**129 Evaluation of a high molecular weight, whey protein concentrate and spray-dried animal plasma on growth performance of weanling pigs.** G.S. Grinstead*, R.D. Goodband, J.L. Nelssen, M.D. Tokach, and J.T. Sawyer, *Kansas State University, Manhattan.*.

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 weanling pig performance. In both trials, pigs were blocked by initial 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%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 = .003, .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

**130 Effect of spray-dried plasma and lipopolysaccharide (LPS) on intestinal morphology and the hypothalamic-pituitary-adrenal (HPA) axis of the weaned pig.** K. J. Touchette*[1], G. L. Allee[1], R. L. Matteri[2], C. J. Dyer[2], and J. A. Carroll[2], [1]*University of Missouri-Columbia,* [2]*ARS-USDA, Columbia, MO.*

Twenty pigs (14 d, 5 kg) were weaned to an isolated environment to determine if feeding spray-dried plasma (SDP) affects the response to a LPS challenge. 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 i.p. injections (LPS 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 non-surgically fitted with jugular cannulae. On d 7, i.p. injections of either saline or LPS were given, followed by collection of blood samples at 15-min intervals for three hr. After three 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 a saline injection, SDP decreased crypt depth (P<.05) and increased VCR (P<.05), with no effect on villus height. Injecting LPS to pigs fed the no SDP diet did not affect intestinal morphology. Injecting LPS to pigs fed the 7% SDP diet decreased villus height and (P<.05) and VCR (P<.05), with no effect on crypt depth. Serum ACTH and cortisol for the 3-hr post-LPS challenge were analyzed using basal levels as covariates. There was an interaction between SDP and LPS for both serum ACTH (P<.001) and cortisol (P<.05). After LPS injection, pigs fed SDP had an increase in ACTH, while pigs fed no SDP had no change in ACTH. The LPS challenge raised serum cortisol for pigs fed both diets; however, this increase was greater for pigs fed the SDP diet than the no SDP diet. These results indicate that feeding SDP alters the responsiveness of the HPA axis in young pigs following an immunological challenge. Further studies are needed to determine if these differences in responsiveness and intestinal morphology may compromise the immune function in young pigs.

**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. Touchette*[1], G. L. Allee[1], R. L. Matteri[2], C. J. Dyer[2], L. W. Pace[1], and J. A. Carroll[2], [1]*University of Missouri-Columbia,* [2]*ARS-USDA, Columbia, MO.*

Twenty pigs (14 d, 5.6 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 non-surgically 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

**132 Evaluation of a coproduct from pork slaughter plants as a protein source for starter pigs.** D.J. Lee*[1], B.R. Dunsford[2], J.D. Hancock[1], K.L. Herkelman[2], M.D. Tokach[1], and J.D. Hahn[2], [1]*Kansas State University, Manhattan,* [2]*Farmland Industries, Inc., Kansas City, MO.*.

A total of 150 weanling 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 and the control with; 2) 20% spray-dried whey; 3) 3.7% menhaden 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. For d 14 to 29, the same corn-soybean meal-based diet (formulated to 1.25% lysine) was fed to all the pigs to determine the effects of Phase I protein source on subsequent growth performance. The diets were pelleted at 62 $^{o}$ C using a 2.54 cm thick die with 3.2 mm diameter holes. Pellet durability index was improved (P < .001) when the animal protein products were added to the diets. 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 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