163 Bioavailability of iron in organic iron sources. A. J. Lewis*[1], H.-Y. Chen[1], and P. S. Miller[1], [1]*University of Nebraska, Lincoln.*

Organic iron sources result from complexing a soluble iron salt with an organic molecule such as an amino acid or protein. There have been many claims that the bioavailability of organic iron is greater than iron in inorganic sources. The objective of this study was to compare the bioavailability of iron in iron methionine and two different sources of iron proteinate with that in ferrous sulfate. Eighty-three rats were fed an iron-deficient diet (9 mg/kg) for 1 wk (depletion period). Rats were weighed at the end of depletion period and eleven were selected as an initial group. Blood samples were obtained from the initial group and hemoglobin concentrations (Hb) were measured. The remaining 72 rats were assigned to the diet fed during the depletion period or to diets that contained 7, 14, or 21 mg/kg from feed-grade ferrous sulfate ($FeSO_4.H_2O$), reagent-grade ferrous sulfate ($FeSO_4.7H_2O$), iron methionine, or two sources of iron proteinate. Rats were fed the treatment diets for 3 wk (repletion period). Body weight and feed consumption were determined weekly. Blood samples were taken at the end of the repletion period to determine final Hb. Average daily gain, final Hb, and Hb repletion were calculated, and bioavailability of the iron sources was determined using slope-ratio methods. Average daily gain, final Hb, and Hb repletion increased linearly ($P < .001$) as the supplemental iron concentration increased. The results from the slope-ratio assays indicated that the two forms of ferrous sulfate were equally bioavailable. The results also revealed that the bioavailabilities (relative to ferrous sulfate) of iron methionine and the two forms of iron proteinate (Optimin^{TM} and Buffermin^{R}) were 70, 91, and 124% for ADG, 52, 71, and 106% for final Hb, and 53, 73, and 108% for Hb repletion. In conclusion, the bioavailability of organic iron sources varies with different forms and is not greater than iron in ferrous sulfate.

Key Words: Rats, Iron, Bioavailability

164 Evaluation of the effect of feeding a micro-pellet to an early weaned pig. T. E. Johnson, E. L. Stephas*, and B. L. Miller, *Land O'Lakes, Webster City, Iowa.*

A 1.7% lysine SEW diet was fed as either a 2.4 mm pellet or a 1 mm micro-pellet to a total of sixty, 15 day old, 4.5 kg, PIC crossbred pigs. Pigs were assigned by weight and sex to 10 pens (5 per treatment) of six animals each. These diets were fed to two week old weaned pigs for a period of two weeks. Common Phase II and Phase III diets were then fed to all pigs for two weeks each. During week 2, pigs fed the micro-pellet gained 15.5 percent less (P=.07) weight (275 vs. 325 g/day) and were less efficient (P=.02) than the pigs fed the 2.4 mm pelleted diet. For the combined two-week Phase I period pigs gained on average 244 g/day with no significant (P=.10) differences in weight gain, feed intake, or feed conversion noted. Similarly, no significant (P=.10) differences were detected during Phase II, Phase III or overall. In conclusion, given the increased manufacturing cost, and no improvement in piglet performance, the use of a micro-pellet cannot be recommended.

Key Words: Pellet, Pig, Extrusion

165 Determination of apparent ileal digestibility and digestible and metabolizable energy values for conventional or dry extruded-expelled soybean meal for swine diets. J. C. Woodworth*[1], M. D. Tokach[1], J. L. Nelssen[1], R. D. Goodband[1], P. R. OQuinn[1], D. A. Knabe[2], and N. W. Said[3], [1]*Kansas State University, Manhattan,* [2]*Texas A&M University, College Station,* [3]*Insta-Pro International, Des Moines, IA.*

