

portance of feeding adequate Lys to optimize ADG and G:F. Additionally, the trials show a difference between university and commercial settings because only the commercial study yielded a detectable phytase response, where pigs fed the low-Lys diet with 1000 FYT/kg phytase had performance similar to pigs fed high Lys diets containing 250 FYT/kg phytase.

Key Words: nursery pigs, phosphorus, phytase

131 Effects of diet complexity, antibiotics, and benzoic acid on nursery pig growth performance. J. E.

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Two 28-d experiments were used to determine the effects of diet complexity, antibiotics, and benzoic acid on nursery pig (PIC 327 × 1050) growth performance. Both experiments were arranged as 2 × 2 factorials with main effects of benzoic acid (Vevovital, DSM Nutritional Products, Parsippany, NJ) and diet complexity (Exp. 1) or antibiotics (Exp. 2). Each experiment had 6 or 7 pigs per pen and 10 pens per treatment. In Exp. 1, 280 pigs (initially 7.0 kg) were used. Benzoic acid levels were 0 or 0.5% fed from d 0 to 28. Diet complexities (simple or complex) were fed from d 0 to 14 followed by a 14-d common diet. Complex diets contained 10% dried whey, 1.25% select menhaden fish meal, 1.25% spray-dried blood cells, and 0.25% zinc oxide and simple diets did not contain lactose, zinc oxide, or specialty protein sources. No interactions were detected between diet complexity and benzoic acid and no benzoic acid main effects were observed. From d 0 to 14, pigs fed simple diets had decreased ($P < 0.001$) ADG (186 vs. 277 g), ADFI (304 vs. 381 g), and G:F (0.612 vs. 0.726). From d 14 to 28, pigs previously fed simple diets tended to have increased ($P < 0.06$) ADG (585 vs. 567 g) and increased ($P < 0.003$) G:F (0.679 vs. 0.651). Overall (d 0 to 28), pigs fed simple diets had decreased ($P < 0.001$) ADG (386 vs. 417 g) and ADFI (581 vs. 626 g). In Exp. 2, 240 pigs (initially 7.3 kg) were used. Benzoic acid levels were 0 or 0.5% fed from d 0 to 28. Antibiotic (carbadox) levels were 0 or 55 ppm from d 0 to 14 and 0 or 27.5 ppm from d 14 to 28. From d 0 to 14, pigs fed diets without antibiotic tended to have increased ($P < 0.07$) G:F (0.736 vs. 0.710). From d 14 to 28, pigs fed diets without antibiotic had decreased ($P < 0.01$) ADG (553 vs. 603 g), ADFI (857 vs. 903 g), and G:F (0.646 vs. 0.668). Overall (d 0 to 28), pigs fed diets without antibiotic had decreased ($P < 0.02$) ADG (422 vs. 449 g) and ADFI (626 vs. 662 g). No main effects of benzoic acid were observed. In conclusion, pigs fed complex diets or antibiotics had improved growth performance, but no differences were observed from including benzoic acid in the diets.

Key Words: benzoic acid, diet complexity, pig

132 Soluble fiber and insoluble fiber sources added to enterotoxigenic *Escherichia coli*-challenged pigs after weaning influence production and β -hemolytic *E. coli* excretion. J. Pluske^{1,*}, J. C. Kim², ¹*Murdoch University, Western Australia, Australia*, ²*Department of Agriculture and Food, Western Australia, Australia*.

Different dietary and/or feeding strategies to ameliorate the postweaning malaise are being examined given increased scrutiny of the use of antimicrobial agents in diets. The extent to which dietary fiber and the balance between soluble and insoluble fiber might modify gastrointestinal tract structure and function to influence performance and health after weaning in the absence of dietary antimicrobials has not been fully established. An experiment using 96 individually housed male pigs was conducted having a 2 × 4 factorial arrangement of treatments, with factors being added (mostly) soluble fiber (approximately 8 versus 48 g/kg) and four levels of high insoluble fiber (added as wood cellulose; 0, 30, 60, and 90 g/kg). Ground white rice was used as the cereal. Antimicrobial-free diets were fed for 2 wk after weaning, after which time all surviving pigs were fed a commercial diet for another week. All pigs were orally inoculated with an enterotoxigenic *E. coli* strain (0149:K91:F4) on d 5, 6, and 7 after arrival to induce diarrhea. On d 8 and 9 after weaning, a subsample of pigs from each treatment was humanely euthanized. There were positive linear effects ($P = 0.046$ and $P = 0.019$) of wood cellulose inclusion level on bodyweight at d 14 and d 21, respectively. In the first 14 d after weaning, each 10 g/kg increase in the analyzed dietary NDF content (to approximately 100 g/kg) increased average daily gain (ADG) and average daily feed intake (ADFI) by 6.4 and 8.1 g/d ($R^2 = 0.84$, $P = 0.085$ and $R^2 = 0.89$, $P = 0.056$, respectively) whilst each 10 g/kg increase in the analyzed dietary ADF content (to approximately 50 g/kg) increased ADG and ADFI by 10.6 and 13.3 g/d ($R^2 = 0.89$, $P = 0.058$ and $R^2 = 0.95$, $P = 0.027$, respectively). There were significant main effects of wood cellulose level on the feed conversion ratio (FCR) in the first 7 ($P = 0.018$) and 14 ($P = 0.028$) d after weaning, but FCR from d 15 through 21 and over the entire 21-d period was determined by an interaction between soluble and insoluble fiber sources ($P = 0.035$ and $P = 0.038$, respectively). At d 9 postweaning, increasing amounts of insoluble fiber linearly decreased ($P = 0.010$) the fecal excretion of β -hemolytic *E. coli*; however, there were no differences ($P > 0.05$) between fiber treatments for the diarrhea index or the number of therapeutic antibiotic treatments given.

Key Words: diarrhea, fiber, weaning