

Impact of Zinc Source and Timing of Implementation on Grow-finish Performance, Carcass Composition and Locomotion Score

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Summary and Implications

Interest in organic mineral sources continues in the pig industry. In this experiment, a zinc amino acid complex was evaluated in a total of 528 pigs, assigned to 48 pens and to one of 4 dietary treatments: A) 50 ppm zinc above that provided in the trace mineral premix as ZnSO₄ during phases 1 through 5; in phase 5, ractopamine was included at 2.5 g/ton for 2 weeks, followed by 7.2 g/ton until the pigs were shipped to market, B) similar to Trt A, except ractopamine was not included in phase 5, C) similar to Trt A, except that Availa-Zn 100 was fed in place of ZnSO₄ in phase 1 through 5 and D) similar to Trt C except that the Availa-Zn 100 replaced ZnSO₄ only in phases 3, 4 and 5. Pigs fed Trt C and D (with Paylean) grew faster than pigs fed Trt B (no Paylean) and pigs fed Trt C also grew faster than the pigs fed Trt A (P<0.05). There were no differences in feed intake among Trt B, C and D, but the pigs receiving Trt C and D (Paylean and Avail-Zn) ate more feed than the pigs receiving Trt A (Paylean but no Avail-Zn; P < 0.05) suggesting Avail-Zn mitigated reduced feed intake associated with Paylean. Trt A, C and D (with Paylean) pigs had the same feed efficiency but better feed efficiency than Trt B (no Paylean) pigs (P < 0.05). Locomotion score conducted at first pull was best for Trt B pigs (no Paylean and zinc sulphate) (P < 0.10), while Trt A pigs (Paylean and zinc sulphate) had the poorest locomotion score (P < 0.10); Trt C and D pigs (Paylean and Avail Zn) earned intermediate scores. Pigs fed Paylean (A, C and D) were leaner (P>0.10). We concluded from this experiment that zinc amino acid complex shows promise in enhancing the response of pigs to Paylean.

Introduction

Margins in pork production are under constant pressure, and indications suggest that this trend will continue in the long term. Consequently, pork producers are aggressive in their search for new technology which will provide benefit to them, in terms of improved overall pig performance, carcass quality or health.

Organic trace minerals are one technology that has received considerable attention in the past decade. The exact mode of action remains elusive, but improvements in animal performance have been observed in response to the use of these products.

AvailaZn is a product sold by Zinpro. It has been hypothesized that Availa-Zn may provide benefit to pigs when they are fed ractopamine, a β -agonist growth promoter. The objective of this experiment was to determine if Availa-Zn would provide benefit throughout the growout period, and especially in the presence of ractopamine.

Materials and Methods

A total of 528 pigs were used for this experiment and assigned to 48 pens of 11 pigs each, providing 12 pens and 132 pigs per treatment. The experiment was divided into a 5 phase feeding program, with 4 experimental treatment regimes. Treatment A involved feeding 50 ppm zinc above that provided in the trace mineral premix as ZnSO₄ during phases 1 through 5; in phase 5, ractopamine was included in the diet at 2.5 g/ton for 2 weeks, followed by 7.2 g/ton until the pigs were shipped to market. Treatment B was similar to Treatment A, with the exception that ractopamine was not included in the phase 5 diet. Treatment C was similar to Treatment A, with the exception that Availa-Zn 100 was fed in place of ZnSO₄ in phases 1 through 5. Treatment D was similar to Treatment A, with the exception that the Availa-Zn 100 replaced ZnSO₄ only in phases 3, 4 and 5. All animals were scored for locomotion 1-2 days before the first pull using the First Fleet Locomotion Scoring system. Data were analyzed as a randomized complete block design with pen as the experimental unit. Analysis of variance was performed using the MIXED procedure of SAS.

Results and Discussion

On the basis of the average daily gain, the pigs receiving Availa-Zn 100 and ractopamine (C & D) grew faster than the pigs on ZnSO₄ and no ractopamine (B). The pigs on Availa-Zn 100 for all 5 phases of the experiment and receiving ractopamine (C) grew faster than the pigs receiving ZnSO₄ and ractopamine (A; P < 0.05). There was no difference in growth rate between the pigs receiving the Availa-Zn 100 in phases 3 through 5 and ractopamine (C) and the pigs receiving ZnSO₄ and ractopamine (A; P > 0.05).

The situation was slightly different in terms of average daily feed intake. The pigs receiving Availa-Zn 100 and ractopamine (C & D) ate more feed than the pigs receiving ZnSO₄ and ractopamine (A; P < 0.05). The feed efficiency data reflected somewhat similar responses as average daily gain.

The pigs that did not receive the ractopamine (B) had the best score, which was not significantly different from the pigs receiving both ractopamine with Availa-Zn 100 (C & D; P < 0.10). The pigs receiving the ZnSO₄ and

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ractopamine had the poorest locomotion score ($P < 0.10$). There was no impact of dietary treatment on carcass value, carcass weight, lean premium or yield ($P > 0.10$). Pigs on ractopamine had less fat than pigs not receiving ractopamine, although the difference in pigs on treatment D was the only one that was significant ($P < 0.05$). The same result occurred with loin depth. Pigs receiving treatments C and D, eg receiving Availa-Zn 100, had heavier carcasses

than pigs on treatments A and B, eg receiving $ZnSO_4$ ($P < 0.05$).

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Table 1. Summary of performance on the experimental treatments.

	Treatments				SEM
	A	B	C	D	
No. Pigs					
- Start	132	132	131	132	
- End	129	130	130	131	
No. Pens	12	12	12	12	
Weights, kg					
- Initial	25.1	25.2	25.3	25.2	1.3
- Final	124.8 ^a	123.9 ^a	127.0 ^b	127.2 ^b	1.1
No. days	111.9	112.4	110.5	112.3	2.1
Ave. Gain, kg/d	0.89 ^{ab}	0.87 ^a	0.92 ^c	0.90 ^{bc}	0.01
Ave. Feed Intake, kg/d	2.42 ^{ay}	2.47 ^{abz}	2.50 ^{bz}	2.49 ^{bz}	0.03
Gain:Feed	0.37 ^b	0.35 ^a	0.37 ^b	0.36 ^b	0.004

^{abc} means within a row with different superscripts differ $P < 0.05$

^{yz} means within a row with different superscripts differ $P < 0.10$

A: 50 ppm zinc above that provided in the trace mineral premix as $ZnSO_4$ during phases 1 through 5; in phase 5, ractopamine was included at 4.5 g/ton for 2 weeks, followed by 6.5 g/ton until the pigs were shipped to market. B: similar to Treatment A, except ractopamine was not included in phase 5, C: similar to Treatment A, except that Availa-Zn 100 was fed in place of $ZnSO_4$ throughout; D: similar to Treatment C except that the Availa-Zn 100 replace $ZnSO_4$ in phases 3, 4 and 5.

Table 2. Locomotion scoring of pigs according to dietary treatment.

	Treatments				SEM
	A	B	C	D	
First Score					
No. of pigs	129	130	130	131	
No. of pens	12	12	12	12	
Ave score	0.31 ^z	0.19 ^y	0.22 ^{yz}	0.23 ^{yz}	0.04

^{xyz} means within a row with different superscripts differ, $P < 0.10$