

white blood cell count were affected by ISS ($P < 0.001$). During pre-ISS, PD increased linearly ($P < 0.01$) as Thr concentration in the diet increased with a significant interaction ($P < 0.05$) between fiber and Thr. Similarly during ISS, PD increased linearly ($P < 0.001$) with Thr concentration. Quadratic plateau model estimated Thr to optimize PD for LF and HF diets during pre-ISS at 0.68% and 0.78%, respectively. During ISS, Thr was estimated at 0.76% for LF diet and 0.72% for HF diet. High fiber and ISS independently increased Thr requirement for PD but these effects were not additive. Therefore dietary fiber may mitigate the effects of ISS on Thr required for immune response and optimal PD.

Key Words: threonine, fibre, pig

363 Increased Intestinal Alkaline Phosphatase Maximal Activities Mediate Improvements in Growth and Gut Health Status in Weanling Pigs Fed the Antibiotic-Supplemented Diet. X. Yin¹, T. Archbold¹, N. Burello¹, M. Scolaro¹, M. Li², W. Wang¹, K. Zhou¹, M. Fan¹, ¹University of Guelph, Guelph, ON, Canada, ²Henan University of Animal Husbandry and Economy, China, Zhengzhou, Henen, China

Improved understanding of the biological mechanisms of antibiotic actions on improving growth rate and gut health aids to develop alternative strategies in weanling pig nutrition. We hypothesized that dietary antibiotic could improve growth performance and gut health by enhancing the intestinal endogenous alkaline phosphatase detoxification capacity in weanling pigs. A total of 104 crossbred (Duroc × Yorkshire × Landrace) barrows were weaned at d 19, with an average initial BW of 6.81; SE=0.09 kg BW, from 62 litters; and were randomly assigned to two groups according to a randomized complete block design. Both groups of pigs were fed a corn and SB-based diet for 3 weeks; and the antibiotic-treatment diet was supplemented with 550 mg aureomycin per kg diet. The dietary antibiotic supplementation increased (PPP-nitrophenyl phosphate as a substrate ranging 0–0.8 mM in incubation media at pH 7.4 and 37 °C for 30 minutes (parameter estimates±SE, $P_2 = 0.33 - 0.83$, $n=40$). For pigs fed the diet with the antibiotic supplementation, the V_{max} (nmol·mg protein⁻¹·min⁻¹) values in the jejunum (38.18 ± 1.22 vs. 27.46 ± 1.96), ileum (28.19 ± 1.61 vs. 20.89 ± 0.86), cecum (3.20 ± 0.24 vs. 3.03 ± 0.26), and colon (12.01 ± 1.18 vs. 9.88 ± 0.85) were increased ($P < 0.05$) by 39.04, 34.94, 5.64 and 21.56%, respectively, compared with the control. These results indicated that dietary antibiotic could mediate improvements in growth rate and gut health status in weanling pigs

through increasing intestinal alkaline phosphatase maximal activities.

Key Words: Alkaline phosphatases, antibiotics, weanling pigs

364 Effect of humic substances on rumen fermentation, nutrient digestibility, methane emissions and rumen microbiota in beef heifers. S. Terry¹, G. Ribeiro Jr², R. Gruninger³, M. Hünerberg⁴, P. Sheng⁵, A. Chaves¹, K. Beauchemin², J. Burtlet⁵, T. McAllister³, ¹The University of Sydney, School of Life and Environmental Sciences, Sydney, New South Wales, Australia, ²Agriculture and Agri-Food Canada; Lethbridge Research and Development Centre, Lethbridge, AB, Canada, ³Lethbridge Research and Development Centre, Agriculture and Agri-Food Canada, Lethbridge, AB, Canada, ⁴University of Goettingen, Department of Animal Sciences, Goettingen, Germany, ⁵Institute of Biological Resources, Jiangxi Academy of Sciences, Nanchang, China (People's Republic), ⁵Venture West Veterinary Services Ltd, Lethbridge, AB, Canada

The objective of this study was to examine the effect of humic substances (HS) on rumen fermentation, nutrient digestibility, methane (CH₄) emissions, and the rumen microbiome of beef heifers fed a barley silage-based diet. The experiment was designed as a replicated 4 × 4 Latin square using 8 ruminally cannulated Angus × Hereford heifers. Heifers were offered a basal diet consisting of 60% barley silage and 40% concentrate (DM basis) with either 0 (control), 100, 200 or 300 mg granulated HS/kg BW. Each period was 28 d with 14 d of adaptation. Rumen samples were taken on d 15 at 0, 3, 6 and 12 h post feeding. Total urine and feces was collected from d 18 to 22. Blood samples were taken on d 22 at 0 and 6 h post feeding. Between d 26 and 28, heifers were placed in open-circuit respiratory chambers to measure CH₄. Ruminal pH was recorded continuously during the periods of CH₄ measurement using indwelling pH loggers. Intake was similar ($P = 0.47$) across treatments. Concentration of ammonia-N and counts of rumen protozoa responded quadratically ($P < 0.03$) to the addition of HS. Apparent total tract digestibility of CP ($P < 0.04$) was linearly increased by HS and total N retention (g/d, % N intake, g/kg BW^{0.75}) was improved ($P < 0.04$) for HS as compared to the control. There was no effect of HS on CH₄ production (g/d; $P = 0.83$); however, HS decreased the relative abundance of Proteobacteria ($P = 0.04$), and increased the relative abundance of Synergistetes ($P = 0.01$) and Euryarchaeota ($P = 0.04$). Results suggest that HS

included at up to 300 mg/kg BW may improve N retention and CP digestibility, but there was no impact on CH₄ production.

