835 Effects of dietary mannan oligosaccharide supplementation on performance and immune response of sows and their offspring. X. D. Duan[1], D. W. Chen[1], P. Zheng[1], G. Tian[1], J. P. Wang[1], X. B. Mao[1], J. Yu[1], J. He[1], B. Li[1], Z. Q. Huang[1], Z. G. Ao[2], and B. Yu*[1], *[1]Institute of Animal Nutrition, Sichuan Agricultural University, Chengdu, Sichuan, China, [2]Alltech Biological Product (China) Co. Ltd., Beijing, China.*

A study was conducted to determine effects of mannan oligosaccharide (MOS) supplementation of the diets of sows and their offspring on maternal and offspring performance and immune status. Sixty multiparous sows were fed either a control diet (sCON, n = 30) or a diet containing 400 mg/kg MOS (sMOS, n = 30) from d 86 of gestation until the end of lactation. On d 7 of age, offspring were assigned within sow treatments to the piglet basal diet (pCON) or the piglet basal diet + 800 mg/kg MOS (pMOS) for 28 d. Thus, the offspring treatments were sCON-pCON, sCON-pMOS, sMOS-pCON, and sMOS-pMOS, 15 litters per treatment. No dietary effect was observed on the number of total piglets born and born alive and the piglet weight at birth. Serum-specific antibody concentrations of porcine reproductive and respiratory syndrome, classical swine fever, and porcine pseudorabies of sows and immunoglobulins concentrations in colostrum and milk were not affected by sow dietary MOS ($P > 0.05$). However, the weaning to estrus interval of sows was shortened significantly in the sMOS treatment compared with the sCON treatment ($P = 0.05$). The weaning weight ($P = 0.03$) and pre-weaning weight gains ($P = 0.01$) of piglets from the sMOS were greater than those from the sCON. Piglets from sMOS had higher serum concentrations of IgA ($P < 0.01$), IgG ($P < 0.01$), complement 3 (C3) ($P < 0.01$), lysozyme(LYZ) ($P < 0.01$) and complement 4 (C4) ($P = 0.05$) at weaning, as well as C3 ($P < 0.01$) and LYZ ($P < 0.01$) on d 35 of age. MOS supplementation of piglet diet improved both pre- and post-weaning weight gain ($P < 0.01$) and increased serum concentrations of IgA ($P = 0.01$) and IgG ($P = 0.01$) at weaning, as well as C3 ($P < 0.01$), LYZ ($P < 0.01$) and C4 ($P = 0.01$) on d 35 of age. Piglets of the sMOS-pMOS group had higher body weight and better immune statue at weaning and on d 35 of age compared with other groups. These results indicate that supplementing sow diets with MOS during late gestation and lactation improved the growth potential and immune responses of nursing piglets. Furthermore, dietary addition of MOS to pre- and post- weaning piglets also has potential growth and immune-promoting effects.

Key Words: immune response, mannan oligosaccharide, performance

836 Dietary chitooligosaccharide supplementation alleviates immune challenge induced by lipopolysaccharide in weaned piglets. L. Zhang, G. Tian, D. W. Chen, B. Yu*, Y. Yao, J. Yu, P. Zheng, X. B. Mao, J. He, and Z. Q. Huang, *Animal Nutrition Institute, Sichuan Agricultural University, Chengdu, Sichuan, China.*

