169 Effects of dietary supplementation with a probiotic (*Enterococcus faecium*) on growth performance, nutrient digestibility, fecal microbiota, and fecal score in weanling pigs. R. X. Lan*, J. K. Kim, Y. H. Liu, H. M. Yun, I. H. Kim, *Department of Animal Resource and Science, Dankook University, Cheonan, South Korea.*

This study was conducted to evaluate the effects of dietary supplementation with a probiotic (*Enterococcus faecium* DSM7134) on growth performance, nutrient digestibility, blood parameters, fecal microbiota, and fecal score in weaning pigs. A total of 140 crossed [(Landrace ×Yorkshire) ×Duroc] weanling pigs with an initial body weight (BW) of 7.45 ± 0.86 kg were used in a 42-d trial. Pigs were randomly allotted to 4 experimental diets according to initial BW and gender (7 replicates each with 2 gilts and 3 barrows). Dietary treatments were: (1) CON, basal diet, (2) T1, CON + 0.05% *E. faecium*, (3) T2, CON + 0.10% *E. faecium*, (4) T3, CON + 0.20% *E. faecium*. Pigs were weighed on d 1, 21, and 42 whereas feed consumption was recorded to calculate ADG, ADFI, and G:F. Fresh fecal samples were obtained on d 42 to determine the ATTD of DM, N, and GE using Cr_2O_3 as an indigestible marker. One gram of fecal sample was diluted with 9 mL of 1% peptone broth and then homogenized. Viable counts of bacteria were conducted by plating serial 10-fold dilutions onto agar plates. Fecal scores: 1 hard, dry pellet; 2 firm, formed stool; 3 soft, moist stool that retains shape; 4 soft, unformed stool that assumes shape of container; 5 watery liquid that can be poured. Orthogonal comparisons were conducted using polynomial regression to measure linear and quadratic effects of increasing dietary supplementation of *E. faecium* with $P < 0.05$ indicating a significance.

From d 22 to 42, and overall, there were linear increase ($P = 0.0099$ and $P = 0.0203$, respectively) in ADG and G:F with *E. faecium* supplementation, only linear increase ($P = 0.0395$) in ADG was observed from d 1 to 21. On d 42, there were linear increase ($P = 0.0315$, $P = 0.0108$, and $P = 0.0046$, respectively) in ATTD of N and GE, and fecal *Lactobacilli* counts. *E. faecium* supplementation linear reduced ($P = 0.0056$, $P = 0.0116$, and $P = 0.0002$, respectively) fecal *E. coli* counts and fecal scores in week 1 and 2. In conclusion, dietary supplementation with *E. faecium* improved growth performance, ATTD of N and GE, shifted microbiota by increasing fecal *Lactobacilli* and decreased *E. coli* counts, and decreased fecal score during the two week post-weaning in weanling pigs.

Key Words: *Enterococcus faecium*, growth performance, weanling pigs

doi: 10.2527/asasmw.2017.12.169

170 Comparing the effects of butyric acid source and level on growth performance of nursery pigs. K. M. Gourley*, J. C. Woodworth, J. M. DeRouchey, M. D. Tokach, R. D. Goodband, S. S. Dritz, *Kansas State University, Manhattan.*

A total of 400 nursery pigs (PIC 19 × 1050 or PIC 3×C 29 initially 6.2 ± 0.01 kg) were used to compare the effects of increasing levels of two encapsulated butyric acid sources on growth performance of nursery pigs. Dietary treatments were arranged as a 2 × 2 + 1 factorial with main effects of butyric acid source (ButiPEARL vs. ButiPEARLZ; Kemin Industries, Des Moines, IA) and acid source level (low (0.05 or 0.07%) vs. high (0.10 or 0.14%), for ButiPEARL or ButiPEARLZ, respectively) plus a control diet without butyric acid. The addition of butyric acid was established such that the same amount of butyric acid was contributed from each source for the low or high levels, respectively. Experimental diets were fed in 3 phases from d 0 to 7, 7 to 21, and 21 to 42. Pens of pigs were balanced by initial BW and randomly allotted to treatments, with 8 pens/treatment. From d 0 to 7, a source × level interaction ($P < 0.05$) was observed for ADG, ADFI, and G:F with pigs fed diets containing ButiPEARL having improved performance at the low inclusion, with those fed the high level not different from the control. However, pigs fed ButiPEARLZ had similar performance to the control regardless of level. In Phase 2 (d 7 to 21), ADG and ADFI were not influenced by butyric acid source or level, but an interaction ($P = 0.002$) was observed for G:F as pigs fed ButiPEARL had poorer G:F as level increased; whereas pigs fed increasing ButiPEARLZ had improved G:F. For Phase 3 (d 21 to 42), increasing either butyric acid source tended ($P = 0.060$) to decrease ADG. Overall (d 0 to 42), butyric acid source or level did not affect ADG, ADFI or G: F. In conclusion, this study showed that pigs fed low ButiPEARL in Phase 1 (d 0 to 7) had improved growth performance compared to other treatments

Table 168.

	Antibiotic, ppm			Gluco-oligosaccharide, ppm				
Item	0	55	SEM	0	200	400	600	SEM
Room 1 and 2 (overall)								
ADG, g	419	439	3.6	418	430	430	437	4.7
G:F	0.683	0.687	0.0035	0.679	0.687	0.683	0.691	0.0040
Room 3 (overall)								
ADG, g	400	408	5.4	410	399	410	399	7.1
G:F	0.667	0.672	0.0052	0.673	0.666	0.667	0.672	0.0059

with only minor treatment effects observed thereafter.

