81 Perfusing egg yolk antibodies in enterotoxigenic *Escherichia coli* K88 infected piglet jejunal segments reduces fluid and electrolyte losses. E. Kiarie*, B. A. Slominski, D. O. Krause, and C. M. Nyachoti, *University of Manitoba*, *Winnipeg, MB, Canada*.

Effects of anti-K88 egg yolk antibodies (EYA) on fluid and electrolyte losses were studied using an *in situ* model of secretory diarrhea in which jejunal segments of 4 anaesthetized piglets were infected with enterotoxigenic *E. coli* K88 (ETEC) and perfused with either EYA or conventional anti-diarrhea agents carbadox (C), zinc oxide (ZO) and fumaric acid (FA). Pigs were weaned at 21 d of age and fed a commercial starter diet for 7 d. In each pig, the first segment (20 cm) was prepared at 300 cm caudal from the stomach and fitted with inflow and outflow PVC tubing at cranial and caudal sites, respectively. Caudal from and adjacent to the first segment 9 other segments were similarly prepared to give a total of 10 segments per pig. Treatments in deionized water suspension were: FA (20 mg/l), ZO (3 g/l), C (55 mg/l), EYA (5 g/l), with saline (S) as a control. In each piglet, a pair of segments (1 non-infected and the other ETEC-infected) were perfused simultaneously with 60 mL of each treatment at 4 mL for every 30 min for a total of 7.5 h. Outflow contents were collected; 2h after the last perfusion, solutions remaining in the segments were emptied into respective containers and then the pig was killed. Net fluid and electrolyte absorption were calculated from the difference between the volume and concentration of inflow and outflow divided by the surface area of each segment. Net loss was calculated as the difference between net absorption in non-infected and infected segments. ETEC infection reduced ($P < 0.05$) fluid absorption in S perfused segments (105 ± 12 µl/cm^2) compared with segments perfused with EYA (760 ± 64 µl/cm^2) C (605 ± 53 µl/cm^2), ZO (624 ± 61 µl/cm^2) and FA (298 ± 34 µl/cm^2). High ($P < 0.05$) Na and Cl losses were observed in ETEC-infected segments perfused with S, FA and ZO compared with those perfused with EYA and C. In conclusion, EYA enhanced fluid absorption and protected against electrolyte losses in piglets challenged with ETEC.

Key Words: Egg Yolk Antibodies, Enterotoxigenic *E. coli*, Piglet

82 Dietary addition of mannobiose, beta glucan, or mannan-oligosaccharides on growth performance and immune response in early-weaned pigs raised at two locations. Y. Han*[1], J. J. Brennan[1], and M. Vignola[2], [1]*Maple Leaf Foods Agresearch*, *Guelph, Ontario, Canada*, [2]*Maple Leaf Foods Agresearch*, *St-Romuald, Quebec, Canada*.

A two-location trial was conducted in early-weaned pigs to study the influence of dietary mannobiose, yeast beta glucan, or mannan-oligosaccharides (MOS) on growth performance and response to *Mycoplasma hyopneumoniae* (MH) vaccine. A total of 960 17 to 21-d-old piglets were used in a complete randomized block design with 192 (8 blocks of 4 pens, 6 pigs/pen) and 768 (12 blocks of 4 pens, 16 pigs/pen) in Ontario and Quebec, respectively. After weaning, pigs were immediately given the experimental diets for 21 d following three-phase feeding programs. At the Ontario location, a MH vaccine was administered at weaning. Throughout Phase 1-3 the basal medicated diet was supplemented with 40ppm mannobiose, 60ppm yeast beta glucan, or 2000ppm MOS. The trial duration was 40 and 42 days for Ontario and Quebec locations, respectively. On d 21 and 35, blood samples were taken from the Ontario pigs for determination of serum MH antibody titres. Main and interactive effects of Diet, Location and Block were analyzed by ANOVA with Block nested within Location and weaning BW as a covariate. Dietary mannobiose significantly improved cumulative feed efficiency by 2.5% by Week 3 ($P<0.033$), 1.6% by Week 5 ($P<0.044$), and 1.6% by end of the experiment ($P<0.033$). None of the additives improved growth ($P>0.05$). Beta-glucan increased MH vaccine antibody titres in pigs in comparison to those fed MOS. It was concluded that mannobiose was a cost-effective feed additive in medicated starter pig diets and that its effect persisted post-withdrawal. The immunostimulatory effect of yeast beta glucan did not impact animal performance.