A total of 24 weaned piglets (8.53 ± 1.00 kg) were used to investigate the effects of chitooligosaccharide (COS) supplementation on immunological responses challenged with *E. coli* lipopolysaccharide (LPS). Experimental treatments were arranged in a 2 × 2 factorial design (n = 6/group), with the main effects of COS (0 vs. 300 mg/kg) and LPS challenge (LPS vs. saline). Piglets were raised individually in metabolic cages and fed 0 or 300 mg/kg COS for 18 d. On d 15~17, piglets were challenged with LPS (80 μg/kg BW) or saline daily. Blood was obtained at 3 h and 48 h post-injection on d 17. At 48 h post-injection, weight of spleen was recorded, thymus and spleen were sampled. All data were analyzed by 2-way ANOVA using GLM procedures of SAS, including COS, LPS, and their interaction as the fixed effects. Spleen index was elevated by LPS challenge (+37.88%, $P < 0.01$), without an effect of COS supplementation. Serum TNF-α (+16.99%, $P < 0.05$) concentrations increased and IL-10 (−11.61%, $P < 0.01$) decreased in pigs injected with LPS at 3 h after injection. Serum IL-1 β, IL-2 and IL-4 content were increased (+5.58%, +12.69% and +11.77%, $P < 0.05$) at 48 h after injection. Piglets supplemented with COS had lower serum IL-1 β and IL-2 at 3 h (−48.36% and −12.14%, $P < 0.05$) post-injection, and lower serum IL-6 at 3 and 48 h post-injection (−10.43% and −13.13%, $P < 0.05$). However, COS supplementation increased serum IL-10 at 3h post-challenge compared with non-supplemented pigs (+8.44%, $P < 0.01$). These alterations in serum inflammatory factor traits in piglets challenged by LPS were accompanied by increased gene expressions of CD14, MyD88 in spleen (+12.63% and +26.77%) and TLR4, NF-kB, TRIF, IRF3 in thymus (+245.81%, +44.44%, +17.13% and +86.55%) that are related to MyD88 dependent and independent signaling pathway ($P < 0.05$), while COS supplementation alleviated most of these changes (−37.23% for CD14, −34.87% for MyD88, −30.43% for NF-kB, −24.30% for TRIF and −31.82% for IRF3, $P < 0.05$). In conclusion, results indicated that COS supplementation attenuated the immune challenge of LPS possibly by inhibiting over-activation of TLR4-MyD88 dependent and independent signaling pathway.

Key Words: chitooligosaccharide, lipopolysaccharide, piglet

837 Effects of feeding fermented wheat with *Lactobacillus reuteri* on nutrient digestibility, growth performance, and intestinal fermentation in weaned pigs. M. H. A. Le*[1], Y. Yang[1], S. Galle[1], J. L. Landero[1], E. Beltranena[1,2], M. G. Gänzle[1], and R. T. Zijlstra[1], *[1]University of Alberta, Edmonton, AB, Canada, [2]Alberta Agriculture and Rural Development, Edmonton, AB, Canada.*

Feeding fermented feed to weaned pigs may improve gut health and thereby reduce diarrhea incidence. Effects of feeding wheat grain fermented for 24 h with *Lactobacillus reuteri* were evaluated in 36 weaned pigs (7.3 kg BW). The fermented wheat contained (DM basis) 14.3% CP, 0.45% chemically available Lys, and 7.8% NDF, whereas the nonfermented wheat contained 17.0% CP, 0.47% chemically available Lys, and 11.7% NDF. Pigs were fed 6 mash wheat-based diets balanced for water content during 2 phases: phase 1 diets for 1 wk (d 0–7) with 20% unfermented or fermented wheat and subsequently phase 2 diets for 2 wk (d 8–21) with 50% unfermented or fermented wheat. The 6 diets were negative control (NC; non-fermented), positive control (PC; nonfermented + organic acid including lactic and glacial acidic acid in the ratio of 4:1), and 4 fermented wheat diets (*L. reuteri* TMW1.656 and *L. reuteri* LTH5794 with or without added sucrose). Diets were formulated to provide 2.5 and 2.4 Mcal NE/kg and 5.3 and 5.0 g SID Lys/Mcal NE for phase 1 and 2 diets, respectively. Data were analyzed using the MIXED procedure with contrast statements to test effects of fermentation with or without sucrose. Feeding fermented wheat reduced ($P < 0.05$) the apparent total-tract digestibility (ATTD) of diet GE (84.4 vs. 85.2%) and CP (81.8 vs. 83.6%) for wk 3 compared with the controls. Weaned pigs fed fermented wheat diets had lower ADFI ($P < 0.05$) than pigs fed NC and PC for wk 1 and for the entire study (271 vs. 300 g of DM/d). Pigs fed fermented wheat diets had lower ADG ($P < 0.05$; 232.8 vs. 260 g/d) and G:F ($P < 0.10$; 0.81 vs. 0.80) vs. pigs fed NC and PC in wk 3, but ADG and G:F did not differ for the entire study. Concentrations of acetic, propionic, branched-chain, and total VFA in feces increased