Key Words: butyric acid, growth, nursery pigs
doi: 10.2527/asasmw.2017.12.170

171 Effects of encapsulated butyric acid and copper on nursery pig growth performance from d 0 to 42 after weaning. J. A. Loughmiller*, D. Sanders, H. Feng, V. Mani, J. K. Rubach, A. L. P. De Souza, F. R. Valdez, M. J. Poss, *Kemin Industries, Des Moines, IA.*

A study was conducted evaluating the effects of propionic acid plus copper carbonate (KemTRACE Cu®, Kemin Industries, Des Moines, IA), encapsulated butyric acid (ButiPEARL, Kemin Industries, Des Moines, IA) and a novel encapsulated butyric acid plus copper carbonate (ButiPearl C, Kemin Industries, Des Moines, IA) on the growth performance of weanling pigs. A total of 350 pigs (PIC 280 × 1050; initial BW = 5.54kg) with 10 pigs/pen and 7 replicate pens/treatment were used in a 42 d study. Pigs were allocated in a randomized, complete block design based on initial BW. Diets were pelleted, corn-soybean meal based and similar within phase except for the additional copper and encapsulated butyric acid. All nutrient concentrations met or exceeded NRC (2012) estimates. Treatments were Control (N), 500 mg/kg ButiPEARL (B), 65 mg/kg Cu from KemTRACE Cu® (C), 500 mg/kg ButiPEARL + 65 mg/kg C from KemTRACE Cu® (BC); 500 mg/kg ButiPEARL C (BPC). Treatment differences were determined by LSMEANS comparisons. During d 0 to 7, no differences were observed for initial BW, ADG; ADFI ($P > 0.10$). Gain:feed was greatest for BC and BPC ($P < 0.05$). From d 7 to 21, ADG was greatest for BPC and BC ($P < 0.05$). Day 7 to 21 Gain:feed for C, BC; BPC was higher than N ($P < 0.05$). Day 21 to 42 ADG was greatest for BC ($P < 0.05$). Day 21 to 42 ADFI was greatest for BC and BPC ($P < 0.05$); gain:feed was greatest for BC ($P < 0.05$). From d 0 to 42, overall ADG and ADFI were greatest for BC and BPC, while N and B were lowest ($P < 0.05$). Overall gain:feed was greatest for BC ($P < 0.05$). Final BW was greatest for BC and BPC ($P < 0.05$). Adding BC or BPC showed the greatest growth performance improvement for pigs from d 0 to 42 after weaning.

Key Words: butyric acid, copper, nursery pigs
doi: 10.2527/asasmw.2017.12.171

172 Effects of feeding probiotic or chlortetracycline or a combination on nursery pig growth performance. H. E. Williams*, M. D. Tokach, S. S. Dritz, J. C. Woodworth, J. M. DeRouchey, R. G. Amachawadi, T. G. Nagaraja, R. D. Goodband, *Kansas State University, Manhattan.*

A total of 300 nursery pigs (initial BW 5.9 ± 0.05 kg) were used to determine the effects of feeding chlortetracycline (CTC) with or without probiotics on nursery pig performance. Pigs were weaned at approximately 21-d of age and randomly allotted to pens based on initial BW. Pigs were fed a common pelleted starter diet for 4 d and then weighed, and pens were allotted, in a randomized complete block design based on BW, to 1 of 6 dietary treatments with 10 replications/treatment. The treatments were arranged in a 2 × 3 factorial with main effects of CTC (0 vs. 440 ppm from d 0 to 42) and probiotic (0, 0.05% Bioplus 2B [Chr. Hansen USA, Inc., Milwaukee, WI], or 0.05% Poultry Star [Biomin America, Inc., San Antonio, TX]). Experimental diets were fed in 2 phases (Phase 1: d 0 to 14 and Phase 2: d 14 to 42) and all diets were fed in meal form. Diets were corn-soybean meal based and were formulated to meet the pigs' nutrient requirements for each phase of this study. The Phase 1 diets contained specialty protein sources while Phase 2 diets did not. On d 15 and 29, CTC was removed from CTC diets and non-medicated feed was fed for 1 d. For overall performance, there were no interactions ($P > 0.05$) between probiotics and CTC. Pigs fed CTC had improved ($P < 0.001$) ADG, ADFI, and overall BW compared with those fed diets without CTC. Adding Poultry Star to the diet increased ($P < 0.05$) ADFI and BW from d 0 to 14. However, there was no difference in ADG or ADFI for the overall d 0 to 42 period. In conclusion, CTC improved nursery pig performance, but there were no consistent benefits of feeding either probiotic alone or in combination with CTC.

Key Words: growth performance, nursery pig, probiotic
doi: 10.2527/asasmw.2017.12.172

Table 170.

		ButiPEARL		ButiPEARLZ			$P <$		
Item	Control	Low	High	Low	High	SEM	Source × level	Source	Level
d 0 to 7[1]									
ADG, g	108[b]	139[a]	107[b]	89[b]	109[b]	7.68	0.002	0.003	0.413
G:F, g/kg	767[ab]	833[a]	729[b]	687[b]	766[ab]	6.20	0.007	0.096	0.711
d 0 to 42									
ADG, g	481	470	456	452	446	8.88	0.693	0.130	0.260
G:F, g/kg	719	712	709	717	707	5.90	0.633	0.796	0.267

[1]Source × level interaction ($P < 0.05$)