Key Words: Early-Weaned Pigs, Mannobiose, Growth Performance

83 Evaluation of plant materials for alternative adhesion of *E. coli* K88 (ETEC) in weaning pigs. R. Maiorano*[1,2], A. W. Jongbloed[1], C. M. F. Wagenaars[1], P. G. Van Wikselaar[1], and P. M. Becker[1], [1]*Animal Sciences Group*, *Lelystad, The Netherlands*, [2]*University of Milan*, *Milan, Italy*.

Specific carbohydrates in some plant materials can function as alternative adhesion matrices for e.g. *E. coli* K88 (ETEC). *In vitro* studies in our lab revealed the efficacy of several plant materials with respect to their binding capacity of various pathogenic GI bacteria. We validated the *in vitro* studies by evaluating the effect of 4 additives, yeast product (Tr II), SW7 (Tr III), SW11 (Tr IV) and sesame seed expeller (Tr V) compared to a negative control (Tr I), on *E. coli* K88 faecal shedding of post-weaning piglets challenged with *E. coli* K88. Pigs (n=72) weaned at 28 to 35 d of age with an initial BW of 7.0 ± 0.18 kg were individually allocated in 72 pens. On d 7 after the weaning, the piglets were orally infected twice with a suspension of 5×10^9 cfu/ml *E. coli* 0149K91$^+$K88ac. Individual BW was noted on the weaning day (d 1), d 6, 13, and on d 22. Feed intake (FI) and faecal consistency scores (FCS) were registered daily. Faecal samples were collected from all the pigs for 8 consecutive days after the challenge to quantify ETEC. There was a depression in FI on d 9 and 10 with all treatments. This drop was largest with treatment I and smallest with treatments II, IV and V. At d 3 post-inoculation, groups II and V showed a significantly lower concentration of faecal *E. coli* K88 compared to group I and IV ($P< 0.03$). From d 4 to d 6 after the inoculation, treatments II and V significantly reduced the *E. coli* faecal count compared to groups I, III and IV ($P<0.05$). From d 6 to 12, group II revealed a significantly better FCS than groups I and IV. These results show clear evidence of the efficacy of the yeast product, sesame seed expeller and to a lesser extent SW 7 to decrease *E. coli* K88 faecal shedding. *In vitro* predictions about the efficacy of different plant materials in inhibiting *E. coli* K88 proliferation were confirmed by the *in vivo* trial.

Key Words: Plant Materials, *E. coli* K88, Piglet

84 Effect of fermentable carbohydrates on the intestinal microbial ecosystem in growing pigs fed low-P diets. B. U. Metzler*[1], W. Vahjen[2], T. Baumgärtel[3], M. Rodehutscord[3], and R. Mosenthin[1], [1]*Institute of Animal Nutrition, University of Hohenheim*, *Stuttgart, Germany*, [2]*Institute of Animal Nutrition, Free University of Berlin*, *Berlin, Germany*, [3]*Institute of Agricultural and Nutritional*

Sciences, Martin-Luther-University Halle-Wittenberg, *Halle (Saale), Germany*.

To determine the effects of differently fermentable carbohydrates on species composition and diversity of intestinal bacteria in pigs, 8 barrows (mean BW 35.9±0.9 kg), fitted with a simple-T-cannula at the distal ileum, were used in a double incomplete 4x3 Latin square design with 4 diets and 3 periods. Dietary treatments consisted of a low-P corn-soybean meal-based control diet or 75% of the control diet and 25% of cellulose, starch and pectin, respectively. After 15d adaptation to the experimental diets, rectal samples of feces were taken during 5d for bacterial DNA determination. Afterwards, ileal digesta were collected for bacterial DNA determination over two periods of 12h each. Quantitative realtime PCR and denaturing gradient gel electrophoresis (DGGE) was applied to specify total bacterial populations both in ileal digesta and feces as well as bacterial diversity and populations of specific bacterial groups in the ileum. Total ileal and fecal bacterial populations were not affected by dietary treatment but there were specific changes in the composition of the ileal microflora. Starch stimulated the population of lactobacilli ($P<0.05$), while cellulose stimulated the growth of bifidobacteria ($P<0.05$) compared to the control. Pectin tended to promote the growth of Bacteroides-like bacteria ($P<0.1$). The bacterial diversity at the distal ileum was affected by the carbohydrates as indicated by the different DGGE band numbers ($P<0.05$). Cellulose and starch inclusion caused a higher bacterial diversity, while pectin reduced it ($P<0.05$) compared to the control. These data suggest that the ileal microbiota is sensible to changes in the carbohydrate composition of the diet which is reflected in changes in the microbial community and diversity at the distal ileum.

