**132 Effects of Rhizopus Ushikoshi on growth performance, serum IGF-1, energy and nitrogen balance in 10 kg pigs.** T. M. Becker*, T. M. Salzer, J. M. McCalla, M. E. White, and G. C. Shurson, *University of Minnesota, St. Paul.*

Rhizopus Ushikoshi (RU) is an extract derived from the fungus Rhizopus that may stimulate the endocrine system to improve pig growth performance when added to the diet. Two experiments were conducted to determine if dietary addition of RU improves growth performance, serum IGF-1 levels, and energy and nitrogen balance in young pigs. In the first experiment, a total of 140 crossbred pigs were weaned at 35 ± 3 d of age and averaged 10 kg in body weight. Pigs were blocked by weight, litter, and sex, and allotted to one of two experimental diets containing none (control) or 0.1 RU for a 4-wk growth assay. Diets were corn-soybean meal based, and contained 20% dried whey (wk 1 and 2), or no dried whey (wk 3 and 4), and provided 3198 kcal ME/kg and 1.25 % lysine. Individual pig weights and pen feed consumption were determined weekly and used to calculate ADG, ADFI, and G/F. Blood samples were collected by venipuncture on d 0, 14, and 28 from all pigs. Serum was harvested, pooled by pen, glycylglycine extracted, and used to determine IGF by radioimmunoassay. The second experiment utilized 16 crossbred barrows averaging 10 kg in body weight. Pigs were blocked by weight and litter, placed in individual stainless steel metabolism cages, and assigned to either control or RU diets for a 7 d adjustment and 3 d collection period. Pigs were fed at a rate of 2% of initial body weight twice daily. Feed, feces, and urine samples were analyzed for gross energy using bomb calorimetry. Nitrogen was determined using an elemental nitrogen determinator for feed and feces, and a micro-Kjeldahl procedure for urine. Data were statistically analyzed using GLM procedures for a randomized complete block design. Cumulative ADG for pigs fed the control and RU diets during the 4-wk growth assay was 371 ± 14 g/d and 361 ± 14 g/d, respectively. No differences were observed for weekly or cumulative ADG, ADFI, and G/F except during wk 2, where G/F for pigs fed the control diet was greater than for pigs fed the RU diet ($P < .05$). Serum IGF-1 levels on d 0, 14, and 28 were not different between control and RU dietary treatments. Furthermore, there were no differences between control and RU dietary treatments for DE, ME, $ME_N$, N retention, net protein utilization, and biological value of protein. These results suggest that RU is ineffective in stimulating growth and increasing serum IGF-1 levels and energy and nitrogen retention in young pigs.

**Key Words:** Rhizopus Ushikoshi, Growth, Nutrient Balance

**133 Inability of 1,25-dihydroxycholecalciferol to improve P utilization in pigs.** G. L. Cromwell*[1], R. L. Horst[2], J. P. Goff[2], S. D. Carter[1], M. D. Lindemann[1], and H. J. Monegue[1], *[1]University of Kentucky, Lexington, and [2]National Animal Disease Center, USDA/ARS, Ames, IA.*

Three 35-d trials were conducted with pigs (14-21 kg initial wt) to determine if 1,25-dihydroxycholecalciferol ($D_3$) improves the utilization of phytate in low-P diets, as has been shown in chicks. Corn-soy diets (.90% lysine) were fed to 5 or 6 pigs/trt (1 or 2 pigs/pen) in each trial. In Exp. 1, 7 diets were fed: (1) .65% Ca/.50% P, (2,3,4) .65% Ca/.32% P + 0, 5, or 10 μg/kg $D_3$, and (5,6,7) .32% Ca/.32% P + 0, 5, or 10 μg/kg $D_3$. Growth rate decreased ($P < .01$) when dietary P was reduced (717 vs 573 g/d), but to a lesser extent when Ca also was reduced (649 g/d). Bone (avg, femur and metatarsal) breaking strength was reduced ($P < .01$) by lowering P (148, 72, 69, 83, 75, 81, 70 kg, respectively), but it was not affected by lowering Ca or by adding $D_3$. Added $D_3$ did not affect plasma Ca (11.0, 12.3, 12.8, 12.7, 11.3, 11.2, 11.4 mg/dl), but it tended to increase plasma P (9.4, 5.6, 5.9, 5.8, 7.2, 7.7, 7.5 mg/dl). In Exp. 2, 8 diets were fed: (1) .65% Ca/.55% P, (2,3,4) .42% Ca/.42% P + 0, 25, or 50 μg/kg $D_3$, (5,6,7) .32% Ca/.32% P + 0, 25, or 50 μg/kg $D_3$, and (8) .16% Ca/.32% P + 50 μg/kg $D_3$. Reducing Ca/P affected bone strength (133, 100, 93, 81, 46, 49, 48, 53 kg) more than growth rate (581, 598, 565, 532, 500, 528, 467, 554 g/d), and $D_3$ had modest effects on both traits. Plasma Ca and P were (mg/dl) 10.9, 11.2, 11.3, 11.6, 10.5, 10.7, 11.4, 10.9; 9.0, 8.3, 8.0, 8.2, 5.0, 5.5, 5.7, 7.1. Pigs in Exp. 3 were fed: (1) .65% Ca/.55% P, (2,3,4) 16% Ca/.32% P + 0, 100, or 200 μg/kg $D_3$, and (5,6) as diet 2 with 10-18 or 20-36 μg/d of $D_3$ injected i.m. ADG and bone strength were 651, 578, 561, 320, 589, 527 g/d; 166, 69, 69, 42, 74, 68 kg. Plasma Ca and P were (mg/dl): 10.0, 8.2, 8.1, 8.7, 8.5, 9.0; 9.4, 7.2, 8.7, 5.8, 7.9, 7.3. The 200 μg/kg level of $D_3$ depressed ($P < .05$) growth rate, bone strength, and plasma P. The results indicate that addition of 5 to 200 μg/kg of $D_3$ to low Ca, low P diets does not improve phytate P utilization in growing pigs.

