

Nonruminant Nutrition: Feed Additives

673 Effects of supplementation of yeast culture to sow diets on reproductive performance and physiological changes in sows and nursing piglets. S. W. Kim^{*1}, C. Vasquez², A. Saraiva¹, and I. Yoon³, ¹North Carolina State University, Raleigh, ²Texas Tech University, Lubbock, ³Diamond V Mills, Cedar Rapids, IA.

Forty-two sows were used to determine the effects of supplementation of yeast culture (XPC™ Yeast Culture, Diamond V Mills, Cedar Rapids, IA) to gestation and lactation diets on reproductive performance and physiological changes in sows and nursing piglets. Sows were allotted to 2 treatments: CON (no yeast culture, n=20) or YC (12 and 15 g XPC/d during gestation and lactation, respectively, n=22). Sows were fed 2 kg/d during gestation and ad libitum during lactation (21 d). On d 5 prior to breeding, d 30 and 110 of gestation, and d 0 (immediately after farrowing) and 21 of lactation, BW, backfat thickness, and blood samples were obtained from sows. Colostrum (d 1) and milk (d 17) samples were collected. On d 18 of lactation, milk yield was measured by weigh-suckle-weigh method. After weaning, conception rate was recorded. Litter BW was measured on d 0 and 21 of lactation. Changes in BW and backfat thickness of sows did not differ between treatments. Yeast culture did not affect litter size at birth or at weaning. Litter birth weight was similar between treatments. However, litter weight at weaning (kg) tended to be greater ($P=0.068$) for YC (61.1) compared to CON (55.1). Feed intake of sows during lactation did not differ between treatments. Post-weaning conception rate of YC (80.1%) was greater ($P<0.05$) than CON (68.4%). On d 110 of gestation, plasma urea nitrogen (mg/dL) of YC (1.28) tended ($P=0.069$) to be smaller than CON (1.46). Milk yield and composition were similar between treatments. Number of neutrophils (10^3 cells/ μ L) of CON (6.49 and 6.18) was greater ($P<0.05$) than YC (4.58 and 4.92) on d 110 of gestation and d 21 of lactation, respectively. Collectively, supplementation of yeast culture can improve post-weaning conception rate of sows and increase the litter weight potentially by improving protein utilization without affecting nutrient intake of sows and mobilization of sow body reserves.

Key Words: litter weight, sow, yeast culture

674 Effects of supplementation of yeast culture to diets of sows and offspring on growth and meat quality of offspring. A. C. Chaytor^{*1}, C. Vasquez², V. Fellner¹, I. Yoon³, and S. W. Kim¹, ¹North Carolina State University, Raleigh, ²Texas Tech University, Lubbock, ³Diamond V Mills, Cedar Rapids, IA.

Pigs (n=256) weaned at 21 d of age were used to determine the effects of supplementation of yeast culture (YC; XPC™ Yeast Culture, Diamond V Mills) to diets of sows and pigs on growth, gut environment, and carcass characteristics of pigs. Equal numbers of pigs (n=128) from two sow groups fed diets with or without supplemental YC (12 and 15 g YC/d during gestation and lactation, respectively) were used. Pigs were fed 6 phase diets and the length of each phase was 7, 14, 21, 56, 42, and 27 d, respectively. Pigs from each sow group were allotted to one of two dietary treatments: with or without supplemental YC (0.2% YC for phase 1 to 3 and 0.1% YC for phase 4 to 6). Feed intake and BW were measured during each phase. On d 5, one pig representing the average BW of each pen was euthanized to obtain samples of the jejunum to measure villus height and digesta from the cecum and colon to measure volatile fatty acid (VFA) concentrations. At 115 kg BW, all pigs were slaughtered at a local abattoir to measure carcass characteristics. During the study, growth performance of pigs did not differ between treatments. On d 5, jejunal villus height did not differ between treatments. However,

pigs fed YC tended to have greater acetate content (61.2 vs. 57.7%, $P=0.084$) and reduced propionate content (24.8 vs. 27.4%, $P=0.054$) in the colon than control-fed pigs. Pigs from sows fed YC tended (8.5 vs. 10.4%, $P=0.098$) to have greater butyrate content in the cecum than pigs from control-fed sows. When pigs were harvested, loin color, pH, and firmness did not differ between treatments. However, pigs fed YC had greater ($P<0.05$) loin marbling score (2.4 vs. 1.9) than control-fed pigs. Collectively, dietary supplementation of yeast culture can be beneficial by improving loin marbling score and production of VFA in the hind gut potentially favorable for intramuscular lipogenesis.

