	LAC	ACID+LAC	SEM
ADG,g	347.9	355.8	348.8	347.1	4.1
ADFI, g	509.5	518.6	515.6	510.3	6.8
Gain /feed[a]	0.682	0.692	0.669	0.675	0.006

[a]Main effect of LAC ($P < 0.05$)

Key Words: Pig, Lactic Acid, Lactose