**Key Words:** Pig, Cholecalciferol, Phosphorus

**134 Effect of Dietary L-Carnitine on Growth, Metabolism, and Carcass Characteristics of Swine.** K. Q. Owen[1]*, H. Ji[2], C. V. Maxwell[3], J. L. Nelssen[1], R. D. Goodband[1], M. D. Tokach[1], G. C. Tremblay[2], S. I., Koo[1], and S. A. Blum[4], *[1]Kansas State University, Manhattan, [2]University of Rhode Island, Kingston, [3]Oklahoma State University, Stillwater, [4]Lonza Inc. Fair Lawn, NJ.*

A trial was conducted to explain the decreased lipid deposition and increased protein accretion observed in pigs fed carnitine. The hypothesis was that an increase in the ratio of acetyl CoA:CoA-SH produced by stimulation of fatty acid oxidation by supplemental L-carnitine may decrease branched-chain α-keto acid dehydrogenase (BCKADH) activity. Such changes could reduce oxidative loss of branched chain amino acids (BCAA). Thirty-six Yorkshire gilts (twelve/treatment) were fed either 0, 50, or 125 ppm L-carnitine from 56 to 120 kg BW. After slaughter the semitendinosus muscle and liver were collected for isolation of mitochondria and hepatocytes. Increased dietary L-carnitine did not influence growth performance ($P > .10$), but linearly decreased ($P < .05$) tenth rib backfat (2.43, 2.24, 2.16 cm for 0, 50, and 125 ppm carnitine, respectively). Pigs fed L-carnitine increased (linear, $P < .01$) the rates (nmol/mg protein/h) of 1-[$^{14}$C] palmitate oxidation in isolated hepatocytes (.94, 1.56, 2.38) and isolated mitochondria (10.6, 11.9, 15.3), and incorporation of [$^{35}$S]-methionine (.95, 1.25, 1.75) into the acid insoluble fraction of isolated hepatocytes. Activity of BCKADH was linearly decreased ($P < .01$) in isolated liver (82.2, 60.4, 54.1) and muscle (108.8, 110.1, 86.5) mitochondria with increasing dietary carnitine. Activity of pyruvate carboxylase, which is stimulated by acetyl CoA, also was increased (linear, $P < .01$) in liver mitochondria (20.4, 30.9, 44.2) isolated from pigs fed carnitine. The increase in protein accretion and reduction in backfat thickness in pigs fed carnitine may be associated with the reduced rate of BCAA oxidation due to the stimulation of fatty acid oxidation by carnitine. These findings suggest that the higher concentration of acetyl CoA produced by the higher rate of fatty acid oxidation may inhibit BCKADH activity resulting in the conservation of BCAA.

**Key Words:** Pigs, L-Carnitine

**135 Removing vitamin and trace mineral premixes from diets for finishing pigs (70 to 112 kg) did not affect growth performance, carcass characteristics, or meat quality.** I. H. Kim*, J. D. Hancock, D. H. Kropf, R. H. Hines, J. H. Lee, J. S. Park, S. L. Johnston, and P. Sorrell, *Kansas State University, Manhattan.*

A total of 80 finishing barrows (PIC 326 boars × C 15 sows with an average initial BW of 70 kg) was used to determine the effects of deleting vitamin and(or) trace mineral premixes from diets for finishing pigs. Treatments were: 1) corn-soybean meal-based control with vitamin and trace mineral premixes; 2) Diet 1 with the vitamin premix omitted; 3) Diet 1 with the trace mineral premix omitted; and 4) Diet 1 with the vitamin and trace mineral premixes omitted. The diets were formulated to .7% lysine, .65% Ca, and .55% P. Average daily gain, ADFI, and gain/feed were not influenced ($P > .14$) by dietary treatment. Dressing percentage, 10th rib fat thickness, fat free lean index, muscle depth, and subjective scores for color, firmness, and marbling of the longissimus muscle also were not affected by dietary treatment ($P > .11$). Objective color determinations (Minolta L) before display and at d 5 suggested that pigs fed the diet without vitamins had lighter muscle than pigs fed the diet without trace minerals ($P < .05$), but color for all treatments was within normal ranges. Also, the change for meat color to d 3, 5, 10, and 15 was similar for all treatments. Water-holding capacity was not affected by dietary treatment ($P > .38$), but pigs fed the diet without vitamins had lower Warner-Bratzer shear force than pigs fed the diet without trace minerals ($P < .02$). Thaw loss was not affected by dietary treatment ($P > .48$), and cooking loss for pigs fed the control diet was greater when compared to pigs fed diets without the vitamin and(or) trace mineral premixes ($P < .01$). In conclusion, omitting vitamin and trace mineral premixes can be used to decrease diet costs without decreasing performance or meat quality of high-lean pigs.

**Key Words:** Pigs, Vitamins, Minerals