Key Words: marbling, pig, yeast culture

675 Use of a phytogetic feed additive in sows during the lactation. Y. Acosta Aragón¹, D. Uribe López², A. Pedroche Quevedo³, and T. Steiner^{*1}, ¹Biomín Holding GmbH, Herzogenburg, Lower Austria, Austria, ²Agropecuaria ALFA S.A., Cundinamarca, Colombia, ³NUTRECO S.A., Bogotá, Colombia.

The aim of this study was to quantify the effects of using a phytogetic feed additive based on a blend of essential oils and prebiotics, hereafter named as PEP, in diets for lactating sows. The experiment was conducted in 2008 in a commercial pig farm in Colombia. The sows (commercial breed) were allocated separately in two treatments. Control sows (n=20) were fed a commercial lactation diet, whereas PEP sows (n=44) were fed the same diet supplemented with a phyto-genics feed additive based on essential oils and prebiotics (Biomín® P.E.P. 1000, 2 kg/t). Lactation feed and drinking water were offered ad libitum. Piglets were weaned from 21 to 28 days of age. Measurements included piglets born live and dead, litter weights, feed intake of the sows before and after farrowing, live weights of the sows at farrowing and at weaning, number of weaned piglets as well as their weaning weights and number of dead piglets during lactation. Mortality of piglets at birth and after the lactation, 21-day lactation feed intake and whole lactation feed intake, weight losses of the sows, and the average weaning weights and weight gains of the piglets were calculated. Control and PEP sows were relocated to the farrowing pens 5.7 and 2.75 days before farrowing, respectively. In week 1, feed intake in the control treatment was higher as compared to the PEP treatment. Nevertheless, feed intake in the second and third week was higher in the PEP treatment (up to 21 days, 101.67 vs. 111.64 kg). The increase in feed intake in the second and third week for the treatment with PEP caused a higher feed intake in the first 21 lactation days (+ 10 kg) and also in the whole period (+ 18.27 kg). Although the piglets in the treatment with PEP were 80 g lighter at birth (1.47 ± 0.38 vs. 1.55 ± 0.30 kg), they were heavier than pigs in the control treatment at the end of lactation (7.52 ± 1.20 vs. 6.28 ± 1.38 kg, $P<0.05$). Average weight gain from birth to weaning was 6.05 ± 2.29 vs. 4.73 ± 1.31 kg in the PEP and control treatment, respectively. In conclusion, lactation feed intake and piglet growth performance was positively affected by supplementation of the lactation diet with the phytogetic feed additive under test.

Key Words: phytogetic, sow, lactation

676 Selection of probiotic strains for combined competitive exclusion treatment in piglets. V. Klose^{*1}, K. Bayer¹, R. Bruckbeck¹, V. A. Sattler¹, A. P. Loibner¹, C. Mair², and G. Schatzmayr³, ¹BOKU-University, Vienna, Department IFA-Tulln, A-3430 Tulln, Austria, ²BOKU-Uni-

versity, Vienna, Department of Food Sciences and Technology, A-1180 Vienna, Austria, ³BIOMIN Research Center, A-3430 Tulln, Austria.

