

Nonruminant Nutrition: Feeder Pig and Sow Nutrition

606 The effect of dietary omega-3 fatty acids on adipose tissue cellularity in grower/finisher pigs. S. A. Meers*, C. R. Dove, and M. J. Azain, *University of Georgia, Athens.*

The objective of this study was to determine the effects of feeding a diet containing omega-3 fatty acids during grower and/or finisher phases on adipose tissue composition and cellularity. The study was designed as a 2 x 2 factorial arrangement, with main effects of feeding omega-3 fatty acids in the grower diet and/or finisher diet. Diets were corn-SBM based diets such that the grower diet (G) was calculated to contain approximately 3327 kcal/kg ME, 17.9% CP and, 1.0% lysine, while the finisher diet (F) was calculated to contain 3340 kcal/kg ME, 17.0% CP and, 0.9% lysine. Omega-3 fatty acids were supplemented in the form of 2% fish oil (Virginia Prime Gold, Omega Protein, Houston, TX) in the n-3 diets, while the Control diets had 2% soybean oil added to them. Pigs (n=92, initial bw 29.26±0.19 kg) were allocated by gender and weight to pens where Control or Omega-3 diet treatments were assigned at random. Pigs were fed the G diets for 35 d and switched to the F diets, with half of the pigs in each dietary treatment maintained on the same diet and half switched to the other diet (Control or Omega-3). Pigs were maintained on their respective diets for an additional 35 d. Pigs were weighed and feed intake recorded approximately every 2 weeks. There were no differences in ADG, ADFI, or G:F across diet treatments. A subset of pigs from the larger study were selected from each diet treatment and slaughtered at d 35 (n=4) and d 70 (n=8) to obtain ISQ, OSQ, and leaf fat, and loin muscle samples. Across treatments cell diameter and volume were 61.79±0.98 µm and 1.2 *10⁵ µm³/cell, respectively at d 35, as compared to 67.81±2.4 µm and 1.6 *10⁵ µm³/cell at d 70 (P< 0.02 and P<0.02, respectively). There was a trend (P < 0.07) for a decrease in average cell size in omega-3 fatty acid fed pigs. These results suggest that diets can be supplemented with omega-3 fatty acids without affecting growth performance and that omega-3 fatty acids may attenuate adipocyte filling.

Key Words: Omega-3 Fatty Acid, Cellularity, Pig

607 Effect of amino acid program (Low vs. High) and dried distiller's grains with solubles (DDGS) on finishing pig performance and carcass characteristics. R. Hinson*¹, G. Allee¹, G. Grinstead², B. Corrigan², and J Less³, ¹University of Missouri, Columbia, ²Vita Plus Corp., Madison, WI, ³ADM Specialty Feed Ingredients, Decatur, IL.

A total of 882 TR-4 x C22 barrows (initial BW = 31.9 kg) reared in a commercial research facility were allotted to one of six dietary treatments in a completely randomized block design with 7 replicate pens per treatment (21 pigs/pen). Treatments were arranged as a 2 x 3 factorial with the main effects of synthetic AA program (Low vs. High) and DDGS addition (0, 10, and 20%). Pigs were fed the experimental diets in a 5-phase finisher-feeding program, with Ractopamine at 5 ppm during the final 21 d phase. At market weight (127 kg BW), pigs were marketed by intact pen to Cargill Meat Solutions (Beardstown, IL) for carcass data collection. No AA×DDGS interactions were observed for growth performance or carcass traits. High levels of synthetic AA inclusion resulted in increased (P < 0.05) overall ADG (1.06 vs. 1.03 kg/d) and ADFI (2.93 vs. 2.85 kg/d) and heavier (P < 0.01) final BW