Key Words: Fermentable Carbohydrates, Bacteria, Pigs

85 Effect of lactoferrin on the growth performance, intestinal morphology, immune function and serum iron level of weaned piglets. Y. Z. Wang*, T. Z. Shan, J. X. Liu, and Z. R. Xu, *Zhejiang University*, *Hangzhou, Zhejiang, China*.

A total of 90 weanling female pigs (Duroc×Landrace×Yorkshire) were used in a 30-d growth experiment to investigate the effect of lactoferrin on growth performance, intestinal microflora and intestinal morphology, immune functions and serum iron levels. The pigs were allocated on the basis of BW and litter to 3 dietary treatments in a randomized complete block design. The dietary treatments were: control group (basal diet), antibiotics group (basal diet + 20 mg/kg flavomycin +110 mg/kg aureomycin) and lactoferrin group (basal diet + 1.0 g/kg lactoferrin). There were 3 replicate pens per treatment and pigs were grouped with 10 pigs per pen. Six pigs, randomly selected from each treatment (2 pigs/pen) were slaughtered for serum and spleen samples on d 30. The results showed that supplementation with lactoferrin significantly increased the ADG by 34.04% ($P<0.01$) and decreased feed efficiency (F/G) by 12.83% ($P < 0.05$), increased the villus height ($P<0.01$) and lowered crypt depth ($P<0.05$) at the small intestinal mucosa as compared with the control. Supplementation with lactoferrin improved the PHA stimulated peripheral lymphocyte proliferation by 47.19% ($P<0.01$), increased both ConA and PHA-induced spleen lymphocyte proliferation by 116.90% ($P<0.01$) and 89.08% ($P<0.01$), enhanced the serum IgG by 10.99% ($P<0.05$), IgA by 20.00% ($P<0.05$) and IgM by 12.64% ($P<0.05$), IL-2 by 46.64% ($P<0.01$) and serum iron values by 25.79% ($P<0.05$) respectively. Compared with the antibiotic group, supplemental LF also improved PHA stimulated peripheral lymphocyte proliferation by 19.30% ($P<0.05$), increased both ConA and PHA-induced spleen lymphocyte proliferation by 68.23% ($P<0.051$) and 61.10% ($P<0.05$), enhanced the serum IgM by 11.36% ($P<0.05$), IL-2 by 36.26% ($P<0.05$). These results support the possible use lactoferrin as an immunostimulant to improve immune functions and strengthen host defenses would be a good method for defending weanling piglets from infections and weanling stress.

Key Words: Lactoferrin, Weanling Piglet, Growth Performance

86 Effects of adding saturated fat to diets with sorghum-based distillers dried grains with solubles on growth performance and carcass characteristics in finishing pigs. C. Feoli*[1], S. Issa[1], J. D. Hancock[1], T. L. Gugle[1], S. D. Carter[2], and N. A. Cole[3], [1]*Kansas State University*, *Manhattan*, [2]*Oklahoma State University*, *Stillwater*, [3]*USDA/ARS*, *Bushland, TX*.