In order to develop a feed additive for piglets, various aerobic, facultative and strict anaerobic bacteria were isolated from porcine gastrointestinal tract (GIT) by using semi-selective media and specific conditions, all at 37 °C. Out of 80, 9 aerobes were classified as endospore-forming strains of *Bacillus* or related genera, 66 facultative anaerobes as members of *Lactobacillus* and *Enterococcus*, and five strict anaerobes as members of *Bifidobacterium*. Using an agar spot test, one strain of *E. faecium*, one *L. salivarius*, and one *L. reuteri* with antagonistic effect against a broad panel of pathogens (various *S. enteritidis* serovars and enterohemorrhagic and -toxicogenic *E. coli* serotypes, *C. perfringens*) were selected and combined with one *B. thermophilum* strain, because of its' capability to suppress *Brachyspira hyodysenteriae*, the main causing agent of Swine dysentery. By determining the minimal inhibitory concentration of ten antibiotics according to the European Guideline (EFSA, 2008), the strains turned out to be susceptible to all antibiotics of human and veterinary importance. In one feeding trial, the effects of their combined use as feed additive on the gut microbiota of weaning piglets (n = 48) was examined by comparing denaturing gradient gel electrophoresis (DGGE) bacterial community fingerprints of different GIT parts in response to the 4-strain probiotic, inulin as non-digestible feed ingredient (prebiotic) and a combination of both (synbiotic). Significant differences (P < 0.05) of the pro- and prebiotic fed groups to the control group could be shown, indicating a pro- and/or prebiotic effect of the feed additive. Future work will first involve field trials at various farms, with later work focussing on the in vivo survival and efficiency of bacterial strains when administered to weaning piglets.

Key Words: multi-strain probiotic, porcine pathogens, antagonistic activity

677 Effects of NCG and arginine on organ weight and HSP70 expression in weaned piglets. X. Wu, Y. L. Gao, X. H. Zhou, R. L. Huang, and Y. L. Yin*, *The Chinese Academy of Sciences, Changsha, China.*

To evaluate the effects of N-carbamylglutamate and L-Arginine on organ weight and heat shock protein 70 (HSP70) expressions, eighty-nine Landrace×Yorkshire piglets from 12 pens (average pen weight 5.56±0.51 kg; weaned at 21 d) were grouped into 3 treatments, and fed one of the following diets for 7 d: a standard diet (SD), SD+NCG (0.08%), or SD+Arg (0.6%). Six piglets from each treatment were selected randomly and slaughtered for tissue samples. Compared to the control group, both Arg and NCG increased heart (P<0.01), and kidney weight (P>0.05). Liver weight was heavier in the NCG group (P<0.01), and ratio of pancreas weight/BW was higher in the Arg group (P<0.05) (Table 1). HSP70 expression was analyzed by real-time PCR and western blotting. The results showed that HSP70 mRNA was expressed in the liver to a greater extent in the Arg group (P<0.01), when compared to the control group. Arg and NCG increased HSP70 mRNA in the kidney by 33.03 and 14.22%, respectively (P=0.12). Western blotting results also confirmed that there was a higher level of HSP70 expression in the liver (P<0.01) and kidney (P=0.027) in the Arg group. These findings indicated that Arg and NCG could prevent tissue dysfunction of weaned piglets and alleviate the weaning stress effectively by inducing HSP70 expression in weaned piglets.

Table 1. Effect of NCG and Arg on organ weight and organ:body weight ratio of piglets (means±SD, n=6)

Items	Control	NCG	Arg
Organ weight (g)			
Heart	25.17±4.22 ^a	33.00±3.51 ^b	31.75±5.91 ^b
Liver	140.92±12.16 ^a	161.25±19.31 ^b	143.92±12.76 ^a
Pancreas	10.42±2.29	9.92±0.74	13.33±3.34
Kidney	15.08±1.83	16.92±2.18	17.83±3.33
Organ:BW (g/kg)			
Heart/BW	0.41±0.064	0.47±0.04	0.48±0.09
Liver/BW	2.27±0.16	2.31±0.28	2.19±0.21
Pancreas/BW	0.17±0.042 ^a	0.14±0.010 ^a	0.20±0.046 ^b
Kidney/BW	0.25±0.025	0.24±0.021	0.27±0.047

a, b means differ (P<0.05).

Key Words: N-carbamylglutamate, L-arginine, weaned piglets

678 Digestible energy in resistant starch and dietary fiber sources fed to pigs. S. K. Cervantes-Pahm*, B. G. Kim, and H. H. Stein, *University of Illinois, Urbana.*

