PSIV18 Effects of Added Zn Level on Growth Performance and Hemoglobin of Nursery Pigs.

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An experiment was conducted to determine the effects of added Zn level on growth performance and hemoglobin of nursery pigs. A total of 673 pigs (initial BW = 6.0 kg) were used in a 45-d trial. There were 3 treatments based on added Zn level: 100, 2,000, or 3,000 mg/kg from Zn oxide. Experimental diets were fed for 21 d. After that, pigs were fed a common corn and soybean meal-based diet with 100 mg/kg added Zn for 24 d. There were 8 replicates per treatment. Pigs were weighed approximately every 10 d to evaluate growth performance, and blood samples were collected for hemoglobin analysis. Data was analyzed with SAS MIXED procedure. From d 0 to 10, there was a linear improvement (P < 0.05) in ADG, ADFI, and G:F with increasing Zn level. From d 10 to 21, increasing Zn level resulted in higher ADFI (linear, P = 0.009). However, there was no difference (P > 0.10) in ADG and G:F. From d 0 to 21, pigs fed increasing added Zn had improved (linear, P < 0.05) ADG and ADFI. From d 21 to 45, pigs previously fed high levels of added Zn had higher ADFI (linear, P = 0.023), but there was no evidence for differences (P > 0.10) for ADG and G:F. Overall (d 0 to 45), pigs fed increasing added Zn levels had improved (linear, P < 0.05) ADG, ADFI, and final BW. A quadratic response (P < 0.05) was observed for hemoglobin on d 10 and 45, with no differences (P > 0.10) observed on d 21. In summary, pigs fed high levels of added Zn presented improved growth performance. Although the response was linear in nature, the differences between pigs fed 2,000 or 3,000 mg/kg Zn were minimal for the response variables evaluated.

Table 1. Effects of added Zn level on growth performance and hemoglobin of nursery pigs[1]

	Added Zn, mg/kg			SEM	Probability, *P* <	
Item[2]	100	2,000	3,000		Linear	Quadratic
BW, kg						
d 0	6.1	6.0	6.0	0.18	0.280	0.609
d 10	7.3	7.4	7.6	0.05	0.001	0.506
d 21	11.1	11.5	11.5	0.11	0.006	0.328
d 45	20.9	21.9	21.8	0.31	0.035	0.298
d 0 to 10						
ADG, g	123	139	155	4.58	0.001	0.359
ADFI, g	127	134	149	2.92	0.007	0.575
G:F	0.966	1.038	1.106	0.025	0.001	0.528
d 10 to 21						
ADG, g	346	373	361	9.00	0.149	0.155
ADFI, g	366	405	400	8.98	0.009	0.150
G:F	0.946	0.921	0.906	0.017	0.102	0.947
d 0 to 21						
ADG, g	240	262	263	5.20	0.003	0.353
ADFI, g	251	275	275	5.61	0.004	0.265
G:F	0.957	0.950	0.957	0.011	0.933	0.642
d 21 to 45						
ADG, g	408	431	427	10.19	0.161	0.414
ADFI, g	550	587	585	10.84	0.023	0.311
G:F	0.743	0.735	0.730	0.007	0.227	0.960
d 0 to 45						
ADG, g	330	352	350	6.72	0.027	0.315
ADFI, g	407	439	439	7.70	0.006	0.270
G:F	0.811	0.803	0.799	0.006	0.174	0.961
Hemoglobin[3], g/L						
d 0	108.5	107.2	110.8	1.72	0.472	0.184
d 10	119.7	115.2	128.0	1.95	0.022	0.001
d 21	87.4	88.5	89.6	1.37	0.272	0.850
d 45	88.1	91.1	85.1	1.69	0.421	0.017

[1] A total of 673 pigs were used with 8 replicates per treatment. Experimental diets were fed from d 0 to 21 followed by a common diet from d 21 to 45.
[2] BW = body weight. ADG = average daily gain. ADFI = average daily feed intake. G:F = gain-to-feed ratio.
[3] Blood was analyzed using HemoCue Hb 201+ Hemoglobin Analyzer (HemoCue, Angelholm, Sweden).

Keywords: growth, nursery, zinc

PSIV-14 Influence of Feed Grade Amino Acid Inclusion Level in Late Nursery and Grower Diets Fed to Pigs from 10 to 35 Kg.