(129.6 vs. 126.7 kg) and carcass weight (95.8 vs. 93.5 kg). Overall ADG (1.03 vs. 1.06 kg), ADFI (2.86 vs. 2.93 kg), final BW (127.1 vs. 130.4 kg), and carcass weight (93.9 vs. 96.3 kg) were reduced (P < 0.01) when DDGS was included in the diet, with no differences (P > 0.05) between DDGS levels. Backfat depth (20.8 vs. 19.6 mm) and \$/pig received (114.27 vs. 112.21) was increased (P < 0.01) in the high AA pigs. The feeding of DDGS reduced the \$/pig received when compared to the control diet (112.35 vs. 115.03, P < 0.01). The feeding of high AA levels resulted in increased performance throughout the study and increased return/pig. The feeding of DDGS reduced overall growth performance, with minimal effects on carcass traits. The decision on the use of DDGS in G-F diets is an economic decision based on the relative cost of feed ingredients, and the economic value of the reduced growth performance. Diets with aggressive use of synthetic AA and DDGS resulted in similar benefits as observed in traditional corn-SBM diets.

Key Words: Pigs, Amino Acids, Dried Distiller's Grain with Solubles

608 Effects of co-products from the ethanol industry on pig performance and carcass composition. M. R. Widmer*¹, L. M. McGinnis¹, D. M. Wulf¹, and H. H. Stein², ¹South Dakota State University, Brookings, ²University of Illinois, Urbana.

An experiment was conducted to investigate pig performance and carcass composition of pigs fed diets based on distillers dried grains with solubles (DDGS), high-protein distillers dried grains (HP DDG), and corn germ. Eighty-four pigs (initial BW: 22 kg) were allotted to 7 treatments with 6 replicates per treatment and 2 pigs per pen. Diets were fed for 114 d in a 3-phase sequence. The control diet sequence was based on corn and soybean meal. Two diet sequences were formulated using 10 or 20% DDGS in each phase. Two additional diet sequences contained HP DDG in amounts sufficient to substitute 50 or 100% of the soybean meal used in the control sequence (20 and 40%, 15 and 30%, and 10 and 20% HP DDG in phase 1, 2, and 3, respectively). The last 2 diet sequences contained 5 or 10% corn germ in the diets fed in each phase. Results of the experiment showed that for the entire experiment, ADG, ADFI, G:F, and final BW were not affected by the inclusion of DDGS or HP DDG in the diet. However, final BW increased (linear, P ≤ 0.05) and ADG tended to increase (linear, P = 0.06) as corn germ was included in the diet. Hot carcass weight (HCW), dressing percentage, and carcass composition were not influenced by the addition of DDGS to the diets. There was no effect of HP DDG on HCW, dressing percentage, lean meat percent, and 10th rib backfat, but LM area and LM depth were reduced (linear, P ≤ 0.05) as HP DDG was added to the diet. Hot carcass weight, dressing percent, LM area, and LM depth was not influenced by the inclusion of corn germ in the diets, but there was an increase in lean meat percent and a decrease in 10th rib backfat as corn germ was included in the diets (quadratic, P ≤ 0.05). In conclusion, DDGS and corn germ do not negatively affect pig performance or carcass composition if included in diets fed to growing-finishing pigs in amounts of up to 20 and 10%, respectively. Also, HP DDG does not affect pig performance, but may reduce LM area and LM depth if substituting all the soybean meal in the diets.

Key Words: Corn germ, DDGS, HP DDG

609 Effect of corn distiller's dried grains with solubles (DDGS) withdrawal program on growth performance and carcass yield in grow-finish pigs. A. M. Gaines, J. D. Spencer, G. I. Petersen*, N. R. Augspurger, and S. J. Kitt, *JBS United, Inc., Sheridan, IN.*