A total of 112 barrows (avg BW of 72 kg) was used in a 65-d growth assay to determine the effects of adding a source of saturated fat (beef tallow) into diets with sorghum-based distillers dried grains with solubles (DDGS). The pigs were sorted by ancestry and blocked by BW with seven pigs/pen and four pens/treatment. Treatments were a corn-soybean meal-based control and diets having 40% DDGS (US Energy Partners, Russell, KS) with none, 2.5, and 5% added tallow. Feed and water were consumed on an ad libitum basis until the pigs were slaughtered (avg BW of 130 kg) to allow collection of carcass data and jowl samples. Fatty acid composition of the jowl samples was used to calculate iodine value (IV) as an indicator of carcass firmness. The corn-soy control supported greater ADG ($P < 0.03$) and ADFI ($P < 0.001$) with no difference in G:F ($P > 0.32$) compared to the DDGS treatments. Increasing fat additions from none to 5% in diets with DDGS did not affect ADG ($P > 0.69$) but improved G:F (linear effect, $P < 0.02$) by 10%. Hot carcass weight (linear increase, $P < 0.05$), dressing percentage (linear increase, $P < 0.06$), and last rib backfat thickness (linear decrease, $P < 0.04$) responded positively as fat addition to the diets was increased from none to 5%. However, changes in IV suggested deposition of softer fat in pigs fed DDGS ($P < 0.001$) even when saturated fat was added to the diet. For the control, DDGS + no tallow, DDGS + 2.5% tallow, and DDGS + 5% tallow, ADG was 961, 885, 877, and 894 g/d, ADFI was 3.3, 3.2, 2.9, and 2.9 kg/d, G:F was 291, 277, 302, and 308 g/kg, hot carcass weight was 93, 90, 91, and 92 kg, dressing percentage was 71, 69, 69, and 71%, last rib backfat thickness was 19, 20, 18, and 18 mm, and IV was 68, 72, 73, and 74, respectively. Adding beef tallow to diets with DDGS improved efficiency of growth and several carcass measurements but resulted in less saturated carcass fat.

Key Words: Distillers Dried Grains, Iodine Value, Pig

87 Effect of feeding fermented soybean meal on plasma concentration of cortisol in LPS-challenged nursery pigs. D. A. Monson*[1], J. A. Carroll[2], R. D. Mateo[1], and S. W. Kim[1], [1]*Texas Tech University*, *Lubbock*, [2]*USDA-ARS-Livestock Lissues Research Unit*, *Lubbock, TX, USA*.

The objective of the present study was to determine if feeding nursery pigs diets containing either plasma protein (PP) or fermented soybean meal (FSBM) would alter the overall stress response to a lipopolysaccharide (LPS) challenge as indicated by plasma concentrations of

cortisol. Pigs (n=24) were weaned at d 21 of age and allotted to 3 dietary treatment groups: (1) CON (diet containing no PP or FSBM), (2) FS (diet with 10% FSBM), and (3) PP (diet with 7% PP). All the diets contained 33% corn, 3% fish meal, 25% dried whey, 0.5% salt, and 4% vitamin-mineral premix. Inclusion of PP and FSBM was done by replacing 11% of soybean meal. Crystalline amino acids were added to match amino acid contents among the diets. Vegetable oils and corn starch was added to match the ME contents among the treatment diets. Pigs were housed individually and fed the experimental diets for 15 d. Each treatment consisted of 8 replicates. Weight gain and feed intake of individual pigs were measured during the 15 d period. On d 14, all the pigs were non-surgically fitted with indwelling jugular vein catheters. On d 15, all pigs were administered a dose of LPS (25 μg/kg BW) via the jugular vein catheter. The ADG was 130.3, 139.0, and 158.5 g for CON, FSBM, and PP, respectively but did not differ (P>0.05) among the treatments. The ADFI of PP (235.9 g) was greater (P<0.05) than CON (182.9 g) and FSBM (198.0 g). Blood samples (3 mL) were collected over a 6-h period at 30-min intervals (from 1-h pre- to 5-h post-LPS challenge) to determine plasma concentrations of cortisol. Plasma concentrations of cortisol in the FS pigs tended to be lower (P<0.10) than those of CON pigs at 30 (58 and 77 ng/mL for FS and CON, respectively), 210 (139 and 180), 270 (100 and 155), and 300 (89 and 132) min after LPS challenge. Collectively, these data indicate that pigs fed a diet containing fermented soybean meal tended to handle the immune stress better than the other groups.

Key Words: Fermented Soybean Meals, Lipopolysaccharides, Pigs

88 The effect of different levels of dietary mannan-oligosaccharide on specific cellular and humoral immune response in weaned piglets. I. Nochta*[1], T. Tuboly[2], V. Halas[3], and L. Babinszky[3], [1]*AGROKOMPLEX C.S.Z.R.T.*, *Zichyújfalu, Hungary*, [2]*Szent István University*, *Budapest, Hungary*, [3]*University of Kaposvár*, *Kaposvár, Hungary*.

