215 Efficacy of biopeptides and blood plasma with young pigs during the starter period. T.G. Wiseman*[1], D.C. Mahan[1], B. Harmon[2], and N. Trottier[3], [1]*The Ohio State University,* [2]*Purdue University,* [3]*Michigan State University.*

Weaning pigs at younger ages has been successful due to the development of dietary proteins that are easily digested and stimulate feed intake. Continual efforts are being made to develop products that will maintain growth performance yet lower starter feed costs. In this study a biopeptide, Ultimate Protein (UP 1672), that contains a blend of plant/yeast products was evaluated at 4 dietary substitution levels for blood plasma protein. Trials were conducted jointly at Michigan State, Ohio State, and Purdue Universities, using a total of 344 pigs that were weaned at an average of 5.6 kg BW. Pigs were weaned from 14 to 21 d of age and allotted to a RCB designed experiment conducted in 16 replicates. Total dietary blood plasma protein levels were set at 6.0, 3.0 and 0.0% for each phase period. The biopeptide replaced plasma protein in phase 1 and 2 on a lysine basis, with all groups receiving a common diet for phase 3. Diets were provided ad libitum for a 38 d trial period which consisted of 3 phases of 10, 14 and 14 d, where dietary lysine levels of 1.60, 1.45 and 1.30% were provided, respectively. Performance data were collected on d 10, 24 and 38, with each station conducting a minimum of 5 replicates. Overall treatment effects during the 0 to 10 d period demonstrated an increase (linear, $P < 0.01$) in daily gain and feed intake as dietary level of blood plasma protein increased. Treatment responses during the 10 to 24 d period were similar for all treatment groups. For the 24 to 38 and 0 to 38 d periods daily gains, feed intake and feed efficiencies were similar. These results indicate that during the phase 1 period, pig performance to the addition of blood plasma was superior to the biopeptide, but for the 10 to 24 d period the biopeptide was as equally effective. For the overall 38 d period performance responses were similar for all groups.

Key Words: Weanling pig, Protein

216 Comparison of spray-dried blood meal and blood cells in diets for nursery pigs. J.M. DeRouchey*, J.L. Nelssen, M.D. Tokach, R.D. Goodband, S.S. Dritz, J.C. Woodworth, and B.W. James, *Kansas State University, Manhattan.*

Two experiments were conducted to determine lysine bioavailability and the effect of increasing levels of spray-dried blood meal (BM) and blood cells (BC) in nursery pig diets. In Exp 1, 350 pigs (6.2 kg and 17 ± 2 d) were used in a 19-d growth assay. All pigs were fed the same pelleted SEW diet to 5 d after weaning. Then, pigs were fed one of seven experimental diets, which included a control with no blood products, and diets containing either 2.5, 5.0, or 7.5% BM or BC. The blood products replaced soybean meal in the diet on a lysine basis. Treatment diets were fed in meal form and formulated to contain 1.40% lysine, .090 Ca, 0.54 available P, 0.26 Na, and 0.43 Cl. For Exp 2, 350 pigs (10.7 kg) were used in a 21-d growth assay to determine the lysine bioavailability of BM, BC and L-Lysine HCl. Diets included both a negative (0.95% lysine) and positive (1.40% lysine) control with no blood products or L-Lysine HCl. Treatment diets were formulated to increase the lysine level in the negative control diet by 0.15% increments (1.10, 1.25, 1.40%) through the addition of L-Lysine HCl, BM, or BC replacing corn starch. Corn and soybean meal were held constant in all diets except the positive control. All diets were formulated to equal energy, Na, and Cl. Crystalline amino acids were added in diets of both experiments to maintain similar ratios of amino acids relative to lysine and above NRC (1998) ratios. In Exp 1, pigs had improved ADG ($P<.005$) and gain/feed ($P<.001$) when blood products were included into the diet. Pigs fed BM tended ($P<.09$) to have greater ADFI than those fed BC; however, no differences in ADG or G/F existed ($P>.24$). As BM increased in the diet, G/F ($P<.04$) and ADG ($P<.10$) improved linearly, while BC did not affect growth performance. In Exp 2, lysine bioavailability was determined by slope-ratio of the efficiency of gain. The lysine bioavailability of BM and BC was 103 and 102%, respectively, relative to the bioavailability of L-Lysine HCl.