An experiment was conducted to measure the concentration of apparent total tract digestible energy (ATT DE) in maltodextrin (MD), 2 sources of resistant starch (PROMITOR™ RS-60 and RS-75), PROMITOR™ soluble corn fiber (SCF), and biogum (BG). All fiber sources were provided by Tate and Lyle, Decatur, IL. A total of 72 castrated male pigs (initial BW: 22.3 ± 1.48 kg) were housed in metabolism crates equipped with a feeder and a nipple drinker and assigned to 6 treatments with 12 replicate pigs per treatment. A basal diet based on corn, soybean meal, and casein was formulated. Five additional diets were prepared by mixing 90% of the basal diet with 10% MD, RS-60, RS-75, SCF, or BG. The daily feed allowance was calculated as 2.5 times the estimated energy requirement for maintenance and pigs were fed 2 equal meals every day. Following a 7-d adaptation period, feces from all pigs were collected quantitatively during a 5-d period using the marker to marker procedure. The ATT DE for each ingredient was calculated using the difference procedure. The ATT DE in RS-60, RS-75, and SCF were less (P < 0.05) than in MD and BG, and BG contained less (P < 0.05) ATT DE than MD. However, there was no difference in the ATT DE values for RS-60, RS-75, and SCF. The present results indicate that resistant starch and soluble corn fiber can be used as low energy ingredients.

Table 1. Concentration of ATT DE in maltodextrin (MD), 60% resistant starch (RS-60), 75% resistant starch (RS-75), soluble corn fiber (SCF), and biogum (BG) fed to pigs

Item	MD	RS-60	RS-75	SCF	BG	SEM
Gross Energy, kcal/kg	3,914	3,738	3,835	3,760	3,850	-
ATT DE, kcal/kg	3,466 ^a	1,776 ^c	1,782 ^c	1,936 ^c	2,795 ^b	189
ATT DE, kcal, kg DM	3,559 ^a	1,973 ^c	1,916 ^c	2,062 ^c	2,949 ^b	200

^{a-c}: Means within a row lacking a common superscript letter are different (P < 0.05)

Key Words: digestible energy, fiber, pigs

679 Feed additives for the amelioration of aflatoxicosis in growing pigs. A. F. Harper^{*1}, M. J. Estienne¹, J. B. Meldrum², R. J. Harrell³, and D. E. Diaz³, ¹Virginia Polytechnic Institute & State University, Blacksburg, ²VA-MD Regional College of Veterinary Medicine, Blacksburg, VA, ³Novus International, Inc., St. Charles, MO.

A study was conducted to assess a hydrated sodium calcium aluminosilicate and a blend of synthetic antioxidants (AOX) (SOLIS[®] and AGRADO[®] Plus Novus International, Inc., St. Charles, MO) for amelioration of toxic effects of aflatoxin in pig feed. Ninety crossbred pigs (31 ± 2 d of age) were allotted to five treatments: 1) positive control with no aflatoxin, 2) negative control contaminated with 500 ppb aflatoxin B1, 3) aflatoxin contaminated diet with 0.5% SOLIS[®], 4) aflatoxin contaminated diet with AOX (a blend of ethoxyquin and tertiary butylhydroquinone), and 5) aflatoxin contaminated diet with SOLIS[®] and AOX. There were six pens with three pigs each per treatment. Feed and water were available ad libitum. The growth assay lasted 21 d after which blood samples were collected for serum indicators of aflatoxicosis. Pigs fed the contaminated negative control diet consumed 29% less feed and grew 27% slower ($P < 0.05$) than pigs fed the positive control diet. Pigs fed the aflatoxin diets with 0.5% SOLIS[®] had feed consumption and growth rate greater than pigs fed the negative control diet ($P < 0.05$) and similar to pigs fed the uncontaminated feed. Pigs fed the aflatoxin diet with AOX alone had feed consumption 22% and growth rate 24% below the positive controls ($P < 0.05$). Serum protein, albumin, globulins, gamma glutamyltransferase (GGT), and vitamins A and E were altered by feeding the aflatoxin contaminated diet ($P < 0.05$). Supplementing the diet with SOLIS[®] returned serum protein, albumin, globulins, and GGT to concentrations similar to the positive control and vitamin A and E to levels intermediate between the positive and negative controls. Serum constituents were less responsive to the AOX supplement. Combining the SOLIS[®] and AOX restored serum vitamin A and E to concentrations similar to the positive control (7.93 vs. 8.44 ± 0.73 g/dL and 83.88 vs. 75.01 ± 5.87 g/dL, respectively). SOLIS[®] was highly effective in amelioration of aflatoxicosis. Responses to AOX were limited, but the broadest correction of serum constituents occurred when the supplements were fed in combination.