Recently mannan-oligosaccharide (MOS) has been considered as a potential growth promoter due to its mode of action beneficially modifying the intestinal microflora and the immune status. Our trial objective was to study how different levels of dietary MOS effect the specific humoral and cellular immune response of weaned pigs. A total of 58 individually kept castrated piglets weaned at 28 d of age were used in two trial series. At 35 d of age 48 piglets were randomly allocated among dietary treatments [commercial piglet diet with 0; 1; 2 and 4g/kg AgriMos (yeast cell wall derivate MOS) or 0.2 g/kg Maxus-G (containing avilamycin; AB)] and immunized with an inactivated Aujeszky′s virus vaccine at day 0 and 14 of the trial. The remaining pigs were not immunized (NI) and given no supplement. All piglets were blood sampled weekly for 5 wk. Systemic humoral and cellular immune response was evaluated by a virus neutralization test and a lymphocyte stimulation test (LST) with Aujeszky mitogen, respectively. Statistical analysis was performed with ANOVA (SAS, 2004). Replication had no effect and according to the 2nd week results, the specific humoral response of pigs fed 1 g/kg MOS was better (3.37 vs. 1.92) than that in the other groups (P<0.0001). The effect of MOS on cellular immune response is shown in Table 1. To conclude, MOS has a dose response effect, and AgriMos at 1 g/kg was beneficial on the specific immune response of weaned pigs after 2 weeks. An earlier, stronger immune response directly after weaning is important in commercial conditions.

Table 1. The effect of MOS supplementation on LST with Aujeszky mitogen (log_2) in weaned piglets

	AgriMos (g/kg)							
week	0	1	2	4	AB	NI	RMSE	P
0.	0.88	1.01	1.01	1.00	1.01	1.01	0.13	NS
2.	1.57^{ab}	1.95^{a}	1.55^{ab}	1.56^{ab}	1.40^{bc}	1.04^{c}	0.33	***
4.	2.94^{a}	3.15^{a}	3.23^{a}	3.11^{a}	2.78^{a}	1.04^{b}	0.68	***

*** P<0.0001

Key Words: MOS, Weaned Pigs, Specific Immunity

89 Dietary supplementation with the Lactobacillus pentosus and/or inulin influences pH and volatile fatty acid characteristics in the colon. Z. McHugh, T. Sweeney, J. J. Callan, M. Ryan, and J. V. O'Doherty*, *University College Dublin*, *Ireland*.

Our objective was to investigate the effects of probiotic inclusion (Lactobacillus pentosus) and/or inulin on nutrient digestibility, nitrogen excretion, volatile fatty acids, gut microflora and in vitro ammonia emissions from finishing pigs. Sixteen boars (65 kg) were assigned to one of four dietary treatments as follows: (T1) wheat based diet; (T2) wheat based diet + 12.5 g/kg inulin; (T3) wheat based diet + 2.5 $times; 1010 CFU Lactobacillus (L) pentosus and (T4) wheat based diet + 12.5 g/kg inulin + 2.5 × 1010 CFU L. pentosus. Feed intake, nitrogen intake, coefficient of total tract apparent digestibility of nitrogen, dry matter, organic matter, ash, neutral detergent fibre (NDF), gross energy and nitrogen balance parameters were similar between treatment groups. Similarly there were no differences in manure volume, faeces:urine ratio and NH3-N per gram of N intake between treatments. Pigs offered diets containing L. Pentosus had a higher proportion of acetic acid in the caecum (P<0.05), a lower proportion of propionic acid in the colon (P<0.001), a higher proportion of isobutyric acid (P<0.001), a higher proportion of isovaleric acid (P<0.01) and a higher colon pH (P<0.01) than pigs offered diets without L. Pentosus. Pigs offered diets containing inulin had a higher proportion of butyric acid in the colon (P<0.05) than pigs offered diets containing no inulin. In conclusion, the inclusion of 2.5 x 1010 CFU L. Pentosus in the pig diet increased the proportion of branched chain fatty acids in the colon and increased colon pH suggesting that it could have a negative impact on environmental odour emissions, while the inclusion of inulin increased the proportion of butyric acid in the colon which has a beneficial health potential.