Key Words: Pig, Blood meal, Blood cells

217 Irradiation reduces the bacteria in animal plasma and improves growth performance of nursery pigs. J.M. DeRouchey*, J.L. Nelssen, M.D. Tokach, R.D. Goodband, S.S. Dritz, B.W. James, and M.J. Webster, *Kansas State University, Manhattan.*

One hundred eighty pigs (BW of 5.9 kg and 17 ± 2) were used in a 24 d growth assay to determine the effects of source, drying technique, and irradiation of animal plasma. Treatment diets were fed in meal form from d 0 to 10 with a control diet containing no animal plasma and five additional diets containing 5% animal plasma from two different sources. From source 1 (S1), treatment diets were animal plasma that had been spray-dried, spray-dried then irradiated, or freeze dried then irradiated. From source 2 (S2), treatment diets consisted of animal plasma that had been spray-dried or spray-dried then irradiated. All treatment diets were formulated to contain 1.50% lysine, 0.89 Ca, and 0.54 available P. A common Phase II diet was fed from d 10 to 24. Irradiation reduced bacteria levels in plasma from 10^4 to less than 10^2 CFU/g. From d 0 to 5, pigs fed irradiated plasma had increased ADG ($P<.05$) and ADFI ($P<.10$) compared to those fed regular plasma, regardless of source. Pigs fed S2 nonirradiated plasma had improved ADG and G/F ($P<.05$) compared to those fed the control diet, whereas those fed S1 plasma did not. From d 0 to 10, ADG (297 vs 252 g [S1]; 330 vs 295 g [S2], $P<.05$) and ADFI (325 vs 293 g [S1]; 363 vs 328 g [S2], $P<.10$) was greater for pigs fed irradiated plasma versus plasma that had not been irradiated. Freeze drying plasma did not improve growth performance compared with spray-drying, indicating that protein damage from spray-drying was not a concern. From d 10 to 24, ADFI was improved ($P<.05$) for pigs previously fed diets containing animal plasma that was irradiated versus plasma that was not irradiated. Pigs fed irradiated spray-dried plasma were heavier (14.2 [S1] and 14.2 kg [S2], $P<.05$) at d 24 compared to control pigs (12.7 kg), whereas pigs fed regular spray-dried plasma were not. These results indicate that irradiation reduces bacteria in animal plasma and improves growth performance of nursery pigs.

Key Words: Pig, Plasma, Irradiation

218 The effects of pH and irradiation of spray-dried blood meal on nursery pig performance. J.M. DeRouchey*, M.D. Tokach, J.L. Nelssen, R.D. Goodband, S.S. Dritz, J.C. Woodworth, B.W. James, M.J. Webster, and D.E. Real, *Kansas State University, Manhattan.*

A decrease in blood meal (BM) pH and increase in bacterial levels are believed to be caused from increased storage time prior to spray-drying. One hundred fifty pigs (BW of 6.3 kg and 17 ± 2 d of age) were used in a 19-d growth assay to determine the effects of pH and irradiation of BM on nursery pig performance. All pigs were fed experimental diets, which included a control diet with no added BM and 5 diets containing 5.0% BM. The five BM treatments were spray-dried from the same lot of blood. One fourth of the lot was dried on d 0, 3, 8, or 12 after collection. This resulted in four BM treatments with pH values of 7.6, 6.4, 6.0, and 5.9 respectively. The fifth treatment was irradiation of the BM with a pH of 5.9. Treatment diets were fed in meal form and formulated to contain 1.40% lysine, 0.90 Ca, and 0.54 available P. The concentration of bacteria increased with storage time until d 8, and then decreased slightly at d 12 of spray-drying. For d 0 to 14 of the experiment (d 5 to 19 postweaning), feed efficiency (G/F) was improved ($P<.004$) without affecting ADG and ADFI when BM (nonirradiated) was added to the diet compared to the control pigs. The pH of the BM did not influence growth performance. Irradiation of the BM with a pH of 5.9 improved ($P<.02$) ADG and G/F. Irradiation of BM reduced the level of the bacteria in the BM. These results indicate that pH of spray-dried BM decreases with increased storage time prior to spray-drying, however, this does not influence nursery pig performance. Also, irradiation is effective in reducing bacteria concentrations and improving nursery pig performance.

		Blood Meal pH					
Item	Control	7.6	6.9	6.0	5.9	Irradiated 5.9	SE
ADG, g	213	245	232	245	227	281	17
ADFI, g	354	359	345	350	327	363	16
G/F, g/kg	602	682	672	700	694	774	27
TPC, CFU/g	-	3.7 x 10^6	1.1 x 10^7	1.2 x 10^7	6.6 x 10^6	9.0 x 10^1	

Key Words: Pig, Blood meal, Irradiation