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.

Table 1. Interactive effects of cellulose and distillers dried grains with solubles (DDGS) on growth performance of nursery pigs[1,2]

Item[4]	Without DDGS		With DDGS		SEM
	Without cellulose	With cellulose	Without cellulose	With cellulose	
d 0 to 25					
ADG, g	284[a]	287[a]	273[ab]	259[b]	3.91
ADFI, g	341	347	317	312	5.13
G:F, g/kg	836	828	860	828	6.84
d 25 to 39					
ADG, g	490	504	500	502	8.33
ADFI, g	740[xy]	755[x]	747[xy]	736[y]	8.38
G:F, g/kg	663	668	670	683	7.24
d 0 to 39					
ADG, g	355[a]	361[a]	351[ab]	342[b]	3.52
ADFI, g	477[xy]	487[x]	464[yz]	457[z]	4.63
G:F, g/kg	744	742	755	748	3.55
Removals, %	6.4[x]	5.0[xy]	4.7[y]	6.3[x]	0.873

[1] Cellulose (Arbocel, J. Rettenmaier USA, Schoolcraft, MI) was added at 1% from d 0 to 25.
[2] DDGS was added at 5% from d 0 to 10, 15% from d 10 to 25, and 25% from d 25 to 39.
[a,b] Means with different superscript are significantly different (DDGS × cellulose, $P < 0.05$).
[x,y,z] Means with different superscript tend to differ (DDGS × cellulose, $P < 0.10$).

Key words: fiber, nursery pig, performance

PSV-10 Effects of storing three phytase sources for 90 days under high temperature and humidity on phytase stability, growth performance, and bone mineralization of nursery pigs. Carine M. Vier[1], Mariana Boscato Menegat[1], Kiah M. Gourley[1], Steve S. Dritz[1], Mike D. Tokach[1], Jon R. Bergstrom[2], Robert D. Goodband[1], Joel M. DeRouchey[1], Jason C. Woodworth[1], [1]*Kansas State University,* [2]*DSM Nutritional Products North America*

This study evaluated storing 3 commercial phytases for 90 d in an environmental chamber set at 29.4°C and 75% humidity on phytase stability and nursery pig growth performance and bone mineralization. The phytases [HiPhos GT (20,000 FYT/g, DSM Nutritional Products, Parsippany, NJ); Axtra Phy TPT (20,000 FTU/g, Dupont, Wilmington, DE), and Quantum Blue G (40,000 FTU/g, AB Vista, Plantation, FL)] were kept as pure forms or blended in a vitamin-trace mineral (VTM) premix and sampled on d 0, 30, 60, and 90 of storage. Regardless of source and form, analyzed phytase activity decreased (linear, $P < 0.001$) as storage increased. Afterwards, 300 nursery pigs (11.7 kg BW) were assigned to 1 of 8 treatments in a RCBD with 4-5 pigs/pen and 8 pens/treatment. Treatments included a negative (NC, 0.12% aP) and positive control (PC, 0.27% aP) without phytase; or NC with added phytase to provide 0.15% aP (1,000, 651 and 500 FTU/kg for HiPhos, Axtra Phy, and Quantum Blue, respectively). Negative control with added phytase treatments were manufactured with each phytase source previously stored in pure form or VTM premix for 90d. Pigs fed PC had greater ($P < 0.001$) ADG compared to pigs fed Axtra Phy stored in VTM or NC. Feed intake was similar for PC, phytases stored in pure forms, and HiPhos and Quantum Blue stored in VTM, and greater ($P < 0.001$) than pigs fed NC. Pigs fed PC or HiPhos stored in pure form had improved ($P < 0.001$) G:F compared to pigs fed NC. Bone mineralization was greater ($P < 0.001$) for pigs fed PC compared to NC, phytases stored in VTM, and Axtra Phy and Quantum Blue stored in pure form. Regardless of source and form, phytase activity decreased as storage increased. In this study, bone ash was reduced when phytases were stored for 90d in a VTM compared to the PC.

Table 1. Effects of phytase after storage in a concentrated VTM premix or as pure product on growth performance and bone mineralization of nursery pigs

Item[1,2]	Negative Control	Positive Control	Stored for 90 d in pure form			Stored for 90 d in VTM form		
			HiPhos	Quantum Blue	Axtra Phy	HiPhos	Quantum Blue	Axtra Phy
ADG, g	484[c]	644[a]	640[a,b]	585[a,b]	625[a,b]	611[a,b]	605[a,b]	575[b]
ADFI,g	868[b]	991[a]	983[a]	975[a]	1012[a]	967[a]	1018[a]	962[a,b]
G:F, g/kg	558[a]	649[c]	651[c]	603[a,b,c]	617[b,c]	634[b,c]	597[a,b]	600[a,b,c]
Bone ash, %	38.4[d]	46.9[a]	44.6[a,b]	42.8[b,c]	43.3[b,c]	44.1[b]	41.3[c]	42.8[b,c]

[1]SEM for ADG, ADFI, G:F, and Bone ash were 23.38, 41.26, 11.43 and 0.64, respectively.
[2]Means within row with different superscripts differ ($P < 0.001$).

Key words: enzyme, nursery pigs, phytase efficacy