PSIX-15 Extrusion of corn-soybean product blends in replacement of soybean meal in weanling pig diets.

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Extrusion is a thermomechanical process that can reduce the content antinutritional factors in soybean, improving the use of its nutrients by pigs. The purpose of this study was to evaluate extruded corn-soybean grain blends, replacing soybean meal in weanling pig diets, on pig growth performance from 21 to 63 d old. Ground corn and the corn-soybean blend (75.27% of ground corn and 24.73%) were extruded at 120°C in a single-screw extruder. One hundred and sixty crossbred weaned pigs (6.02 ± 0.63 kg) were used in a three-phase feeding program (21-35, 36-49, 50-63 days of age) and fed a basal diet (BD - extruded corn, dairy product, spray dried plasma, and soybean meal) or one of four diets in which soybean meal was replaced for deactivated (DS) or extruded (EX) corn-soybean blend, in 50 or 100%, generating diets DS50, DS100, EX50 and EX100. Diets were formulated to provide 3.40, 3.38, and 3.20 Mcal of ME/kg; 220, 215, and 190 g/kg of CP; and 14.5, 13.3, and 10.9 g/kg of digestible lysine, in phases 1, 2, and 3, respectively. A randomized block design based on initial BW was used. The data was submitted to ANOVA and means were separated using Tukey test (5%). Pigs fed diets EX50 and EX100 presented reductions (P< 0.05) in ADG (16-50%), final BW and G:F (13-33%) compared to pigs submitted to diets SBM100, DS50 or DS100 in phases 1 and 2. ADG, ADFI, and G:F of pigs were not affected (P >0.05) in phase 3, but final BW of pigs fed extruded corn-soybean blend were lower (P< 0.05) than that of pigs fed other diets. The extrusion temperature may have been insufficient to inactivate the anti-nutritional factors of soybean that probably reduced pig growth performance. The inclusion of extruded corn-soybean blend in replacement of soybean meal reduced growth performance of pigs.

Table 1. Growth performance of pigs fed with extruded corn-soybean blends in replacement of soybean meal

Item	Treatments					SEM	P
	SBM100	DS50	DS100	EX50	EX100		
Initial BW, kg	6.02	6.02	6.02	6.02	6.02	0.18	0.4837
1 to 14d period							
BW, kg	9.99[a]	9.69[ab]	9.98[a]	9.11[b]	8.09[c]	0.34	<0.0001
ADG, g/d	283.9[a]	262.0[ab]	283.2[a]	220.6[b]	148.0[c]	19.20	<0.0001
ADFI, g/d	409.7[a]	388.7[a]	421.2[a]	375.7[a]	274.6[b]	22.55	<0.0001
G:F	0.69[a]	0.67[a]	0.67[a]	0.58[b]	0.53[b]	0.02	<0.001
15 to 28 d period							
BW, kg	17.03[a]	16.31[a]	16.97[a]	13.60[b]	11.54[c]	0.64	<0.001
ADG, g/d	471.1[a]	457.1[a]	468.4[a]	334.5[b]	311.3[b]	23.17	<0.001
ADFI, g/d	775.1[a]	749.1[ab]	797.3[a]	677.6[bc]	602.8[c]	22.56	<0.001
G:F	0.61[a]	0.61[a]	0.60[a]	0.50[b]	0.47[b]	0.02	0.009
29 to 42 d period							
BW, kg	25.52[a]	24.50[a]	24.87[a]	21.14[b]	17.39[c]	1.01	<0.001
ADG, g/d	532.4	537.9	492.0	543.4	554.1	26.33	0.4613
ADFI, g/d	1,044	1,042	986	996	1,010	29.81	0.4302
G:F	0.51	0.51	0.49	0.54	0.54	0.01	0.3582

SEM=Standard error of mean; mean followed by same letter, in the same row, is not different by the Tukey's test (P<0.05).

Keywords: extrusion, performance, pigs, soybean

PSIX-7 Effects of a dietary seaweed product on sow progeny performance, fecal consistency, and fecal microbiota during gestation, lactation, nursery and grow-finish periods.