The purpose of this research was to evaluate the effect of DDGS (11.8% crude fat, 27.7% CP; and 0.81% Lys, as-fed basis) withdrawal prior to marketing on growth and carcass yield in grow-finish pigs. A total of 1,117 PIC pigs (66.1 ± 1.0 kg) were allotted to one of four treatments in a randomized complete block design with 12 replicate pens/treatment. Treatments included: a corn-soybean meal diet with 0% DDGS (Trt 1) or 30% DDGS (Trt 2), or the DDGS withdrawn from the diet three (Trt 3) or six weeks (Trt 4) prior to marketing of pigs. Diets were formulated to the same standardized ileal digestible lysine and energy level (ME basis). Pigs were fed from 66 to 128 kg BW in a 3 phase program (Phase 1, 29 d; Phase 2, 21 d; and Phase 3, 20 d). At trial termination, pigs were marketed by intact pen for carcass data collection. For the overall period, there were no differences ($P > 0.30$) in ADG or ADFI among treatments. However, G/F was lower ($P < 0.02$) for pigs fed 30% DDGS compared to pigs fed 0% DDGS or the 6-week withdrawal program (0.312, 0.305, 0.307, and 0.309 kg/kg, respectively). For pigs on the 3- and 6-week DDGS withdrawal programs, G/F was similar ($P > 0.10$). Carcass weight was reduced ($P < 0.01$) for pigs fed 30% DDGS continuously; however, the withdrawal of DDGS (3 or 6 weeks) improved ($P < 0.05$) carcass weight and was similar ($P > 0.05$) to pigs fed 0% DDGS (97.8, 94.8, 96.7, and 97.5 kg, respectively). The reduction in carcass weight of pigs fed 30% DDGS was due to a reduction ($P < 0.01$) in carcass yield (77.1, 75.9, 76.5, and 77.1%, respectively). Removal of DDGS from the diet 3- or 6-weeks prior to marketing improved ($P < 0.05$) carcass yield, but only the 6-week removal fully restored yield. There were no differences in loin depth ($P < 0.46$) or percent lean ($P < 0.56$) among treatments. This research demonstrates that continuous feeding of 30% DDGS up to market weight may result in similar growth performance, but carcass yield is negatively impacted. It does appear that the withdrawal of DDGS prior to marketing may help negate this effect.

Key Words: Dried Distiller's Grains with Solubles, Swine, Growth and Carcass

610 Effects of a Pichia-expressed phytase on performance and P excretion of growing pigs. L. M. McGinnis*¹, M. R. Widmer¹, C. L. Wright¹, T. M. Parr², and H. H. Stein³, ¹*South Dakota State University, Brookings*, ²*Syngenta Animal Nutrition, Research Triangle Park, NC*, ³*University of Illinois, Urbana*.

Two experiments were conducted to evaluate the effects of feeding a Pichia-expressed phytase, Quantum™ phytase (QP), to growing pigs. In Exp. 1, 60 growing pigs (initial BW: 23 kg) were allotted to 3 treatments with 2 pigs per pen and 10 pen replicates per treatment. The positive control diet (PC) was a corn-soybean meal diet containing 1.0% dicalcium phosphate and 0.20% digestible P. The negative control diet (NC) and the QP diet were similar to the PC diet with the exception that only 0.32% dicalcium phosphate was used. The QP diet contained 500 FTU/kg of phytase equivalency and the concentration of digestible P was calculated at 0.10 and 0.20% in the NC and the QP diets, respectively. The experiment lasted 42 d. Pigs fed the PC and QP diets had greater ($P \leq 0.05$) ADG (0.92 and 0.91 vs. 0.82 kg/d),

G:F ratio (0.41 and 0.43 vs. 0.37 kg/kg), and final BW (62.52 and 61.15 vs. 57.67 kg) than pigs fed the NC diet. There were, however, no differences between pigs fed the PC and QP diets. In Exp. 2, nine barrows (initial BW: 22 kg) were placed in metabolism cages and allotted to three 3 x 3 Latin squares with 3 diets and 3 periods. The 3 diets were similar to the diets used in Exp. 1. Urine and feces were collected for 5 d of each period. Pigs fed the QP diet had a lower ($P \leq 0.001$) fecal P excretion (7.63 g/5d) and a greater ($P \leq 0.01$) apparent total tract digestibility (ATTD) of P (62.46%) than pigs fed the PC diet (11.57 g/5 d and 56.35%) or the NC diet (11.73 g/5d and 41.85%). Fecal Ca output was lower ($P \leq 0.001$) for pigs fed the QP diet than for pigs fed the PC or NC diets (6.48 vs. 7.62 and 9.96 g/5d). The ATTD for Ca in pigs fed the QP (76.4%) or PC (75.5%) diets were not different, but they were greater ($P \leq 0.001$) than the ATTD for NC fed pigs (66.0%). The results confirm that low-P, QP-containing diets support pig performance to the same degree as a high-P diet, but pigs fed the QP diet have a lower fecal excretion of P and Ca than pigs fed a high P diet.

