at 4-h post-injection increased (linear, $P \leq 0.05$) with increasing n6/n3 (4.1, 5.1, 7.7 μg/dl) and by LPS vs saline (13.9 vs -2.6 μg/dl). Body temperature increased (linear, $P \leq 0.01$) with increasing n6/n3 with the LPS (39.5, 39.8, 39.9°C) but not the saline (39.6, 39.6, 39.7°C) injections, with differences ($P \leq 0.05$) between injections at the higher two n6/n3 diets. Dietary n6/n3 did not affect ADG ADFI, F/G or immune parameters in response to an immune challenge.

Key Words: Pigs, Fatty Acids, Endotoxin

203 Responsiveness of weanling pigs to Carbadox (Mecadox®) and vitamin B_{12} supplementation. S. S. Blodgett*, P. S. Miller, and R. L. Fischer, *University of Nebraska, Lincoln.*

An experiment was conducted to assess the responsiveness of weanling pigs (96 barrows and gilts) to supplemental antibiotics (Carbadox) and vitamin B_{12}. Pigs (initial weight 5.13 kg) were fed one of four diets for a total of 35 days: 1) negative control, common nursery diet with no added Carbadox or vitamin B_{12}; 2) antibiotic, common nursery diet with 55 ppm added Carbadox; 3) vitamin B_{12}, common nursery diet with 80 μg/kg added vitamin B_{12}; and 4) positive control, common nursery diet with 55 ppm added Carbadox and 80 μg/kg added vitamin B_{12}. The study was conducted as a 2 × 2 factorial with 4 replications (pens; 6 pigs/pen) per treatment. Pig weights and feed disappearance were measured weekly to determine ADG, ADFI, and feed efficiency (ADG/ADFI). Pigs were visually scored to assess any potential vitamin B_{12} deficiencies on d 14, 21, 28, and 35. No Carbadox × vitamin B_{12} interactions were observed ($P > 0.10$). During Phase I (d 0 to 14), pigs fed Carbadox had a greater ADG (223.5 vs 195.6 g, $P < 0.02$) and ADFI ($P < 0.003$) versus pigs not fed supplemental antibiotics. During Phase II and the overall experimental period, pigs fed vitamin B_{12} had greater ADG (558.1 vs 505 g and 418.6 g vs. 386.9 g, respectively; $P < 0.003$), ADFI ($P < 0.04$), and improved feed efficiency ($P < 0.006$ and $P < 0.03$, respectively) compared to pigs not fed supplemental vitamin B_{12}. During Phase II (d 15 to 35), pigs fed Carbadox had greater ADFI ($P < 0.02$) versus pigs not fed Carbadox. For the overall experimental period, pigs fed Carbadox had greater ADG (414 vs 391.9 g; $P < 0.02$) and ADFI ($P < 0.004$) versus pigs not fed Carbadox. During Phase II and overall, pigs supplemented with Carbadox had lower ADG/ADFI ($P < 0.02$ and $P < 0.04$, respectively). There were no differences among groups for visual assessment of B-vitamin deficiencies. Pigs responded to vitamin B_{12} in the absence of antibiotic in the diet. The results from this study indicate that the vitamin B_{12} requirement of 10- to 20-kg pigs may be greater than the current NRC requirement recommendation.

Key Words: Nursery Pigs, Antibiotic, Vitamin B_{12}

204 Vitamin B_{12} requirement of weanling pigs. S. S. Blodgett*, P. S. Miller, and R. L. Fischer, *University of Nebraska-Lincoln.*

An experiment was conducted to help define the vitamin B_{12} requirement of the 5- to 20-kg pig. A total of one hundred and fourty-four pigs(barrows and gilts; initial weight = 5.08 kg) were fed one of six diets (4 pigs/pen; 6 reps/treatment) for a total of 35 days: 1) negative control, common nursery diet with no added vitamin B_{12}; 2) 1X, addition of 100% the 1998 NRC-requirement for a 5- to 10-kg pig for vitamin B_{12} (17.5 μg/kg of diet), 3) 2X, addition of 200% the 1998 NRC-requirement for a 5- to 10-kg pig for vitamin B_{12} (35 μg/kg of diet), 4) 4X, addition of 400% the 1998 NRC-requirement for a 5- to 10-kg pig for vitamin B_{12} (70 μg/kg of diet), 5) 8X, addition of 800% the 1998 NRC-requirement for a 5- to 10-kg pig for vitamin B_{12} (140 μg/kg of diet), 6) 16X, addition of 1,600% the 1998 NRC-requirement for a 5- to 10-kg pig for vitamin B_{12} (280 μg/kg of diet). Pig weights and feed disappearance were measured weekly to determine ADG, ADFI, and feed efficiency (ADG/ADFI). Pigs were visually scored to assess any potential vitamin B_{12} deficiencies on d 14, 21, 28, and 35. During Phase I (d 0 to 14), there were no growth or feed intake responses to supplemental vitamin B_{12}. During Phase II (d 15 to 35), ADG and ADG/ADFI responded quadratically to vitamin B_{12} supplementation ($P < 0.007$ and $P < 0.02$, respectively). Pigs fed 8X the NRC requirement for the 5- to 10-kg pig had the greatest ADG (609 g) and pigs fed 4X the NRC requirement had the greatest ADG/ADFI (0.721 g/g). For the overall experimental period, there was a trend for a linear growth response ($P < 0.07$). Pigs fed 8X the NRC requirement had the greatest ADG (477 g). Also, there was a quadratic ADG/ADFI response ($P < 0.02$). Pigs supplemented with 4X the NRC requirement had the greatest ADG/ADFI (0.718 g/g). Feed intake did not respond to vitamin B_{12} supplementation. Based on these results, the vitamin B_{12} requirement of the 5- to 10-kg pig is similar to that recommended by the 1998 NRC (17.5 μg/kg). The 10- to 20-kg pig responded to vitamin B_{12} supplementation between 4.5 and 9 times the dietary concentration that is currently recommended by the 1998 NRC (15 μg/kg of diet).

