
Two 28-d growth trials were conducted to evaluate increasing high molecular weight, whey protein concentrate (HPWPC, 73% CP, 6.8% lysine) and spray-dried animal plasma (SDAP) on weaning pig performance. In both trials, pigs were blocked by weight and allotted randomly to one of five dietary treatments with eight or nine pigs/pen and seven pens/treatment. Diets were based on a corn-soybean meal based control diet containing 25% (dried whey, 6% fish meal, 5% lactose, 1.75% blood meal, and 2.5% (Exp.1) or 6.7% (Exp.2) SDAP. In Exp. 1, additional SDAP (2.5 or 5.0%) or HPWPC (2.5 or 5.0%) was substituted for soybean meal on an equal lysine basis. In Exp. 2, HPWPC was substituted for 25, 50, 75, or 100% of the SDAP on an equal lysine basis. All diets were formulated to contain 1.7% lysine and were fed from d 0 to 14 after weaning in a pelleted form. From d 14 to 28, all pigs were fed a corn-soybean meal diet (1.35% lysine, 9% Ca, 8.5% P). In Exp. 1, 305 pigs (initially 4.1 kg and 13-d of age) were used. From d 0 to 14 after weaning, ADG, ADFI, and gain/feed (G:F) increased then decreased with increasing SDAP (quadratic, P < .001, .04, and .02 respectively). Average daily gain and ADFI tended to increase (quadratic, P = .07, and linear, P = .09, respectively), but G:F was not influenced by increasing HPWPC. In Exp. 2, 320 pigs (initially 4.2 kg and 13-d of age) were used. From d 0 to 14, ADG and ADFI increased with increasing HPWPC (quadratic, P < .04, and .09, respectively). Pigs fed 5.0% HPWPC and 1.7% SDAP had higher ADG and ADFI than any other treatment. In either study, protein sources fed from d 0 to 14 had no effect on growth performance from d 0 to 28. In conclusion, increasing SDAP above 5% did not further improve growth performance and pigs fed HPWPC demonstrated similar growth performance compared to similar amounts of SDAP. Therefore, HPWPC can be an effective replacement for SDAP in diets for early-weaned pigs.

Key Words: starter pig, animal plasma, whey protein concentrate


Twenty pigs (14 d, 5 kg) were weaned to an isolated environment to determine if feeding spray-dried plasma (SDP) affects the pigs response to an oral E. coli challenge. Weaned pigs were allotted to one of four treatments in a 2 x 2 factorial arrangement, with two levels of spray-dried plasma (0 vs 7%) and two oral doses (E. coli, F17 vs saline). Diets, formulated to contain equal ME and digestible essential amino acids, were fed for 7 d postweaning. On d 6, the pigs were nonsurgically fitted with jugular cannulae. On d 7, an oral dose of either saline or E. coli was given, followed by blood samples for 10 hr. After 10-hr, all pigs were killed and intestinal samples were collected to measure villus height, crypt depth, and villus:crypt ratio (VCR). Spray-dried plasma did not affect weight gain. For pigs that received the saline, SDP increased villus height and VCR (P < .05), with no effect on crypt depth. There was no effect of the E. coli challenge on intestinal morphology regardless of diet. Serum ACTH and cortisol for the 10-hr post-E. coli challenge were analyzed using basal levels as covariates. There was an interaction between SDP and E. coli for both serum ACTH (P < .05) and cortisol (P < .001). Serum ACTH for pigs fed SDP was increased by E. coli from 1 to 4 hr after administration, while pigs fed no SDP had no significant increase in serum ACTH. Serum cortisol for pigs fed SDP was increased by E. coli from 1 to 5 hr after administration, while pigs fed no SDP had an increase in serum cortisol from 2.5 to 6 hr after E. coli administration. There was no significant histologic lesions seen in brain, heart, lung, liver, kidney, spleen, or intestinal sections. Our results indicate that feeding SDP alters the responsiveness of the HPA axis when stimulated by an E. coli challenge.

Key Words: Weaned Pigs, Spray-dried Plasma, Stress

131 Effect of spray-dried plasma and Eschericia coli on intestinal morphology and the hypothalamic-pituitary-adrenal (HPA) axis of the weaned pig. K. J. Touchette1, G. L. Allee1, R. L. Mattern1, C. J. Dyer1, L. W. Face1, and J. A. Carroll2, 1 University of Missouri-Columbia, 2ARS-USDA, Columbia, MO.

A total of 150 weaning pigs (average initial BW of 4.6 kg) were used to determine the effects of a porcine coproduct (primarily red blood cells and slaughter floor tissue) as a protein source in diets for weanling pigs. Treatments were: 1) a corn-soybean meal-based control diet with the control with 2) 26% spray-dried whey; 3) 3.7% menadhen fish meal; 4) 2.1% spray-dried blood cells; and 5) 2.9% porcine coproduct. The animal protein sources (whey, fish meal, blood cells, and porcine coproduct) were substituted for soybean meal (on a lysine basis) and fed for d 0 to 14 of the 29-d growth assay. The diets had 1.30% total lysine (deficient compared to the 1998 NRC value of 1.50% lysine for this weight pig) and 14.4% total lactose. Otherwise, the diets were simple formulations to accentuate differences in growth performance among pigs fed the various protein sources.

Among the animal protein products the ranking (from best to worst) for pellet durability index was whey > porcine coproduct > blood cells > fish meal (P < .001). As for the piglet growth assay, there were no numerical advantages when animal protein products were used to replace soybean meal, but no statistically significant differences (P > .15) were observed for ADG, ADFI, or gain/feed among pigs fed the various protein sources. In conclusion, results from this experiment demonstrated improved pellet quality when animal protein products were added to diets for nursery pigs. However, growth performance was similar among pigs fed the various protein sources.

Key Words: Soybean Meal, Animal Protein, Pig