Key Words: Lactobacillus Pentosus, Inulin, Pigs

90 Response of nursery pigs to a synbiotic based on starch (prebiotic) and an anti-*Escherichia coli* K88 colicinogenic probiotic. S. K. Bhandari*, A. Setia, D. O. Krause, and C. M. Nyachoti, *University of Manitoba*, *Winnipeg, MB, Canada*.

Probiotics are live or dead microbial cultures that provide a benefit to the gut, whereas prebiotics are carbohydrates that selectively enhance proliferation of beneficial microbial populations. Synbiotics are combinations of probiotics and prebiotics that act synergistically. The objective of the present study was to design an *E. coli*-based colicinogenic probiotic that selectively inhibits pathogenic *E. coli* K88

in the presence of starch (prebiotic), and to evaluate its efficacy in an *in vitro* competition and in an *in vivo* piglet growth assay. From 463 environmental strains of *E. coli*, two strains (UM-2 and UM-7) with enhanced colicinogenic properties and rapid growth on starch were selected. Results of *in vitro* competition assays revealed that UM-2 and UM-7 suppressed *E. coli* K88 growth in the presence of starch. In the *in vivo* assay, 40 piglets with an initial BW of 4.82 ± 0.6 kg were assigned to 4 wheat-soybean meal-based diets consisting of a control with an antibiotic (C) and three diets with no antibiotics but containing UM-2 and UM-7 as the probiotics (PRO), 14% potato starch (PS), or a combination of 14% potato starch and probiotics (PRO-PS). PRO and PRO-PS diets were prepared each morning by mixing 50 ml of 9 x 10^{10} cfu/ml overnight probiotic cultures with fresh feed. Pigs were adapted to experimental diets from d 1 to 7. On d 8, pigs were orally inoculated with a 6 ml dose of 2 x 10^9 cfu/ml *E. coli* K88. ADFI, ADG, gain:feed ratio and fecal consistency scores (FCS) were monitored. ADFI and ADG before and after *E. coli* K88 infection were higher for the PRO-PS treatment compared with the other dietary treatments ($P < 0.05$). Gain:feed ratio was higher ($P < 0.05$) for the PRO-PS diet than C diet before infection and was similar to the C treatment after infection. PRO-PS and C fed piglets had a lower FCS ($P < 0.05$) than the PS and PRO fed piglets. In conclusion, colicinogenic probiotics and potato starch acted synergistically to reduce the negative effects of *E. coli* K88 infection in piglets.

Key Words: Pigs, Probiotics, *E. coli* K88

91 Dosage and efficacy of a novel *Saccharomyces cerevisiae* strain to enhance piglets productivity. M. Lucero P*[4,1], G. E. Lanz A[4,1], A. A. Martinez A[2], and J. A. Cuaron I[3], [1]*PAIEPEME A.C.*, *Querétaro, México*, [2]*CNID-Microbiología*, *México*, [3]*CNID-Fisiología Animal, INIFAP*, *Queretaro, México*, [4]*FESC UNAM*, *Ajuchitlan, Queretaro, Mexico*.

An advantage of using yeast as a probiotic is that as an eucariotic is compatible with antibiotherapies, Use of live yeast in piglets feed is an effective ADG enhancer (40 a 60 g) as long as *Saccharomyces cerevisiae* (SC) is from known effective strains, viable in the intestine and at doses greater than 8×10^9 cfu/g of product, or, a least, 1×10^7 cfu/g of feed, but some authors will defend effectiveness based on the immune–stimulant potential of the cell wall. This novel strain of yeast (Biocel) is of interest because the cell size (20×10^9 cfu/g) is about 50% of a normal SC, thus cell wall concentration is potentially doubled. An experiment using 600 piglets (a total of 60 experimental units) was conducted, from 10.19 ± 2.96 kg of initial weight during 5 weeks to measure growth performance effects of 5 yeast inclusion levels: 0, 0.25, 0.5, 1.0 and 2 kg/MT. The experiment was a Randomized Complete Block (2 nurseries) design. No differences ($P\geq0.33$) were detected in feed intake (0.75±0.142), morbidity or mortality (12.45±3.45) but, noted after 28 days, Biocel quadratically increased ($P\leq0.01$) ADG (380, 400 440, 470 and 460, SEM = 15.6 g) and feed efficiency (500, 530, 610 600 and 600, SEM = 15.86 g/kg). The inflection point of the curve showed that most effective levels of Biocel are between 1.25 y 1.50 kg/MT of feed (2.5 to 3×10^7 cfu/g).