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This study evaluated the effects of providing a selected mix of brown, red and green seaweeds (OceanFeed® Swine; Ocean Harvest Technology, Galway, Ireland) to sows during gestation and lactation and progeny during nursery and grow-finish periods on growth performance, fecal consistency, and microbiota composition. Twenty-eight sows and litters were used from d 30 of gestation until weaning. Sow treatments consisted of a control diet or diet supplemented with OceanFeed Swine (OFS) at 0.50% in gestation and 0.66% in lactation. At weaning, 360 pigs from these sows were used from d 0 to 56 and 57 to 156 in nursery and grow-finish periods, respectively, in a split-plot design. Treatments were a control diet or a diet supplemented with OFS at 0.75% in the nursery and grower phase (5.5 to 34 kg and 34 to 59 kg respectively) and 0.5% in the finisher phase (59 to 127 kg). Maternal OFS supplementation did not improve (P >0.10) sow or litter performance. There was no evidence (P >0.10) for main effects or

interactions for nursery and finishing performance. On day 56 after weaning, there was an increased proportion of pigs exhibiting the families Peptostreptococcaceae and Veillonellaceae in fecal samples when fed OFS in the nursery and originating from OceanFeed OFS-fed sows. Pigs from this treatment combination also had increased mean number of species detected within the families Ruminococcaceae and Lachnospiraceae and had lower mean number of species detected within the family Fusobacteriacea. In the finishing period, no evidence for main effects or interactions (P >0.10) were observed on overall growth performance. In summary, addition of OFS in gestation, lactation, and nursery-finishing phases had no consistent effect on sow or litter performance; however, there were relative increases in beneficial bacteriain fecal microbiota, including the butyrate-producing families Ruminococcaceae and Lachnospiraceae that warrant further investigation.

Table 1. Effects of OceanFeed Swine on growth performance[1]

Sow[1]:	Control		OceanFeed Swine		
Grow-finish[3]:	Control	OceanFeed Swine	Control	OceanFeed Swine	SEM
BW[4], kg					
d 0	5.6	5.6	5.5	5.5	2.001
d 56	35.9	36.2	36	36.2	2.384
d 156	138.8	139.8	139.7	138.6	1.661
Nursery Phase (d 0 to 56)					
ADG, g	538	542	538	539	31.87
ADFI, g	876	882	865	881	63.79
G:F, g/kg	618	617	623	612	10.19
Grow-finish Phase (d 56 to 156)					
ADG, kg	1.03	1.04	1.03	1.02	0.008
ADFI, kg	2.93	2.90	2.87	2.88	0.039
G:F, g/kg	352	358	360	355	4.60

[1]Control diet or diet supplemented with OceanFeed Swine at 0.5% in gestation (d 30 to farrowing) and 0.66% in lactation (farrowing to weaning)
[2]Control diet or a diet supplemented with the OceanFeed Swine at 0.75% and 0.50% for grower (34 to 59 kg) and finisher (59 to 127 kg) periods, respectively.
[3]There was a sow treatment interaction (*P*=0.001) for starting BW in Grow-Finish

Keywords: seaweeds, feed additive, microbiota, swine, growth performance

PSIX-1 Altering dietary fiber components mitigates severity of Brachyspira hyodysentariae challenge. Emma T. Helm[1], Nicholas Gabler[1], Eric R. Burrough[1], [1]*Iowa State University*

Swine dysentery (SD) induced by Brachyspira hyodysentariae (Bhyo) has recently become more prevalent in swine herds, renewing research interest regarding dietary mitigation strategies. It has been reported that insoluble dietary fiber such as DDGS influences Bhyo colonization leading to more rapid disease development. Therefore, the objective of this study was to determine if replacement of insoluble (20% DDGS) with soluble and highly fermentable [sugar beet pulp (BP) and resistant potato starch (RS)] fiber would reduce Bhyo disease expression. At total of 38 pigs (40.9 ± 5.0 kg BW) were selected, confirmed negative for Bhyo, and allocated to dietary treatment groups (13 pigs/trt): 1) Control consisting of 20% DDGS, no BP or RS (0%), 2) 10% DDGS, 5% BP and 5% RS (5%), or 3) 0% DDGS, 10% BP, 10% RS (10%). All diets were formulated to be isocaloric and isonitrogenous. Diets were fed for 14 days pre-challenge and on days post inoculation (dpi) 0, all pigs were inoculated with Bhyo. Pigs and feeders were weighed weekly for 28 dpi. Overall, ADG was greater in both 5% (0.85 kg/d) and 10% (1.18 kg/d) pigs compared with 0% pigs (0.63 kg/d; P=0.004). The 10% pigs (2.46 kg/d) had greater ADFI compared with the 0% pigs (1.84 kg/d; P=0.024), 5% pigs being intermediate (2.20 kg/d). The 10% pigs also had greater G:F compared with both the 0% and 5% pigs (P< 0.001). In terms of clinical disease presentation, 11/13 0% pigs developed clinical SD compared with 6/13 5% pigs and only 2/13 10% pigs (P=0.002). In conclusion, while not completely protective, reducing insoluble dietary fiber via replacement with soluble and fermentable BP and RS reduced clinical SD and improved pig performance during a 28-day Bhyo challenge. These data suggest such dietary manipulation may reduce usage of antibiotics in SD treatment and control.

Keywords: Pig Brachyspira hyodysentariae Fiber