Key Words: Phosphorus, Pigs, Quantum phytase

611 Effect of form of fat and NDF addition on apparent ileal and apparent total tract digestibility of fat in diets fed to growing pigs.

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An experiment was conducted to measure the effect of the concentration and form (liquid or intact) of dietary fat and the concentration of dietary NDF on the apparent ileal (AID) and apparent total tract (ATTD) digestibility of dietary fat by growing pigs. Eleven barrows (initial BW: 38.1 ± 1.2 kg) were fitted with a T-cannula in the distal ileum and allotted to an 11 × 11 Latin square design. Four diets containing 0.92% NDF and 1.3, 3.2, 5.1, or 6.9% liquid fat (LF) from corn oil were prepared. Three additional diets were formulated by adding 3.0, 6.0, and 9.0% NDF from solka floc to the diet containing 5.1% LF. The remaining 4 diets were prepared by mixing varying amounts of whole corn germ meal and defatted corn germ meal to produce diets containing 3.0, 5.3, 7.7, or 9.7% of intact fat (IF). Ileal digesta and fecal samples were collected from pigs and AID and ATTD of fat were calculated for each diet and linear and quadratic effects of the inclusion of LF, IF, and NDF were calculated. Preplanned contrasts were used to compare AID and ATTD of the 2 forms of fat and to compare AID and ATTD. The AID of fat increased (linear and quadratic, $P \leq 0.05$) as the inclusion of fat increased regardless of the form of fat (67, 82, 88, and 83% for LF and 53, 65, 71, and 70% for IF). The ATTD of fat also increased (linear and quadratic, $P \leq 0.05$) as the inclusion of fat increased regardless of the form of fat (65, 76, 88, and 86% for LF and 48, 57, 69, and 72% for IF). On average, the values for AID (80 vs. 65%) and ATTD (79 vs. 61%) were greater ($P \leq 0.01$) for LF than for IF. There was no effect of the dietary inclusion of NDF on the AID of fat, but the ATTD exhibited a quadratic relationship ($P \leq 0.05$) with increasing level of dietary NDF (88, 85, 85, and 87% for 0, 3, 6, and 9% NDF in the diet). There were no differences between AID and ATTD of fat regardless of the diets being fed. These results suggest that LF is better digested by growing pigs than IF, but the dietary concentration of NDF does not influence the AID of fat.

Key Words: Dietary Fat, Digestibility, Pigs

612 Performance and phosphorus status of growing pigs are improved by a multi-enzyme complex containing NSP-enzymes and phytase. A. V. Mori, J. Kluess*, R. Maillard, and P. A. Geraert, *Adisseo France SAS, Commentry, France.*

The effect of a multi-enzyme complex containing carbohydrase and phytase activities on performance, bone mineralization and phosphorus status of growing pigs fed a corn-barley based diet was investigated. Twenty-four (initial body weight BW: 25 kg) individually penned pigs were allotted to one of three diets in a complete randomized block design during a 6-wk study: positive control PC meeting requirements (3230 kcal/kg metabolizable energy ME, 17.9 % crude protein CP, 0.22 % available phosphorus avP, 0.67 % calcium Ca); negative control NC reformulated below requirements (-80 kcal/kg ME, -0.3 units CP, -0.13 units avP, -0.08 units Ca) and NC supplemented with the enzyme complex Rovabio™ Max (NCE). Rovabio™ Max provided 1,100 visco units (equivalent to 70 AXC) of endo- β -1,4-xylanase, 100 AGL units of endo-1,3(4)- β -glucanase, and 350 RPU of 3-phytase per kg of diet. Enzyme-supplementation significantly increased BW gain in the negative control (36.1 vs 40.1 kg, $P < 0.05$) reaching the same performance as the positive control. Feed conversion ratio tended to be improved ($P = 0.07$). Furthermore, enzyme addition tended to improve bone ash (%) content (17.4 vs 18.7 %; $P = 0.06$) and P content (2.9 vs 3.2 %; $P = 0.07$) in comparison to the negative control. Weight of the metacarpus was significantly higher (19.2 vs 21.7 g; $P < 0.01$). Plasma P concentration showed a significant improvement of 18.5 % ($P < 0.05$) and faecal P excretion was significantly reduced by 16.9 % (1.36 vs 1.13 %; $P < 0.05$) due to the enzyme supplementation. In conclusion, supplementation with the multi-enzyme complex Rovabio™ Max of a corn-based diet reformulated below requirements for ME, CP, P and Ca improved growth performance, P status and excretion in the growing pig. This combination of NSP-enzymes and phytase is an efficient strategy to enhance the nutritional value of swine diets.