Two replicated 3 X 3 Latin square designed digestion trials were conducted to determine the apparent ileal digestibility of amino acids (Exp. 1) and DE and ME values (Exp. 2) for conventional solvent-extracted soybean meal (SBM) and dry, extruded-expelled soybean meal (Insta-Pro Express^{TM} extruder/press system). The two extruded meals tested were produced from soybean meal with (DEH) or without hulls (DENH). The DM, CP, lysine, crude fat, and crude fiber contents (%, as-fed basis) were, respectively: SBM, 88, 47.1, 2.97, 1.14, 3.60; DEH, 95, 47.5, 2.96, 4.89, 4.80; DENH, 96, 50.5, 3.11, 5.86, 3.30. In Exp. 1, six barrows (initially 39 kg) were fitted with ileal T-cannula and allotted to three isolysinic treatments that were cornstarch based and formed by adding soybean meal from one of the three sources as the only dietary lysine source. Diets containing either DEH or DENH had higher ($P < .05$) apparent ileal digestibilities of CP (86 vs. 84%), lysine (91 vs. 89%), and other amino acids (Arg, Iso, Leu, Phe, Val, Ala, Asp, Glu, and Ser) compared to SBM. There were no differences ($P > .10$) in digestibility between DEH and DENH. In Exp. 2, six barrows (initially 41 kg) were allotted to three dietary treatments that were corn based and contained 25% soybean meal from one of the three sources. A fourth diet was fed at the end of the trial containing all ingredients except soybean meal so that energy values could be determined by difference. Digestible energy and ME values (kcal/g, DM basis) were, respectively: SBM, 4.15, 3.87; DEH, 4.35, 4.10; DENH, 4.38, 4.13. Energy values for DEH and DENH were similar ($P > .05$), but greater ($P < .05$) than those for SBM. In conclusion, dry, extruded-expelled soybean meal with or without hulls had higher nutritional value for swine than conventional solvent-extracted soybean meal.

Key Words: Pigs, Soybean Meal, Extrusion

166 Evaluation of different soybean meal processing techniques on growth performance of pigs. J. C. Woodworth*[1], M. D. Tokach[1], J. L. Nelssen[1], R. D. Goodband[1], and N. W. Said[2], [1]*Kansas State University, Manhattan,* [2]*Insta-Pro International, Des Moines, IA.*

Two hundred and sixteen pigs were used to determine the influence of different soybean meal (SBM) processing techniques on starter pig growth performance. Pigs were fed a common diet for 14 d postweaning after which pigs (10.6 kg BW) were blocked by weight and randomly allotted to six different dietary treatments and fed for 21 d. Four iso-lysinic, iso-caloric treatments were formulated using apparent ileal digestible amino acid values and metabolizable energy values determined in a previous experiment. Corn-SBM based diets containing dry extruded-expelled SBM with and without hulls (Insta-Pro) were compared to corresponding 44% CP (with hulls) and 46.5% CP (without hulls) solvent-extracted SBM diets with 3.21 and 4.57% added soy oil, respectively. Two additional corn-SBM based iso-lysinic, iso-caloric diets were formulated using total amino acid values and crude fat values determined from laboratory analysis. In this comparison, a second expelled SBM source with hulls (Soyplus) was compared to a 44% CP (with hulls) solvent-extracted diet with 1.61 % added soy oil. For the entire trial, pigs fed diets containing either Insta-Pro extruded-expelled SBM product did not differ ($P > .14$) for ADG, ADFI, and G/F compared to the corresponding diets containing solvent-extracted SBM and soy oil. Pigs fed diets containing Soyplus expelled SBM had lower ($P < .001$) ADG (513 vs. 566 g) and G/F (.52 vs. .58) compared to the corresponding solvent-extracted SBM and soy oil diet. These results suggest differences exist in the quality of various expelled SBM sources for swine diets. In our trial, pigs fed diets containing Insta-Pro dry extruded-expelled SBM had similar growth performance to pigs fed diets containing conventional solvent-extracted SBM and soy oil.

Key Words: Starter Pig, Growth, Soybean Meal

167 Supplementing grain energy sources with field peas and full-fat canola seed in swine growing-finishing diets.. D.G. LANDBLOM*[1] and W.W. POLAND[1], [1]*North Dakota State University, Dickinson Research Extension Center, Dickinson, ND.*

Two growing-finishing trials were conducted to evaluate growth performance and carcass characteristics when various grain energy bases were supplemented with field peas (*P. sativum*Profi') and canola seed (*B. napus*) as protein sources. In **Exp. 1**, pigs (n = 75; initial BW = 29.0 kg) were assigned to corn (*Z. mays*), barley (*H. vulgare*), naked oat (*A. sativa*Paul'), barley/corn, and barley/naked oat diets supplemented with field peas. Compared to the other test grains, barley fed pigs grew faster (P<.05), required less days on feed (P<.05), and were more efficient (P<.01). When corn and naked oats were compared to barley/naked oats or barley/corn fed pigs, no growth or efficiency differences were noted. Pigs fed barley/naked oats or barley/corn had higher percent lean values (P<.02); other carcass measures did not differ. In **Exp. 2**, pigs (n = 84; initial BW = 25.5 kg) were fed either corn, barley, or naked oat diets fortified with field peas and either 0 or 10% canola seed. Compared to barley, feeding either corn or naked oats was associated with faster growth (P<.05), and reduced feed consumption (P<.01). Pigs fed naked oats were markedly more efficient (P<.001). Loin depth was greater (P<.10) for pigs fed a corn/pea diet. Fat depth