Key Words: Nursery, Pigs, Vitamin B_{12}

205 Effects of different wheat gluten sources on nursery pig growth performance. K. R. Lawrence*, R. D. Goodband, M. D. Tokach, S. S. Dritz, J. L. Nelssen, J. M. DeRouchey, C. W. Hastad, S. H. Hanni, M. R. Barker, and B. W. James, *Kansas State University, Manhattan.*

Four experiments were conducted to determine the effects of different wheat gluten (WG) sources compared to soybean meal (SBM) or spray-dried animal plasma (SDAP) on growth performance of nursery pigs. In Exp. 1, 220 pigs (6.1 kg BW; 8 pens/trt; 6 pigs/pen) were fed a control diet containing 6% of either SDAP, enzymatically hydrolyzed WG, or non-hydrolyzed WG. The WG and L-lysine HCl replaced 50% or 100% of the SDAP. From d 0 to 21, increasing WG (either source) decreased ADG and ADFI (linear, $P < 0.01$), but improved G/F (linear, $P < 0.04$). In Exp. 2, 252 pigs (6.2 kg BW; 6 pens/trt; 6 pigs/pen) were fed a negative control containing no SDAP or WG, 9% WG, 6.75% WG & 1.25% SDAP, 4.5% WG & 2.5% SDAP, 2.25% WG & 3.75% SDAP, or a positive control containing 5% SDAP. From d 0 to 14, pigs fed increasing WG had decreased ADG (linear, $P < 0.05$) and ADFI (linear, $P < 0.10$). In Exp. 3, 240 pigs (7.0 kg BW; 7 pens/trt; 5 pigs/pen) were fed a negative control diet containing no WG or SDAP, the control diet containing either 3, 6, 9, or 12% spray-dried WG, or a positive control diet containing 5% SDAP. The diets containing 9% WG and 5% SDAP had the same amount of SBM. From d 0 to 7, pigs fed 5% SDAP had greater ($P > 0.05$) ADG than pigs fed the diet containing 9% WG. Overall (d 0 to 14), increasing WG had no effect ($P > 0.05$) on ADG, ADFI, or G/F. In Exp. 4, 200 pigs (6.0 kg BW; 8 pens/trt; 5 pigs/pen) were fed a negative control diet, which contained no SDAP or WG, the control diet with 4.5% or 9.0% enzymatically hydrolyzed WG, or the control diet with 2.5% or 5.0% SDAP. Diets containing WG and SDAP had similar SBM levels. From d 0 to 14, increasing SDAP improved (linear, $P < 0.06$) ADG, but increasing WG had no effect. There were no differences ($P > 0.05$) in ADG, ADFI, or G/F between the wheat gluten sources used in these trials. The results of these studies suggest that increasing WG in diets fed immediately after weaning did not improve growth performance.

Key Words: Pigs, Wheat Gluten, Spray-dried Animal Plasma

206 An evaluation of barley, corn or wheat-based diets, with and without glucanase and xylanase addition, on the nitrogen balance and ammonia emission of finishing boars. A.B.G. Leek*[1], V. E. Beattie[2], W. Henry[2], and J. V. O'Doherty[1], [1]*University College Dublin, Ireland,* [2]*Devenish Nutrition Ltd., Belfast, Northern Ireland.*

Finishing boars (67 kg) were used in a 3 x 2 factorial arrangement of treatments to investigate the interaction between cereal-soybean- (Cereal: barley (B), maize (M) and wheat (W)) based diets and non-starch polysaccharide (NSP) enzyme inclusion (with (+) or without (-) a xylanase and glucanase combination) on nitrogen (N) balance and ammonia nitrogen (NH_3-N) emission. The diets were formulated to have similar concentrations of DE (13.2 MJ DE/kg) and amino acids (11 g Lys/kg, 180 g CP/kg). The NSP contents of the diets were; B = 138 g/kg, M = 104 g/kg and W = 86 g/kg. Following diet adaptation, boars were housed in metabolism crates fitted with urine and feces separators for 12 d (5 d adaptation and 7 d N balance). An *in-vitro* measurement of NH_3-N emitted over 10 d and recovered from the headspace-air drawn over the surface of a fresh slurry sample collected during the N balance experiment, was performed. Volatile fatty acid (VFA) content in feces was quantified and qualified by HPLC. Boars fed B- or M-based diets had lower digestibility of ($P < 0.05$) DM (DMD), GE (GED) and lower urinary N to fecal N excretion ratio than boars fed W-based diets. Apparent digestibility of N was lower ($P < 0.02$) in B- compared to W-. N retention was not affected by cereal type. The addition of enzymes reduced ($P < 0.05$) DMD and GED in B and M, however there was no effect in W. The addition of enzymes reduced the digestibility of acid