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A total of 912 pigs (PIC TR4 × (Fast LW × PIC L02)) were used in a 43-d trial to evaluate the influence of feed grade amino acid levels in late nursery and grower diets containing 30% dried distillers grains with solubles (DDGS) on growth performance. Pigs were randomly assigned to pens (19 pigs per pen) and pens were randomly allotted in weight blocks to 1 of 4 dietary treatments with 12 pens per treatment. Treatment diets were fed in 2 phases from 10 to 19.5 kg and 19.5 to 35 kg with digestible lysine at 1.31 and 1.15%, respectively). Predetermined orthogonal contrasts were used to evaluate linear or quadratic effects based on percentage of digestible lysine from intact protein versus feed grade lysine. Dietary treatments contained low, medium, high, or very high levels of feed grade amino acids with L-lysine added at 0.25, 0.40, 0.55, and 0.70% of the diet, respectively, with all other amino acids added as needed to meet minimum ratios relative to lysine (60% Ile; 58% Met and Cys; 65% Thr; 19% Trp; 72% Val). Overall, from d 0 to 43, there was an increase (quadratic, P< 0.020) in average daily gain (ADG) and average daily feed intake (ADFI) with pigs fed increasing levels of feed grade amino acids having the greatest gain and feed intake at the medium and high inclusion of feed grade amino acids, respectively. For overall gain:feed (G:F), pigs fed the medium level of feed grade amino acids had improved G:F (P=0.002) compared to pigs fed the high and very high feed grade amino acids with the pigs fed the low feed grade amino acids intermediate. In summary, feeding pigs medium levels of feed grade amino acids resulted in increased ADG and G:F during the late nursery and grower period.

Table 1. Effect of feed grade amino acid levels in late nursery and grower diets on growth performance[1]

	Feed grade amino acids					Probability, P =[2]		
Item[3]	Low	Medium	High	Very high	SEM	Treatment	Linear	Quadratic
BW, kg								
d 0	9.7	9.7	9.7	9.7	0.144	0.976	0.904	0.791
d 43	33.2	34.3	34.0	33.6	0.504	0.112	0.534	0.032
Overall								
ADG, g	537[b]	567[a]	560[ab]	553[ab]	9.649	0.043	0.204	0.020
ADFI, g	907[b]	944[ab]	974[a]	955[a]	17.301	0.002	0.001	0.016
G:F, g/kg	592[ab]	601[a]	575[b]	580[b]	4.537	0.002	0.005	0.752

[a,b]Means within a row with different superscripts differ ($P < 0.05$).

[1]A total of 912 pigs were used in a 43-d study with 19 pigs per pen and 12 replications per treatment.

[2]Linear and quadratic was measured based on % intact vs % feed grade lysine.

[3]BW = body weight; ADG = average daily gain; ADFI = average daily feed intake; G:F = gain to feed ratio.

Keywords: amino acids, crude protein, pig

PSIV-15 Influence of Particle Size of Enogen Feed Corn and Conventional Yellow Dent Corn on Lactating Sow Performance.

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A total of 107 sows (Line 241; DNA, Columbus, NE) across 4 batch farrowing groups were used to evaluate the effects of corn source and particle size on sow and litter performance. Treatments were arranged in a 2×2 factorial with main effects of corn source (Enogen® Feed corn (Syngenta Seeds, Downers Grove, IL) or conventional yellow dent corn) and ground corn particle size (600 or 900 µm). Sows were blocked by parity and BW upon arrival to the farrowing house. There were approximately 27 sows per treatment, sow was considered the experimental unit, dietary treatment was a fixed effect, and sow group and block were used as random effects. Main effects of corn source and particle size as well as their interactions were tested. From farrowing to weaning, there was a tendency for a source×particle size interaction (P=0.065) for sow BW change. Sows fed 900 µm Enogen Feed corn had decreased BW loss compared to sows fed other treatments which were similar in BW loss. There was a source×particle size interaction (P=0.048) for lactation ADFI with sows fed 900 µm conventional yellow dent corn having lower feed intake than the sows fed 600 µm conventional yellow dent corn, whereas sows fed 900 µm Enogen Feed corn had greater feed intake compared to the sows fed 600 µm Enogen Feed corn. There was a tendency for a particle size main effect (P<0.10) for litter ADG (2,849 vs 2,635 g/d) and total litter gain (45.7 vs 42.3 kg), with sows fed corn ground to 600 µm having increased litter ADG and total litter gain compared to sows fed corn ground to 900 µm. In summary, there were few differences in sow or litter characteristics among corn sources. Reducing particle