period. Gain:feed did not differ between the treatment groups during any phase of the trial. Pigs farrowed outdoors had greater (P = 0.04) BW and were 2.1 kg heavier at the end of the trial. An additional subset of 12 pigs (six from each treatment) was weighed on d 3 after weaning (d 0). The six pigs farrowed outdoors tended to have greater (P ≤ 0.08) ADG (0.24 vs. 0.15 ± 0.04 kg/d) compared to the six pigs farrowed indoors. These data indicate that pigs farrowed in an outdoor management system and weaned to an indoor facility begin to gain BW more rapidly and maintain greater rates of gain during the nursery period than pigs farrowed in indoor facilities.

Table 1. Nursery growth performance of pigs farrowed in indoor and outdoor facilities.

	Indoor	Outdoor	SEM	P =
Initial BW, kg	5.7	5.2	0.3	0.16
d 42 BW, kg	22.9	25.0	0.7	0.04
d 0 to 42 ADG, g	417	477	13	0.01
d 0 to 42 ADFI, g	613	703	20	0.01
d 0 to 42 G:F	0.71	0.70	0.01	0.70

Key Words: swine, growth, weaning

161 The use of ractopamine to enhance the environmental sustainability of pork production. K. A. Ross*[1,2], A. D. Beaulieu[1], J. Merrill[3], G. Vessie[3], and J. F. Patience[1,4], [1]*Prairie Swine Centre Inc., Saskatoon, SK, Canada*, [2]*University of Saskatchewan, Saskatoon, SK, Canada*, [3]*Elanco Animal Health, Guelph, ON, Canada*, [4]*Iowa State University, Ames*.

This experiment was conducted to determine if ractopamine HCl (RAC) can increase nutrient utilization and decrease water use in hog operations. This experiment combined growth (GEXP) and metabolism (MEXP) experiments using 9 dietary treatments (trt) arranged as a 3 × 3 factorial: 3 levels of RAC (0, 5 & 10 ppm) and 3 standardized ileal digestible LYS: DE ratios (1.75, 2.25 & 2.75 g/Mcal DE). GEXP utilized a comparative slaughter technique which consisted of 120 barrows (initial BW 95±3 kg) including 12 assigned to an initial slaughter group; the remaining pigs were slaughtered at 108 (n=6/trt) or 120 kg (n=6/trt). Growth performance and nutrient retention were determined. The 15d MEXP consisted of 54 pigs (initial BW 95±3 kg; n=6/trt). Growth performance, feed and water intake and urine and fecal outputs were measured. In GEXP, RAC had no effect on ADG, ADFI or G: F (P>0.10). Increasing LYS improved G: F (0.35, 0.35 and 0.39; P<0.05), but not ADG or ADFI (P>0.10). Crude protein deposition rates tended to increase (162, 185 & 189 g/d for 0, 5 & 10 ppm RAC; P<0.12) and water deposition (466, 609 & 573 g/d; P<0.05) rates increased, while lipid deposition (620, 462 & 542 g/d) tended to decrease with RAC inclusion (P<0.10). Nitrogen (N) retention tended to increase (29, 32 and 34 %; P<0.11). Pigs fed higher LYS concentrations had improved N retention (26, 29 & 32 g/d; P<0.05) but not when expressed as a % of intake (P>0.10). In MEXP, higher levels of RAC and LYS improved ADG (1.09, 1.27 & 1.25 for RAC; 1.13, 1.27 & 1.21 for LYS; P<0.05) and G: F (0.34, 0.39 & 0.41 for RAC; 0.35, 0.40 & 0.40 for LYS; P<0.0001). RAC decreased water intake (8.3, 7.9 & 7.3 l/d; P<0.05.) and urine output (3.5, 3.2 & 2.9 l/d; P<0.05). LYS had no effect on water balance (P>0.10). RAC may reduce the environmental footprint of pork production through improved nutrient utilization and reduced water requirements.

Key Words: swine, ractopamine, environment

162 Effects of EcoCare® Feed on the mass balance of N and P during the swine finishing phase. T. Walraven*[1], S. D. Carter[1], M. Lachmann[1], J. Bundy[1], J. Jarrett[1], and B. De Rodas[2], [1]*Oklahoma State University, Stillwater*, [2]*Land O'Lakes Purina Feed, Gray Summit, MO*.

