High Fortification of B Vitamins for Increased Grow-Finish Performance of Pigs

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Summary and Implications

The addition of niacin, pantothenic acid, riboflavin, and B-12 fortified at 500 % over the Iowa State University (ISU) Life Cycle Nutrition recommended levels did not significantly improve production parameters in grow-finish (G-F) pigs. Therefore, a commercial vitamin premix formulated to supply niacin, pantothenic acid, riboflavin, and B-12 in a grow-finish diet at the ISU Life Cycle Nutrition recommended levels would be sufficient for maximizing pig performance.

Introduction

This demonstration project was designed to show if a 500 % increase in niacin, pantothenic acid, riboflavin, and B-12 over recommended industry levels would improve the grow-finish performance of pigs. Previous studies done at Iowa State University (ISU) indicated increased pig performance with the high fortification of niacin, pantothenic acid, riboflavin, and B-12 over the levels as recommended by the National Research Council (NRC). However, for this demonstration trial the high fortification of the selected B vitamins at the 500 % level was based on the normal B vitamin recommendations of the ISU Life Cycle Nutrition guidelines for the various phases in the grow-finish feeding period. Therefore, could a swine producer provide a very high fortified diet containing these selected B vitamins to increase the grow-finish pig performance?

Materials and Methods

This demonstration trial consisted of two replications that were conducted in a 100-head room of a modern double curtain finishing facility at Kirkwood Community College (KCC) in Cedar Rapids, IA. There were three pens on each side of the room, one side was fed the normal KCC grow-finish diet (control) and the other side was fed the B vitamin-fortified diet (B - Vit) of 500 % over the normal KCC diet for niacin, pantothenic acid, riboflavin, and B-12. The diets fed to both treatment groups were identical except for the elevated level of the four B vitamins (Tables 1 and 2). A B vitamin premix in a corn carrier supplied the additional niacin, pantothenic acid, riboflavin, and B-12 for the B vitamin treatment diets. All diet phases were analyzed for moisture, crude protein, calcium, phosphorus, and lysine. The levels of inclusion of the four B vitamins for both the control and B vitamin treatment groups were analyzed in phase 4 and 5 diets for trial one and only phase 4 for trial two. Treatments over the two replications were assigned to each side of the room. Trial one was Segher sired pigs from a Yorkshire x Landrace (YxL) sow base with 44 mixed sexed pigs on the control diet and 45 pigs on the B vitamin diet. Trial two was PIC sired pigs from a YxL sow base with 49 pigs in each treatment group. All pigs were allotted to treatments by sex, litter, and weight. Pigs were ear tagged and then group weighed every week. Individual pig weights were taken every two weeks. All pigs were real-time ultrasound scanned before marketing by an NSIF certified technician.

Results and Discussion

There was no significant difference between any of the parameters in comparing the control pigs to the B vitamin fed pigs. Similar growth rates, feed efficiency, and scanning data were evident between the control and B vitamin pigs (Table 3). A combined total of 72 control pigs and 70 B vitamins pigs were harvested to compare kill sheet data. There was no difference observed in any of the carcass traits (Table 3). Analysis of the diets indicated acceptable levels in both the control and B vitamin diets for niacin, pantothenic acid, riboflavin, and B-12 as well as for the moisture, crude protein, lysine, calcium, and phosphorus. Because of the additional cost of the B-vitamin fortification, the feed cost per pound of gain was slightly higher for the B vitamin pigs. Consequently, the control group gave a slight advantage for profitability.

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Table 1. Analysis for control and B-vitamin diets.

	Phase 1 65 to 90 lb	Phase 2 90 to 120 lb	Phase 3 120 to 155 lb	Phase 4 155 to 195 lb	Phase 5 195 to 240 lb
Crude protein, %	19.80	18.20	16.80	15.60	14.40
Lysine, %	1.07	0.96	0.87	0.78	0.70
Calcium, %	0.73	0.68	0.63	0.60	0.57
Phosphorus, available %	0.34	0.29	0.25	0.22	0.20

Table 2. Diet vitamin levels.

	Phase 1 65 to 90 lb		Phase 2 90 to 120 lb		Phase 3 120 to 155 lb		Phase 4 155 to 195 lb		Phase 5 195 to 240 lb	
	Control	B-Vit	Control	B-Vit	Control	B-Vit	Control	B-Vit	Control	B-Vit
Niacin, mg/lb	25	127	22	110	19	95	17	85	15	75
Pantothenic Acid, mg/lb	12	69	11	59	10	51	8	46	7	41
Riboflavin, mg/lb	3.9	21	3.4	18.1	3	15.6	2.7	14.1	2.4	12.6
B-12, mcg/lb	20	100	17	87	15	75	13	67	12	60

Table 3. Production data.

Item	Trial 1 Control	Trial 1 B-Vit	Trial 2 Control	Trial 2 B-Vit	Combined Control	Combined B-Vit
Number placed on test, hd	44	45	49	49	93	94
Average wt., lb	79.3	78.9	60.9	60.8	70.1	69.9
Number off trial, hd	44	43	47	47	91	90
Ave wt. off trial, lb	244.6	243.9	231.1	225.6	237.9	234.8
Feed efficiency, lb/lb gain	2.72	2.60	2.44	2.45	2.58	2.53
ADG, lb/day	1.97	1.96	1.87	1.81	1.92	1.89
Scanned backfat, in.	0.72	0.75	.61	0.59	0.67	0.67
Scanned LMA, sq. in.	7.25	7.06	6.46	6.42	6.86	6.74
Scanned per cent lean, %	55.06	54.26	54.42	54.96	54.74	54.61
LGOT, lb./day	0.8316	0.8112	0.7821	0.7661	0.8069	0.7887
Number harvested, hd	38	39	34	31	72	70
Ave. market wt., lb	257.2	255.7	243.4	241.2	250.3	248.5
Ave. wt. at plant, lb	242.1	242.2	235.0	234.0	238.6	238.1
Per cent shrink, %	5.87	5.30	3.45	2.99	4.66	4.15
Per cent yield, %	79.11	79.44	76.64	76.86	77.88	78.15
Backfat, in.	0.87	0.87	0.79	0.75	0.83	0.81
Loin depth, in.	2.40	2.40	2.24	2.20	2.32	2.30
% lean, %	52.4	52.2	52.7	53.0	52.6	52.6
Days on test	84	84	91	91	x	x