
Previous work has demonstrated that spray-dried animal plasma (SDAP, AP 920®) improves the feed intake and growth rate of the weaned pig. However, the causative factor(s) in SDAP have yet to be identified. This experiment was conducted to evaluate the effects of three molecular weight class fractions of SDAP on growth performance of weaned pigs. The fractions consisted primarily of globulin protein, albumin, and the low molecular weight component. One hundred newly weaned pigs (6.7 kg) were utilized in a 35-d experiment. The pigs were assigned to 5 dietary treatments on the basis of weight, gender, and ancestry. Each experimental diet was fed to replicate pens of 10 pigs/pen from 0 to 14 postweaning and then all pigs were fed a common diet (wheat, soybean meal, 5% meat meal) from 15 to 35 postweaning. The treatments consisted of: 1) CONTROL (wheat, canola oil, 3% crude, dried whey (20%) basal diet); 2) Basal diet + 8% spray-dried animal plasma (SDAP); 3) Basal diet + 2% low molecular weight plasma protein (Alb-4) (ALB); 4) control diet + 2.7% high molecular weight plasma fraction (IgG); 5) Wheat and the appropriate fraction replaced casein in the experimental diets. The experimental starter and common diets were prepared in meal form and formulated to contain lysine and methionine concentrations of 1.55%, 1.55% and 1.15%, 31%, respectively. ADG, ADFI, and G:F ratio for pigs fed the 5 dietary treatments were: (d-07) - 51, 110 and 101, 111; 188, 184, 170, and 175 g; 44, 62, 41, and 60, and 63; (d-04) 198, 223, 117, 212, and 218 g; 247, 300, 185, 294, and 284 g; 82, 73, 62, 72, and 76. The addition of SDAP, ALB or Ig improved ADG, ADFI, and G:F ratio from 0.7 postweaning compared to the CONTROL or diet containing LMW (P < 0.05). ADG and ADFI from d 8-14, 0-14, and 0-35 postweaning were similar among pigs fed the CONTROL, SDAP, ALB, or Ig (P < 0.05). The addition of LMW resulted in poorer pig performance (d 0-14 and 0-35 postweaning) than pigs fed the CONTROL, SDAP, ALB, or Ig (P < 0.05). This data indicates that the dietary addition of the primary components of plasma (IgG and ALB) resulted in improved pig performance in the first week postweaning, while the LMW component depresses growth performance.

Key Words: Weaned pigs, spray-dried animal plasma, plasma fractions


Two experiments were conducted to determine the influence of various fractions of spray-dried porcine plasma on performance of the early weaned pig. In Exp. 1, 216 (initially 4.5 kg and 21-d-old) pigs were used in a 2 x 2 factorial experiment. Pigs were blocked by weight, sex, and litter and allotted to one of five diets (six pigs/pen and dietary treatment). Spray-dried porcine plasma was added to diet fed (IgG, low molecular weight peptides (< 10,000 MW), and albumen. A negative control diet containing corn, soybean meal and dried skim milk was formulated with the three other dietary treatments obtained by replacing dried skim milk with one of the three plasma fractions on an equal lysine basis. A positive control diet (1% lysine and 42% methionine) was fed to contain 7.5% spray-dried plasma (SDPP), 1.75% spray-dried albumen (SDAB), 1.4% spray-dried milk meal (SDMB), and 2.5% dried whey (DWH). A common diet was fed during phase II (d 14 to 35 postweaning) that was corn-soybean meal based (1.25% lysine) and contained 2.5% spray-dried blood meal and 10% dried whey. From 0 d to 14 postweaning, pigs fed the IgG diet had higher ADG (< 0.05) than pigs fed the negative control, low molecular weight, or albumen diet. Average daily gain was similar for pigs fed the IgG and plasma-based diet. However, pigs on the plasma-based diet had the poorest feed efficiency compared to the other dietary treatments (P < 0.10). During phase II and the overall trial, no differences were noted for any of the response criteria. In Exp. 2, 216 pigs (initially 3.2 kg and 10 d of age) were used to evaluate the IgG and albumen fractions of spray-dried porcine plasma. Pigs were blocked by weight and allotted to one of four dietary treatments (stale, IgG, and seven pens/treatment). A positive control diet (1.9% lysine and 40% methionine) was formulated to contain 25% dried whey, 12% lactose, 10% spray-dried porcine plasma, and 6% scratch meal, fish meal. The two other dietary treatments were characterized in Table 1. All pigs were fed the control diet from d 0 to 9 and 0 to 35 postweaning; pigs fed either of the two plasma (IgG or ALB) fractions had similar ADG to pigs fed the negative control diet, but superior performance to pigs fed the plasma-based diet (P < 0.05). Feed efficiency was not affected for the entire nursery phase. This data suggest the need for further research evaluating the IgG and albumen fractions of spray-dried porcine plasma for high nutrient density diets fed to the early weaned pig.

Key Words: Pigs, Growth performance, Fractions

166 Assessment of three fractions of spray-dried porcine plasma protein (PP) fractions as influenced by pig antigen exposure and PP source. T.S. Stahly, D.R. Cook, S.G. Swenson, and D.R. Zimmerman, Iowa State University, Ames

Two experiments were conducted to determine the impact of 1) antigen exposure (AE) and 2) dietary plasma protein source on growth responses of pigs to dietary PP additions. In experiment one, pigs from a single genetic strain (DHDYL) and sourced from origin (pigs possessed antibody titers for mycoplasma pneumonia, actinobacillus pleuropneumonia and transmissible gastroenteritis) were raised in a conventional and a medically-earthing-weaning scheme to create a high and low degree of AE, respectively. Within each AE group, 40 gilts (19 d of age and 5.9 kg BW) were randomly allotted, from outcome groups based on pig weights, to a 1:1:1 ratio of corn-soybean meal fed 5% dried skim milk diet that contained 0 or 6% PP. The PP was substituted on an isonitrogen basis. Feed efficiency was not affected on the addition of PP in a AE interaction (P < 0.06). In experiment two, PP was derived from high (H) and low (L) AE pigs which were reared as described above. Ten sets of three littersmates from the original genetic strain and source of origin were reared via a conventional scheme, weaned at 20 days of age and individually-paned at their site of origin. Within a litter, pigs were fed 1.5% spray-dried whey-10% casein diets that contained 0 or 4% added PP derived from H- or L-AE pigs, from 6.0 to 9.5 kg BW, and then all pigs were placed on the 0% PP diet until 17.1 kg BW. The PP was substituted on an isonitrogen basis for casein. The H- and L-PP sources contained 13.0 and 11.2% immunoglobulin G and 72 and 68% protein, respectively. Pigs were reared from 37.0 kg BW. In greater feed intakes (313, 321 to 304 g/d, P < 0.01), daily BW gains (227, 241 vs 178 g/d, P < 0.01) and gain/feed ratios (735, 753 to 593, P < 0.10) regardless of PP source. After dietary PP withdrawal, pigs previously fed PP consumed less feed (801, 700 vs 941 g/d, P < 0.05) and gained BW slower (569, 520 vs 641 g/d, P < 0.01) than pigs initially fed the 0% PP diet. Over the entire study, pigs fed PP gained weight faster (391, 377 vs 350 g/d, P < 0.05) than pigs fed the 0% PP diet. Based on these data, dietary PP enhances rate and efficiency of growth in pigs with a high degree of AE, but not in pigs with a low degree of AE.

Key Words: Pigs, Plasma protein, Antigen exposure