Key Words: Phytase, NSP Enzymes, Pigs

613 Comparison of particle size analysis of ground grain with or without the use of a flow agent. R. D. Goodband*¹, W. Diederich², S. S. Dritz¹, M. D. Tokach¹, J. M. DeRouchey¹, and J. L. Nelssen¹, ¹*Kansas State University, Manhattan*, ²*Mid-West Laboratories, Omaha, NE.*

According to the American Society of Biological and Agricultural Engineers' standard, particle size analysis of grain can be conducted with or without the use of a flow agent. Because two procedures can be used, particle size results can be variable, depending on whether the laboratory uses a flow agent or not. Therefore, the objective of this study was to determine if the two procedures (with or without flow agent) were similar as measured by a Method of Agreement analysis. A total of 603 ground corn samples were analyzed for particle size with or without 0.5 g of synthetic amorphous precipitated silica (Sipernat® 22-S) per 100 g of sample. Results indicated a bias between the two procedures. Particle size analysis conducted with a flow agent will result in a mean particle size that is approximately 80 μ smaller than the result from analysis without a flow agent. There was no evidence the slope (0.027) of the comparison was different than zero ($P = 0.13$), indicating a similar bias across the range of particle sizes tested (400 to 1000 μ), but the intercept (-80.2 μ) was highly significant ($P < 0.01$). The same procedures were used in comparing particle size standard deviation. Using a flow agent produced a greater particle size standard

deviation value than without a flow agent. Unlike the bias for the particle size analysis, the standard deviation values showed a significant bias that changed with increasing particle size. There was strong evidence that the slope of this line (0.460) was different than zero ($P < 0.05$), indicating that the magnitude of difference between the two procedures increased as the standard deviation of the sample increased. Results of this study indicate that there are differences in results between the two procedures. Therefore, selection of one of the two procedures as the official standard is necessary. Also, it is important to know if a flow agent was, or was not, used in the analysis when interpreting results.

Key Words: Flow Agent, Particle Size, Quality Control

614 Effects of a dry organic acid blend on growth performance and carcass parameters in growing-finishing pigs. J. Zhao*¹, R. J. Harrell¹, B. R. Hinson², G. L. Allee², F. Navarro¹, and C. D. Knight¹, ¹*Novus International Inc, St. Louis, MO*, ²*University of Missouri, Columbia.*

