PSV-2 Effects of protease on growth performance, fecal gas emission of 25- to 55-kg pigs fed low or high density diets. Ludovic Lahaye[1], Glenmer Tactacan[1], Seung-Yeol Cho[2], Jinho Cho[3], In Ho Kim[4], Roger Campbell[5], [1]*Jefo,* [2]*Eugenebio,* [3]*Chungbuk National University,* [4]*Dankook Univ.,* [5]*RG Campbell Advisory*

Volatility in feed ingredient prices prompts animal nutritionists to evaluate alternative methods to control feed costs. The objective of this study was to evaluate the effects of protease in growing pigs fed either high or low-density diets. A total of 140 pigs [(Landrace×Yorkshire)×Duroc] were used in a 6-wk study with an initial BW of 24.1 ± 0.02 kg equally distributed in 7 pens per treatment fed one of the following treatments: High-density diet with 3400 kcal ME/kg, 19.5% CP, and 0.85% SID Lys; High-density diet + 125 g/t Jefo Protease (Jefo, Canada); Low-density diet with 3300 kcal ME/kg, 17.6% CP, and 0.83% SID Lys; and Low-density diet + 125 g/t Jefo Protease. Diets were corn, soybean meal-based with 12% rice bran and 8% wheat bran. Data were subjected to statistical analyses as a completely randomized design using a 2 × 2 factorial arrangement with pen as the experimental unit. Differences among treatment means were determined using Duncan's multiple range test with level of significance at $P \leq 0.05$. High-density diets ($P = 0.01$) and protease supplementation ($P = 0.05$) significantly improved G:F in pigs (Table 1) compared to low-density diets and no protease supplementation. NH_3 and H_2S gas emission tended to be lower ($P \leq 0.10$) in diets supplemented with protease. There were no statistical differences ($P > 0.10$) in initial weight, final weight, ADG, and ADFI. In conclusion, protease supplementation and high density diets improved G:F in 25- to 55-kg pigs.

Table 1. Effects of protease on growth performance, fecal gas emission of 25- to 55-kg pigs fed low or high density diets

Dietary density[1]	Low		High			*P-value*		
Protease[2]	-	+	-	+	SEM	Diet	Protease	Diet x Protease
Initial BW, kg	24.1	24.1	24.1	24.1	0.02	0.97	0.99	0.99
Final BW, kg	53.2	54.0	54.4	55.8	0.4	0.33	0.48	0.84
ADG, g	692	710	721	754	9.0	0.11	0.25	0.74
ADFI, g	1573	1564	1565	1546	16.0	0.57	0.54	0.82
G:F	0.440	0.454	0.461	0.488	0.006	0.01	0.05	0.54
NH_3, ppm	4.9	4.6	4.8	4.5	0.2	0.33	0.06	1.00
H_2S, ppm	3.2	2.9	3.2	2.7	0.3	0.55	0.10	0.69

[1] Low: 3300 kcal ME/kg, 17.6% CP, and 0.83% SID Lys; High: 3400 kcal ME/kg, 19.5% CP, and 0.85% SID Lys.

[2]125 g of Jefo Protease/ton (Jefo, Canada).

Key words: protease, performance, pigs

PSV-7 Effects of a *Bacillus*-based probiotic on sow and litter performance, fecal consistency, and fecal microflora. Mariana Boscato Menegat[1], Kiah M. Gourley[1], Michaela B. Braun[1], Joel M. DeRouchey[1], Jason C. Woodworth[1], Jim Bryte[2], Mike D. Tokach[1], Steve S. Dritz[1], Robert D. Goodband[1], [1]*Kansas State University,* [2]*Quality Technology International, Inc.*