Key Words: Yeast, Piglets, Saccharomyces Cerevisiae

92 Strategies for enhancing microbiological gut's barrier: BMD y BioPlus 2B. D. Munoz V*[1], G. E. Lanz A[1], M. Lucero P[1], A. Soria F[1], J. A. Renteria F[3], J. A. Cuaron I[3], S. Correa N[4], and S. Martinez[2], [1]*Paiepeme, A.C.*, *Queretaro, Mexico*, [2]*Alpharma*, *Mexico*, [3]*Fisiología Animal, INIFAP*, *Queretaro, Mexico*, [4]*Synbios*, *Mexico*.

The aim of this experiment was evaluating 2 strategies for clostridium control: a non absorbable antibiotic, bacitracine (BMD 0.3 kg/Mt), and a bacterial probiotic, BioPlus 2B (BP2B 0.5 kg/Mt), in finishing pigs. A total of 1125 pigs (half gilts and barrows) were used. Pigs were allotted in 56 pens, considering each pen as an experimental unit. Pigs were offered a single diet, containing therapeutical levels of antibiotic (AB) for respiratory diseases prevention (Clortetracicline 2 kg/Mt)). Treatments (TRT) were: 1) NEGCON, 2) BMD (first 21d), 3) BP2B (first 21d), 4) BMD + BP2B (first 21d). From day 22 to 41 AB was withdrawed from all diets and at day 42, experimental units were divided to form three new treatment: 5) AB + BMD, 6) AB + BP2B, and 7) AB + BMD + BP2B (each treatment with 8 experimental units) until day 84. Pigs were weighed every 21 days, ADFI, ADG, and Gain:Feed were estimated weekly. Feces samples were collected every feeding phase change for total anaerobians, coliforms, and salmonella counts. Mortality and its causes were registered the day they happened. After 84 d on trial there was a difference ($P\leq0.05$) on ADFI, BMD or BP2B pigs were better than CON; for ADG there was an interaction ($P\leq0.03$) between BMD and BP2P compared to CON pigs; there were no differences ($P\geq0.05$) between treatments for Gain:Feed. When AB was added to the diets, growth performance was improved (ADFI, 2.8 vs. 2.1 kg/day; ADG, 0.874 vs. 0.778 kg/day; Gain:Feed, 0.439 vs. 0.406 kg/day; $P\leq0.02$). There were no differences ($P\geq0.05$) in total coliforms, anaerobians or salmonella counts in feces. A few clostridium deaths were presented but were not associated to TRT. Combining the use of BMD and BP2B may help prevent clostridium infection and improve growth performance, thus the use of a therapeutical AB may enhance the effects of obtained by the other 2 products.

Key Words: Clostridium, Probiotic, Antibiotic

Nonruminant Nutrition: Poultry Nutrition - Protein and Amino Acids

93 Ileal amino acid digestibility of protein feed ingredients at 5 and 21 days of age by broiler chickens. J. M. Rynsburger*[1], D Hoehler[2], and H. L. Classen[1], [1]*University of Saskatchewan*, *Saskatoon, SK, Canada*, [2]*Degussa Corporation*, *Kennesaw, GA*.

The amino acid (AA) digestibility of feed ingredients by broiler chickens has most often been determined using older birds. However, these values are unlikely to predict AA digestibility in chicks during the initial period post-hatch because of their immature digestive tracts and lower nutrient utilization. Therefore, the objective of this research was to compare the ileal AA digestibility of selected protein sources using 5 and 21 d old broilers. Twenty two Ross x Ross 308 broilers were randomly assigned to eight battery cages per treatment. After sampling on d 5, remaining birds for 21 d sampling were distributed into 6 replicates of 7 birds. A 2 x 6 factorial arrangement was used to examine the effect of age on the ileal AA digestibility of six protein feed ingredients. Ingredients examined included canola meal, a canola protein concentrate, fishmeal, meat meal, peas and soybean meal. Diets were formulated to derive crude protein (approximately 18%) and