A total of 720 growing pigs (40.2 \pm 1.1 kg BW) were used to investigate the effect of a dry organic acid blend (DOAB) (ACTIVATE® Starter DA, registered trademark of Novus International, Inc., St. Louis, MO), containing 2-hydroxy-4-(methylthio) butanoic acid calcium, benzoic acid, and fumaric acid, on growth performance and carcass parameters. Nutrient adequate non-medicated corn soybean meal diets were supplemented with DOAB at 0 (control), 0.1%, and 0.2% for 12 weeks. Pigs were blocked by sex (20-22 pigs/pen) with 10 replicate pens per treatment and 16 replicate pens for controls. All pigs received ractopamine during the last 3 weeks (5.0 ppm and 7.5 ppm for week 1, week 2 and 3, respectively), and were harvested at Tyson's Columbus Junction plant in Iowa. Average daily gain and ADFI were linearly increased with DOAB supplementation from d 0-21 ($P < 0.05$) and tended to be increased for the overall period (d 0-84, $P < 0.09$) with no differences in feed efficiency ($P > 0.38$). The ADG was 1.04, 1.07, and 1.07 \pm 0.01 kg/d, and ADFI was 2.61, 2.66, and 2.70 \pm 0.03 kg/d for the 0, 0.1, and 0.2% DOAB, respectively, from d 0-84. Pigs fed DOAB had heavier body weights compared to controls (linear, $P < 0.05$) at d 21. Pigs fed DOAB had heavier final bodyweights than controls ($P < 0.05$), 127.0, 130.0, and 130.2 \pm 0.9 kg for the 0, 0.1, and 0.2% DOAB, respectively. Mortality and morbidity were not different among treatments ($P = 0.69$). Pigs fed DOAB had 2.5 kg heavier carcass weights (linear, $P < 0.05$), increased grade premium by 5% (linear $P < 0.05$), and higher pig value by 2.8% (linear $P < 0.05$). No differences were observed in back fat depth, loin depth, lean percentage, or sort loss ($P > 0.30$). In summary, dietary DOAB increased growth performance, final BW, carcass weights, and increased grade premium and individual pig value.

Key Words: Organic Acid, Carcass, Swine

615 Dietary arginine supplementation enhances the growth performance of milk-fed piglets. Y. Kang*¹, Y. L. Yin¹, R. L. Huang¹, X. F. Kong¹, T. J. Li¹, I. Shinzato², S. W. Kim^{3,4}, and G. Y. Wu^{1,4}, ¹*Institute of Subtropical Agriculture, The Chinese Academy of Sciences, Changsha, Hunan, China*, ²*Ajinomoto, Tokyo, Japan*, ³*Texas Tech University, Lubbock*, ⁴*Texas A&M University, College Station.*

This study was designed to determine the effect of dietary L-arginine (Arg) supplementation on the growth performance of milk-fed piglets. The milk replacer powder consisted of 60% dried whey, 26% dried skim milk, 6.2% a-casein, 3.6% lactose, 1.65% glucose, 1% calcium lactate, 1% dihydrocalcium phosphate, 0.1% vitamin premix, 0.2% mineral premix, 0.1% lysine, 0.1% methionine, and 0.05% antibiotic. Seventy piglets (Landrace–Yorkshire) with similar BW (2.75 ± 0.05 kg) from 14 sows (5 piglets/sow) were weaned at 7 d of age and housed individually. Piglets were assigned randomly on the basis of BW and litter origin to one of the five treatments (14 piglets/treatment; 7 males and 7 females), representing dietary supplementation with 0.0% (control), 0.2%, 0.4%, 0.6% and 0.8% Arg (on the basis of milk powder). Milk powder was dissolved in water to obtain 18% DM, and the resultant liquid milk was fed to piglets every 4 h for 14 d. On d 0, 7, and 14, the BW of piglets was measured and jugular venous blood samples were obtained for analysis of insulin and growth hormone. There were no differences in any measured parameter between male and female piglets. Feed intakes did not differ among all the groups of piglets. ADG was similar among piglets supplemented with 0.0%, 0.2% and 0.4% dietary Arg. However, dietary supplementation with 0.6% and 0.8% Arg for 14 d increased ($P < 0.05$) the BW of piglets by 18% and 23%, respectively, as well as ADG by 41% and 53%, respectively, compared with control piglets. Additionally, dietary supplementation with 0.6% and 0.8% Arg increased ($P < 0.05$) plasma concentrations of insulin and growth hormone by 24%–27% in piglets on d 14. Collectively, these results indicate that Arg availability is a major factor that limits the maximum growth of milk-fed piglets.