Key Words: microbiome; greenhouse gases; ruminants

365 Effects of coated-cysteamine on growth performance, carcass characteristics, meat quality and lipid metabolism in finishing pigs. W. Tao¹, M. Wang¹, H. Li², R. Yu³, Z. Li³, ¹College of Animal Science, Zhejiang University, Hangzhou, Zhejiang, China (People's Republic), ²Zhejiang University, Hangzhou, Zhejiang, China (People's Republic), ³Hangzhou King Techina Technology Co., Ltd., Hangzhou, Zhejiang, China (People's Republic)

This study was conducted to evaluate the effects of coated-cysteamine (CS) on growth performance, carcass characteristics, meat quality and lipid metabolism in finishing pigs. A total of 160 finishing pigs (60.1 ± 1.01 kg BW) were randomly divided into four groups, with 4 pens per group and 10 pigs (5 gilts and 5 barrows) per pen. Pigs were fed a basal diet supplemented with 0, 100, 200, or 400 mg/kg CS, corresponding to 0, 27, 54, or 108 mg/kg cysteamine, respectively. All pigs were given free access to feed and water for forty days. After the feeding trial, eight pigs were selected from each treatment and slaughtered to measure carcass and meat quality, and to collect serum samples for laboratory analysis. Results showed that supplemental 100 mg/kg CS increased ADFI (3.03%, $P < 0.05$), while 200 mg/kg and 400 mg/kg CS decreased ADFI (1.52%, 3.03%, respectively; $P < 0.05$). Supplemental CS increased carcass lean ratio (2.26%, 2.38%, 6.13%, respectively; $P < 0.05$). The 24 h drip loss was decreased by 17.51% ($P < 0.05$) and 12.03% ($P < 0.05$) respectively in the 100 and 200 mg/kg CS groups, and Hunter b was reduced by 14.49% ($P < 0.05$) in the 200 mg/kg CS group. Serum free fatty acids of CS supplementation group was higher (22.78%, 32.45%, 41.35%, respectively; $P < 0.05$) than that in control group. Dietary supplementation of CS decreased activities of fatty acid synthase (16.26%, 15.43%, 14.44%, respectively; $P < 0.05$), while increased the activity of hormone-sensitive lipase (64.82%, 41.95%, 106.33%, respectively; $P < 0.05$) and isocitrate dehydrogenase (44.09%, 33.76 %, 70.21%, respectively; $P < 0.05$) in subcutaneous adipose tissue. These results suggested that dietary supplementation of coated-cysteamine has beneficial effects on carcass characteristics and meat quality, and positively affected lipid catabolism in finishing pigs.

Key Words: coated-cysteamine, carcass characteristics, lipid metabolism

CSAS GRADUATE STUDENT POSTER COMPETITION

PSI-19 Effect of extended colostrum feeding on serum IgG in newborn calves. S. Pletts¹, J. Pyo¹, S. He¹, D. Haines², L. Guan³, M. Steele³, ¹University of Alberta, Edmonton, AB, Canada, ²Saskatoon Colostrum Co. Ltd., Saskatoon, SK, Canada, ³Department of Agricultural, Food, and Nutritional Science, University of Alberta, Edmonton, Alberta, Canada

Colostrum is commonly fed to dairy calves for only one meal as it is thought that intestinal closure limits IgG transfer after the first day of life. The objective of this study was to determine how feeding colostrum beyond the first meal affects passive transfer of IgG. Twenty-seven Holstein bull calves were fed colostrum (62 g IgG/L; 7.5% of BW) at 2 h postnatal, randomly assigned to 1 of 3 treatments, then fed at 5% of BW at 12, 24, 36, 48, 60 h. Treatments were colostrum (COL), 1:1 colostrum:milk (MIX), or MILK. A jugular catheter was inserted at 1 h postnatal for blood collection over 75 h. Data were analyzed using the MIXED procedure of SAS, with significance declared at $P \leq 0.05$. MILK had a lower ($P < 0.05$) maximum IgG concentration (22.4 g/L) and reached max IgG earlier (12 vs. 21 h) compared to MIX and COL (25.0 g/L and 30.0 g/L, respectively). Minimum IgG concentration was 21.0 and 30% lower ($P < 0.05$) for MILK relative to MIX and COL, respectively. The overall decrease in total IgG transfer for MILK is reflected in an area under the curve that was less ($P < 0.05$) for MILK at 24 h (279.9 g/L × h) compared to MIX and COL (330.7 and 391.1 g/L × h, respectively). Although apparent efficiency of absorption (AEA) for MIX and COL decreased ($P < 0.01$) following the initial colostrum meal at 2 h, there was no difference in AEA between MIX and COL at 24 h (2.3 and 0.9 g/L, respectively). These results suggest that the neonatal intestine is still permeable to IgG past 12 h, and feeding a colostrum or colostrum-milk mix after the first meal postnatal provides an opportunity to increase passive transfer of IgG in the neonatal dairy calf.

Key Words: IgG, extended colostrum, passive transfer

PSI-20 Effects of physical exercise on growth performance, and carcass and meat quality characteristics of Sunit sheep R. Su¹, Y. Jin², Y. Luo², B. Wang², Q. Yuan², L. Zhao², L.

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