Eighty crossbred (D × (L × Y)) pigs (30 kg BW) were used to determine the effects of EcoCare® Feed (Land O'Lakes Purina Feed) on the mass balance of N and P during a 122-d finishing period. Pigs were blocked by BW and sex, and randomly allotted to 1 of 2 dietary treatments. Pigs were housed in an environmentally-controlled building with 4 identical rooms (20 pigs/room, 2 rooms/trt). Each room contained a shallow pit, pull plug system. A fortified corn-soybean meal-based diet served as the control (20.1, 19.3, 17.9, 16.5, 15.1, 13.7% CP; 0.37, 0.34, 0.31, 0.29, 0.27, 0.25% available P for phases 1 to 6, respectively). The test diet (EcoCare®, EC) was similar to the control diet except that CP was reduced by 2.6% units and available P by 0.11% units; with additions of Lys, Thr, Met, EC Pak (containing phytase) and EC premix. The estimation of mass balance, on a per pig basis, assumed that N and P entered the finisher via the feed and pigs, and exited via the slurry, exhaust air, and pigs. On d 0 and 122, 6 and 24 pigs (6/room), respectively, were ground to estimate initial and final body composition. Feed intake and composition were used to estimate N and P entering via feed. Slurry volume and composition, and NH_3-N emission were used to estimate N and P exiting via slurry and air. The amount of N (0.64 kg) and P (0.11 kg) entering via pigs was similar (P > 0.10). However, N (7.4 vs. 6.3 kg) and P (1.6 vs. 1.3 kg) in the feed were reduced (P < 0.04) for the EC diet. Thus, EC reduced (P < 0.03) total N (8.1 vs. 7.0 kg) and P (1.7 vs. 1.4 kg) entering by 13 and 20%, respectively. EC tended (P < 0.09) to increase the amount of N (3.42 vs. 3.44 kg) and P (0.71 vs. 0.72 kg) exiting via the pigs. However, N (4.2 vs. 3.1 kg) and P (1.02 vs. 0.68 kg) exiting via slurry were reduced (P < 0.02) for pigs fed EC. Also, EC reduced (P < 0.03) NH_3-N (0.58 vs. 0.35 kg) in exhaust air. Thus, EC reduced (P < 0.03) total N (8.2 vs. 6.9 kg) and P (1.7 vs. 1.4 kg) exiting by 16 and 20%, respectively. The proportion of N and P entering the finisher that exited via the pigs increased from 42 to 49% for N and 41 to 52% for P for pigs fed EC compared with those fed the control.

Key Words: pig, nutrient, mass balance

163 Effects of high levels of distillers dried grains with solubles (DDGS) and enzymes on growth performance and carcass traits of grow-finish pigs. J. J. Jacela*[1], S. S. Dritz[1], M. D. Tokach[1], J. M. DeRouchey[1], R. D. Goodband[1], J. L. Nelssen[1], and K. J. Prusa[2], [1]*Kansas State University, Manhattan*, [2]*Iowa State University, Ames*.

A total of 1,032 pigs (BW=46 kg) were used in a 90-d study to determine the effects of high levels of DDGS and enzymes on growth and carcass traits. Pig were blocked by BW and randomly allotted to 1 of 7 dietary treatments with 6 pens per treatment. Control diet had 30% DDGS. Remaining treatments were arranged in a 2 × 3 factorial based on DDGS level (45 or 60%) and enzyme used (none, product A, or product B). Enzymes were proprietary enzymes for use in DDGS diets. Pigs on the 60% DDGS treatment were fed 45% DDGS for the first 2 wk of the trial. The 4 heaviest pigs from each pen were sold at d 78 and DDGS levels in all treatments were reduced to 20% until d 90. Pigs were weighed and feed intake were determined every 2 wk to calculate ADG, ADFI, and G:F. Overall (d 0 to 90), enzyme supplementation did not affect ADG (P >0.24), ADFI (P >0.30), or G:F (P >0.52). From d 0 to 78; regardless of enzyme treatment, ADG decreased (linear; P <0.05) as DDGS increased (856, 833, and 825 g/d) due to the reduction (quadratic; P<0.04) in ADFI (2.32, 2.21, and 2.20 kg). After topping and