Key Words: pigs, aflatoxin, antioxidant

680 Xylanase supplementation improves nutrient and energy digestibility in pigs fed corn-soybean meal diets containing 20% corn dried distiller's grains. J. A. Jendza^{*1}, A. Owusu-Asiedu², P. H. Simmins², and O. Adeola¹, ¹Purdue University, West Lafayette, IN, ²Danisco Animal Nutrition, Marlborough, UK.

The apparent ileal (AID) and total tract (ATTD) digestibility of nutrients and energy response of pigs to dietary xylanase (Xyl; Porzyme[®] 9300, endo 1,4-β-xylanase) supplementation of a corn-soybean meal diet containing 20% corn dried distiller's grains (cDDG) was investigated in cannulated pigs. Eight 25-kg barrows fitted with T-cannula at the distal ileum were used in a replicated 4 × 4 Latin square, with 4 treatments in 4 periods. A control diet (C) containing 20% cDDG was formulated to contain 3.33 Mcal ME/kg and 0.13% available P. Treatments consisted of the C plus 0, 1,000, 2,000, and 4,000 U Xyl/kg feed. Periods consisted of a 5-d adjustment period, 2 fecal grab samples on d 5, and two 12-h ileal collections on d 6 and 7. The AID and ATTD were calculated via the index method using Ti. Increasing levels of Xyl linearly improved ($P < 0.05$) AID of energy, Ile, Leu, Phe, Thr, Trp, Glu, Pro, and total amino acids. The respective AID of energy, Thr, and Trp increased ($P < 0.05$) from 61.5 to 64.7%, 75.2 to 77.9%, and 74.9 to 78.0% for 0 to 4,000 U Xyl/kg feed. Increasing levels of Xyl supplementation from 0

to 4,000 U Xyl/kg feed linearly improved ($P < 0.05$) ATTD of DM from 80.4 to 81.6% and ATTD of energy from 79.9 to 81.4%. Digestibility of P ($P < 0.05$) increased 34 to 37% with Xyl supplementation compared to the C diet. In summary, Porzyme[®] xylanase supplementation improved the apparent ileal digestibility of energy and at least some amino acids, as well as the apparent total tract digestibility of dry matter, energy, and P in pigs fed corn-soybean meal diets containing 20% corn dried distiller's grains.

Key Words: energy, pigs, xylanase

681 Effect of processing method and enzyme supplementation on the apparent metabolizable energy (AME_n) of different oilseed meals. B. Jayaraman^{*} and D. M. Anderson, Nova Scotia Agricultural College, Truro, Nova Scotia, Canada.

A study was conducted to determine the apparent metabolizable energy (AME_n) of different oil seed meals by broilers. Three hundred and eighty four male broiler chicks were randomly distributed to battery cages (6 birds per cage). A common starter diet was fed from 1-13 days of age. From days 14-21, the birds were fed one of the thirteen treatments (trts), a basal grower diet (4 reps) or the basal grower diet supplemented with 30% of the test ingredients (12 trts, 5 reps/trt). Celite (0.8%) was used as an inert marker in the grower diet. The test ingredients were pre-press solvent extracted meals from full fat seeds of yellow and black canolas and juncea processed by regular (95°C±5 during the desolventization process) and gentle (57°C±5 during the desolventization process) methods with and without a multi-carbohydrase enzyme mixture. A 3 × 2 × 2 factorial design (seed source × processing method × enzyme supplementation) was used. At 21 days of age, excreta were collected from individual cages, freeze-dried and used for subsequent analysis. Method of processing did not affect ($P > 0.05$) AME_n of the oil seed meals. There was an increase ($P < 0.05$) in AME_n by addition of multi-carbohydrase enzymes to the canola meals only. The mean AME_n (kcal/kg) of regular processed yellow and black canola meals and juncea meals with and without enzymes, respectively, were 1629±124 and 1538±78; 1686±99 and 1450±120; 1629±107 and 1742±160. The mean AME (kcal/kg) of gentle processed yellow and black canola meals and juncea meals with and without enzymes, respectively, were 1791±112 and 1782±51; 1519±191 and 1282±82; 1280±59 and 1413±54. Addition of the carbohydrate enzymes to the canola meals resulted in higher AME_n.