This study evaluated the effects of supplementation of sow diets with *Bacillus subtilis* C-3102 (Calsporin®, Calpis Co. Ltd., Tokyo, Japan) during gestation and lactation. A total of 29 sows (DNA 241) with confirmed pregnancy on d 30 of gestation were assigned to dietary treatments in a randomized complete block design based on BW and parity. Treatments were: control diet or probiotic diet with Calsporin® at 500,000 and 1,000,000 CFU/g of diet in gestation and lactation, respectively. Data were collected on d 30 and 112 of gestation and d 2 and 19 of lactation. Fecal consistency was assessed on a 1-to-5 scale for each litter. Fecal samples were collected from sows and piglets for microbial analysis by culture method and bacterial quantification of *Bacillus subtilis* C-3102, total *Bacillus* sp., *Lactobacillus* sp., *Clostridium perfringens, Salmonella* spp., *Enterococcus* sp., *Enterobacteriaceae*, total aerobes, and total anaerobes. Data were analyzed using a linear mixed model (PROC GLIMMIX, SAS®) with sow as experimental unit. Probiotic-fed sows had a marginally significant ($P < 0.10$) increase in lactation ADFI, but it did not result ($P > 0.10$) in improvement in sow or piglet weight at weaning. Probiotic-fed sows had a marginally significant ($P < 0.10$) larger litter size after cross-fostering, but it did not result ($P > 0.10$) in larger litter size at weaning. Fecal consistency of piglets was not influenced ($P > 0.10$) by sow diet. Microbial analysis revealed an increase ($P < 0.01$) in *Bacillus subtilis* C-3102 and, consequently, total *Bacillus* sp. in fecal microflora of probiotic-fed sows and piglets born and nursed by probiotic-fed sows. In conclusion, this study demonstrates that providing Calsporin® to sows during gestation and lactation improved lactation ADFI and cross-fostering litter size, although further larger-scale studies are required for elucidation. The probiotic diet did not influence fecal consistency, but altered the fecal microbial population in sows and nursing piglets by increasing total *Bacillus* sp.

Table 1. Effects of supplementation of Calsporin® (*Bacillus subtilis* C-3102) during gestation and lactation on sow and piglet performance until weaning

	Control	Probiotic[1]	SEM	*P*-value
Sow lactation ADFI, kg	5.7	6.2	0.24	0.057
Sow wean BW, kg	220.2	217.0	7.7	0.366
Total born, n	15.5	16.8	0.95	0.201
Stillborn and mummy, n	1.4	2.3	0.59	0.228
Born alive, n	14.1	14.5	0.72	0.624
Litter size at cross-fostering, n	13.3	13.8	0.24	0.060
Litter size at weaning, n	12.7	12.7	0.32	0.916
Piglet birth weight, kg	1.41	1.38	0.05	0.664
Piglet wean weight, kg	5.74	5.85	0.21	0.601
Fecal total *Bacillus* sp. at weaning, $\log_{10}$ CFU/g				
Sow	4.25	6.22	0.05	<0.01
Piglet	3.39	5.41	0.20	<0.01

[1]Calsporin® (Calpis Co. Ltd., Tokyo, Japan) was included at 500,000 and 1,000,000 CFU/g of diet in gestation and lactation, respectively.

Key words: Bacillus subtilis, direct-fed microbial, lactation

PSV-9 Effects of insoluble fiber source (cellulose or distillers dried grains with solubles) on growth performance of nursery pigs. Henrique S. Cemin[1], Mike D. Tokach[1], Steve S. Dritz[1], Jason C. Woodworth[1], Joel M. DeRouchey[1], Robert D. Goodband[1], Matt W. Allerson[2], [1]*Kansas State University,* [2]*Holden Farms Inc.*

A total of 3,171 pigs (PIC 327×L42; initially 5.8 kg) were used in a 39-d study. Treatments were arranged in a 2 × 2 factorial with 0 or 1% cellulose (Arbocel, J. Rettenmaier USA, Schoolcraft, MI) and distillers dried grains with solubles (DDGS; 0 or 5% in phase 1 and 0 or 15% in phase 2). Dietary phases 1 and 2 were offered from d 0 to 10 and 10 to 25, respectively. From d 25 to 39, pigs received a common diet with 25% DDGS. Pens were blocked by weight and allotted to treatments in a randomized complete block design. Experimental unit was two pens (66 pigs) sharing a fence-line feeder with 12 replicates per treatment. Data were analyzed with the GLIMMIX procedure of SAS with block as random effect. From d 0 to 25 and d 0 to 39, there was an interaction ($P < 0.05$) between cellulose and DDGS for ADG. Pigs fed diets with both DDGS and cellulose had lower ADG than those fed diets without DDGS, with pigs fed diets with DDGS without the addition of cellulose being intermediate. From d 25 to 39, there was a tendency ($P = 0.080$) for an interaction for ADFI. Pigs previously fed diets without DDGS and with cellulose had higher ADFI than those fed diets with DDGS and cellulose, and pigs previously fed diets without cellulose had similar ADFI regardless of DDGS inclusion. There was a tendency for an interaction ($P = 0.070$) for pig removals. Adding cellulose to diets without DDGS numerically decreased pig removals, but the inclusion of cellulose to diets with DDGS resulted in increased pig removals. In summary, adding fiber to the diet as cellulose or DDGS resulted in a less pig removals; however, adding both cellulose and DDGS decreased ADG and ADFI.