($P < 0.05$) in pigs fed fermented wheat with added sucrose; however, VFA did not differ in ileal digesta. In conclusion, feeding fermented wheat diets to weaned pigs stimulated hindgut fermentation but did not increase growth performance and ATTD of diet nutrients.

Key Words: fermented wheat, performance, weaned pig

838 Extracted rice bran improves performance and fecal parameters in weaning pigs via prebiotic action. M. Begum*, B. Balasubramanian, M. M. Hossain, S. D. Upadhaya, and I. H. Kim, *Department of Animal Resource & Science, Dankook University, Cheonan, Chungnam, South Korea.*

One hundred forty weaning pigs [(Yorkshire × Landrace) × Duroc] with an average BW of 5.70 ± 1.41 kg (21 d) were used in a 6-wk experiment to evaluate the effect of extracted rice bran (ERB) on growth performance, ATTD of nutrients, diarrhea score, blood profiles, fecal microbial shedding and fecal noxious gas emissions. Weaning pigs were allotted to diets containing 0 or 0.1 g ERB/kg of diet and 2 levels of antibiotic (tiamulin; ANT, 0 and 33 ppm) according to a 2 × 2 factorial arrangement of treatments. There were 7 replicated pens per treatment with 5 pigs per pen. The experiment included 2 phases: 0 to 2 weeks and 2 to 6 weeks. At 2 and 6 wk, 2 pigs from each pen were subjected for the fecal microbiota and blood profiles. All data were statistically analyzed using the repeated-measure statement of the MIXED procedure of SAS. The model included diet as a fixed effect whereas pig and period were included as random effects. During phase 1 and overall, ERB supplementation increased growth efficiency (G:F) compared with the ERB-free diet in weaning pigs (0.84 vs. 0.80 and 0.69 vs. 0.67; $P = 0.01$ and $P = 0.04$, respectively). Pigs receiving diets supplemented with ANT increased DM and N digestibility than their counterparts during phase 1 (82.89 vs. 81.19% and 82.85 vs. 80.71%; $P = 0.04$ and 0.01, respectively). Pigs fed ERB had higher N digestibility than pigs fed the non-ERB diet during phase 1 and phase 2 (83.60 vs. 79.96% and 82.48 vs. 79.22%, $P = 0.01$ and 0.02, respectively). Supplementation of ANT × ERB diets had positive effects for DM digestibility ($P = 0.04$). During phase 2, the supplementation of ERB decreased total cholesterol (TC) than pigs fed the diet lacking ERB (97.30 vs. 103.60 mg/dL; $P = 0.01$). During phase 2, the supplementation of ERB increased the *Lactobacillus* and reduced *Salmonella* counts than pigs fed the ERB-free diet (7.72 vs. 7.58 $\log_{10}$ cfu/g and 2.37 vs. 2.49 $\log_{10}$ cfu/g; $P = 0.04$ and $P = 0.02$, respectively). Pigs fed ERB diets reduced ammonia (NH_3) gas emission compared with non-ERB diets (22.70 vs. 26.46 ppm; $P = 0.01$). In conclusion, results indicated that dietary supplementation of ERB improved performance in weaning pigs.

Key Words: extracted rice bran, microbial shedding, noxious gas emissions