Key Words: apparent metabolizable energy, oil seed meals, enzyme supplementation

682 Effects of dietary aflatoxin on performance of growing barrows. S. M. Rustemeyer^{*1}, W. R. Lamberson², D. R. Ledoux², R. R. Cockrum¹, K. L. Kessler¹, K. J. Austin¹, and K. M. Cammack¹, ¹University of Wyoming, Laramie, ²University of Missouri, Columbia.

Dried distillers grains (DDGS) can have high aflatoxin content due to its concentration during ethanol production. Increased use of DDGS in swine diets could potentially lead to aflatoxicosis which causes decreased feed intake, reduced BW gain, and impaired liver function, resulting in substantial losses to the pork industry. The objective of this study was to determine the effects of aflatoxin exposure on performance and blood parameters of growing barrows. Duroc × Yorkshire crossbred barrows (n = 90; age = 35 ± 5 d; initial BW = 14.2 ± 3.031 kg) were randomly assigned in a 3 × 3 factorial design to receive 0, 250 or 500 ppb aflatoxin B1 for 7, 28 or 70 d. Pen feed intake was measured daily,

and pigs were weighed and bled weekly. Serum was analyzed for blood urea nitrogen (BUN), total bilirubin, alanine aminotransferase (ALT), and aspartate aminotransferase (AST). Pen feed intake was lower ($P < 0.01$) in aflatoxin treated barrows (high and low) than control barrows from d 29 onward, and was lower ($P < 0.05$) in high aflatoxin treated barrows than low aflatoxin treated barrows from day 42 onward. Average daily gain was lower ($P < 0.01$) in high aflatoxin treated barrows than control barrows from d 49 onward, and was similar between control and low aflatoxin treated barrows except on d 69, when ADG was lower ($P = 0.0449$) in aflatoxin treated barrows. High aflatoxin treated barrows had lower bilirubin than low aflatoxin treated barrows on d 27 ($P = 0.0372$) and 62 ($P = 0.0030$). Additionally, bilirubin was higher in high aflatoxin treated barrows than control barrows on d 55 ($P = 0.0480$), 62 ($P = 0.0052$) and 69 ($P = 0.0304$). High and low aflatoxin treated barrows had lower BUN ($P < 0.01$) than control barrows on d 6 and low aflatoxin treated barrows additionally had lower ($P = 0.0018$) BUN than control barrows on d 20. These results demonstrate that performance and blood parameters in young growing barrows are affected by consumption of an aflatoxin-contaminated diet, especially when the concentration of aflatoxin is high (≥ 500 ppb) and the diet is fed over an extended period of time (≥ 1 month).

Key Words: aflatoxin, swine, production

683 Effects of adding a pelleted protein supplement to processed corn in diets for nursery pigs. S. M. Williams*, E. F. Mader, S. M. Rogers, S. Issa, A. C. Fahrenholz, L. J. McKinney, J. D. Hancock, and K. C. Behnke, *Kansas State University, Manhattan.*

A total of 180 pigs (90 barrows and 90 gilts) were used in a 28-d experiment to determine the effects of adding a pelleted protein supplement to processed corn in diets for nursery pigs. The pigs (average initial BW of 7.5 kg) were weaned and allotted by sex, weight, and ancestry to 30 pens with 6 pigs/pen and 5 pens/treatment. All pigs were fed a common diet for 7 d post weaning and the experimental treatments for the next 28 d. Treatments were a corn-soybean meal-based control in mash form and the corn-soybean meal-based diet as pellets. For the remaining treatments, all ingredients were pelleted together except the corn which was finely ground, cracked, and steam-flaked before mixing with the protein supplement pellets. Pellet durability index for d 0 to 14 of the growth assay was 97 and 98% and for d 14 to 28 was 89 and 94% for the complete feed and protein supplement, respectively. For d 0 to 14, ADG was greater for pigs fed the mash control compared to all thermally processed treatments ($P < 0.06$) and there was a trend ($P < 0.10$) for pigs fed complete pellets to have greater G:F compared to pigs fed the supplement pellets/processed corn treatments. For d 14 to 28 and overall (d 0 to 28), pigs fed the mash control had greater ADG

