

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 AXU) of endo- β -1,4-xylanase, 100 AGU 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*, W. Diederich², S. S. Dritz¹, M. D. Tokach¹, J. M. DeRouchey¹, and J. L. Nelssen¹, ¹Kansas State University, Manhattan, ²Mid-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*, R. J. Harrell¹, B. R. Hinson², G. L. Allee², F. Navarro¹, and C. D. Knight¹, ¹Novus International Inc, St. Louis, MO, ²University 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*, 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}, ¹Institute of Subtropical Agriculture, The Chinese Academy of Sciences, Changsha, Hunan, China, ²Ajinomoto, Tokyo, Japan, ³Texas Tech University, Lubbock, ⁴Texas A&M University, College Station.