Key Words: Arginine, Piglets, Growth Performance

616 Production of the recombinant bovine lactoferricin and its beneficial supplementation to the diet for weaned pigs. Z. R. Tang^{*1}, Y. M. Zhang^{1,2}, Y. L. Yin¹, A. F. Stewart³, and G. Y. Wu^{1,4}, ¹*Institute of Subtropical Agriculture, The Chinese Academy of Sciences, Changsha, Hunan, China*, ²*Gene Bridges GmbH, BioInnovation Zentrum, Am Tatzberg, Dresden, Germany*, ³*BioInnovation Zentrum, Technical University of Dresden, Am Tatzberg, Dresden, Germany*, ⁴*Texas A&M University, College Station*.

This study was conducted to produce a new antimicrobial polypeptide, bovine lactoferricin (44 amino acids), using the gene engineering technology and to determine its nutritional efficacy as an additive to the diet for weaning pigs. After both *cipA* and *cipB* genes in *photorhabdus luminescens* subsp. *Akhurstii* were knocked-out using the Red/ET homologue recombination technology, a mutant (the *photorhabdus luminescens* TZR) was obtained as the host bacterial strain for protein expression. The expression plasmid pBAD-CipB-BLfcin-Ampin was constructed and transformed to the host bacterial strain, which produced high levels of the recombinant bovine lactoferricin (rBLfcin) under the induction of L-arabinose. The resultant rBLfcin reached 10% of the total bacterial protein. Experiments in vitro showed that rBLfcin had a similar antimicrobial activity to bovine lactoferricin isolated from the bovine milk. A feeding trial was conducted with

60 piglets which were weaned at 21 d of age (5.42 ± 0.59 kg), fed a corn- and soybean meal-based diet supplemented with 0 or 0.01% rBLfcin or 0.01% polymyxin sulfate (an antibiotic), and challenged with pathogenic *E. coli* (k88, k99, and k149); there were 20 pigs per dietary treatment. Compared with control pigs, dietary supplementation with 0.01% rBLfcin for 3 wk increased ADG by 21%, improved the gain:feed ratio by 16%, and reduced diarrhea incidence ($P < 0.01$). Growth performance was similar between rBLfcin- and polymyxin sulfate-supplemented pigs. Our results indicate that rBLfcin is an effective alternative to a feed antibiotic for enhancing growth performance in weaned pigs.

Key Words: Bovine Lactoferricin, Recombination Technology, Weaned Piglets

617 InraPorc: A model and decision support tool for the nutrition of growing pigs and sows. J. van Milgen^{*}, J. Noblet, M. Étienne, A. Valancogne, S. Dubois, and J. Y. Dourmad, *INRA, Saint Gilles, France*.

InraPorc is a model allowing the evaluation of different nutritional strategies for growing pigs and sows. The core of the model is the definition of the animal's phenotypic potential in which both the feed intake capacity and production potential are described. The latter includes body weight gain and the shape of the growth curve for growing pigs. For sows, the production potential is determined by the changes in body weight and backfat thickness (during gestation and lactation and up to the eighth litter), litter size and litter growth. Both the sow and the growing pig models are based on the premise that nutrients are transformed into body protein and body lipid that cumulate progressively into two body pools. Lactating sows may also mobilize nutrients from these body pools to support milk production. Both models operate internally using established concepts of nutrient utilization (e.g., standardized ileal digestible amino acids, ideal protein, metabolizable or net energy). The decision support tool was designed around a common feed modules and specific modules for growing pigs and sows. The feed module allows characterizing the nutritional values of feeds and includes the complete INRA-AFZ tables of feed ingredients. Using a feeding strategy (type and quantities of feed), the user can graphically evaluate the use of nutrients by the pig. This includes the utilization of energy and amino acids for the main physiological functions, identification of (potentially) limiting nutrients, and input-output balances for N, P, Ca, Cu and Zn. In addition, the user can compare different nutritional strategies (different types or quantities of feed) and evaluate the effects on animal performance. The target audience for the model and tool include professional nutritionists and educational institutions. All underlying hypotheses and model equations are freely available and the software is from Inra at a modest cost. A slightly limited version of the software is available free of charge for academic institutions.

Key Words: Nutrition, Model, Pigs