and G:F compared to those given the thermally processed feeds and pigs fed complete pellets had improved ADG and G:F compared to those given the supplement pellets/processed corn treatments ($P < 0.02$). Finally, among pigs fed the processed corn treatments, G:F was greater with steam-flaked corn vs ground corn for d 14 to 28 and overall ($P < 0.007$). For pigs fed the mash, pellets, and protein supplement pellets with ground, cracked, and steam-flaked corn, overall ADG was 496, 472, 444, 421, and 451 g, overall ADFI was 661, 626, 651, 648, and 652 g, and overall G:F was 750, 754, 682, 650, and 692 g/kg. Our results indicated that steam-flaked corn was of benefit compared to ground corn, but compared to a mash diet or complete pellets, the separately processed corn treatments reduced growth performance in nursery pigs.

Key Words: nursery pigs, particle size, steam-flaking

684 Effect of a dry organic acid blend on pig performance during the Paylean® phase of growth. R. J. Harrell*¹, F. Navarro¹, J. Zhao¹, M. Vazquez-Anon¹, B. R. Hinson², G. L. Allee², and C. D. Knight¹, ¹*Novus International, Inc., St. Charles, MO*, ²*University of Missouri, Columbia.*

Organic acids have been broadly utilized in young nursery pigs as a growth promotant, presumably by providing antimicrobial activity. Less information is available on the performance benefits of organic acids in grow-finish pigs. The objective of the present study was to determine the effects of a dry organic acid blend (DOAB, ACTIVATE® Starter DA, Novus International, Inc.) on pig performance during the Paylean® (ractopamine hydrochloride) phase of growth, a period of limited antibiotic utilization. Data were generated from two separate trials conducted in the same facility with similar management at two different times. Pigs were fed a nutrient adequate corn-soybean meal based diets with TID lysine levels of 0.95% and 7.5 ppm Paylean for a period of 21 days. In each experiment pigs were fed either 0 or 0.1% of a DOAB throughout the grower and finisher phases. In experiment 1, there were 10 pens of 20-25 pigs/pen and experiment 2 there were 8 pens of 20-25 pigs/pen for control and 0.1% inclusion rate of a DOAB, respectively. No differences in performance were detected by the addition of DOAB from 0 to 63 or 0 to 74 days of study, respectively, for experiments 1 and 2. Initial body weights were not significantly different between trials at the start of the Paylean phase, but ADG, ADFI, and GF were affected by trial ($P < 0.01$). The DOAB did not significantly affect final body weights or GF ($P > 0.20$). The DOAB significantly increased ADG (1006 vs 955±12 g/d) by 5.3% ($P < 0.01$) and tended ($P = 0.12$) to increase ADFI (2651 vs 2563±12 g/d). There were no trial by treatment responses for any parameter tested ($P > 0.25$). In summary, the DOAB increased pig growth rate during the Paylean phase of growth.

Key Words: organic acids, Paylean®, pigs

Physiology and Endocrinology: Livestock Physiology

685 Evaluation of sperm fertilizing capability in stored semen collected from boars fed a diet supplemented with organic selenium. S. Speight*¹, M. Estienne¹, B. Whitaker², A. Harper¹, R. Crawford¹, and J. Knight¹, ¹*Virginia Polytechnic Institute and State University, Blacksburg*, ²*Ferrum College, Ferrum, VA.*

This study compared sperm fertilizing capability in stored semen collected from boars fed diets supplemented with organic or inorganic sources of selenium. At weaning, crossbred boars were assigned to one of three dietary treatments: I. basal diets with no supplemental selenium

(controls), II. basal diets supplemented with 0.3 ppm organic selenium (Sel-Plex, Alltech, Inc., Nicholasville, KY) and, III. basal diets supplemented with 0.3 ppm sodium selenite ($n = 6$ boars/treatment). At sexual maturity, semen was collected, processed and stored in Androhep-Lite (Minitube of America, Inc., Verona, WI; 3×10^9 sperm/85 mL semen and extender) at 18° C and was evaluated at d 1 and 8 post-collection (day of semen collection = d 0) using commercially obtained porcine oocytes (Bomed, Madison, WI; 100 oocytes/boar) and in vitro fertilization procedures. Data were analyzed using ANOVA and boar was