

SUPPLEMENTATION OF BIOTIN TO HARD RED WINTER WHEAT DIETS FOR BRED GILTS

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Story in Brief

Ninety nine bred crossbred gilts were allotted to two experimental treatments formed by feeding a hard red winter wheat (TAM-105 variety) - soybean meal diet with and without 400 mg of biotin per ton of feed. During lactation, all gilts were fed a yellow corn-soybean meal diet without biotin supplementation. No dietary treatment effects were observed for gestation gain; lactation loss; litter size at birth, 21 and 42 days; survival rate at 21 and 42 days; individual pig weight at birth, 21 and 42 days and litter weight at birth, 21 and 42 days. This study does not support the concept that biotin supplementation is efficacious for bred gilts consuming a wheat-soybean meal diet .

(Key Words: Swine, Biotin.)

Introduction

Research conducted by Luce et al. (1992) suggested that some decrease in reproductive performance may occur when gilts are fed hard red winter wheat during gestation as compared with those fed sorghum grain. One plausible explanation for this occurrence would be a biotin deficiency. The calculated value of the wheat-soybean meal based diet was .06 mg/lb while the suggested requirement for bred gilts and sows is .09 mg/lb of diet (NRC 1988). Although yellow corn is reported to be higher in biotin content than hard red winter wheat (NRC 1988), research by Lewis et al. (1991) suggested that supplemental biotin fed to bred sows on corn-soybean meal diets improved reproductive performance. A similar response was also reported by Bryant et al.(1985) for sows fed corn or soft red winter wheat diets. Thus a study was conducted to determine if biotin supplementation would improve reproductive performance of bred gilts fed hard red winter wheat diets.

Materials and Methods

A total of 99 crossbred gilts mated to crossbred boars were randomly allotted within four selection lines to two dietary treatments. The four composite lines were: 1) selection of boars for fast average daily gain under ad libitum feed; 2) selection of boars for fast average daily gain at 83% of

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predicted ad libitum intake; 3) selection of boars for slow average daily gain with ad libitum feed intake, 4) unselected control. The two experimental diets were a hard red winter wheat - (TAM-105 variety) soybean meal diet with and without 400 mg of biotin supplementation per ton of feed (Table 1).

The gilts were housed outside in dirt lots during gestation and group fed five pounds of feed per head daily. At day 110 of gestation, gilts were moved to individual confinement farrowing crates. Approximately 1 week after parturition each sow and litter were moved to a nursery facility and penned together until weaning at 42 days. Beginning at day 110 of gestation, all gilts were fed a common lactation diet (Table 1) at a rate of 4.5 lb per day until farrowing. After farrowing the gilts were self-fed the lactation diet for the 42 day lactation. Pigs had access to creep feed from 21 to 42 days of age.

Results and Discussion

Dietary treatment means on gestation gain; lactation loss; litter size at birth, 21 and 42 days; survival rate at 21 and 42 days; individual pig weight at birth, 21 and 42 days and litter weight at birth, 21 and 42 days are presented in Table 2. Since no significant diet X line interactions were observed for any of the traits measured, data are reported for dietary treatment means only.

Dietary biotin supplementation did not significantly affect any of the traits measured. These results are not in agreement with data reported by Lewis et al. (1991) who reported that 300 mg of biotin per ton of feed fed to first litter gilts and multiple parity sows (overall average parity of 2.8) on corn-soybean meal type diets resulted in larger litter size at 21 days. Bryant et al. (1985) also reported that supplementation of 400 mg of biotin per ton of feed in yellow corn or soft winter wheat diets for bred sows resulted in increased total and live pigs per litter at birth for females after the first parity.

Data from this study are in agreement with the research reported by Watkins et al. (1991). These scientists reported that supplementation of 400 mg of biotin per ton of feed in a corn-soybean meal diet for bred gilts or sows had no beneficial effect on number of pigs born, number and percentage of pigs born alive or number of pigs alive at 21 days.

This study does not support the concept that biotin supplementation is of benefit in hard red winter wheat diets for bred gilts. The calculated value of biotin in the control diet of this experiment was only .06 mg/lb of diet, while (NRC 1988) suggest the requirement to be .09 mg/lb for breeding swine.

Literature Cited

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Table 1. Composition of experimental diets.

Ingredients	Gestation	Gestation	Lactation
	Control	+ Biotin	
	%	%	%
Wheat ^a	83.95	83.65	—
Yellow corn	—	—	75.65
Soybean meal, 44%	11.25	11.30	19.50
Calcium carbonate	1.00	1.00	.95
Dicalcium phosphate	2.05	2.05	2.15
Salt	.50	.50	.50
Vitamin-trace mineral mix ^b	.25	.25	.25
CTC-10 ^c	1.00	1.00	1.00
Biotin premix ^d	—	.25	—
Total	100.00	100.00	100.00
Calculated composition			
Metabolizable energy, kcal/lb	1402	1402	1457
Crude protein, %	15.19	15.20	15.24
Lysine, %	.65	.65	.75
Calcium, %	.91	.91	.91
Phosphorus, %	.70	.70	.70
Biotin, mg/lb	.06	.16	.11

^a Hard red winter wheat, TAM 105 variety.

^b Supplied 5,000,000 IU vitamin A, 500,000 IU vitamin D, 5 gm riboflavin, 22.50 gm pantothenic acid, 35 gm niacin, 125 gm choline chloride, 25 mg vitamin^B12, 30,000 IU vitamin E, 3.3 gm menadione, 270 mg iodine, 90 gm iron, 18 gm manganese, 9 gm copper, 90 gm zinc and 270 mg selenium per ton of feed.

^c 10 gm of chlorotetracycline per lb of premix.

^d 40mg of biotin per lb of premix.

Table 2. The effects of supplemental biotin to wheat based diets for gestating gilts.*

Item	Treatments	
	(1) Control	(2) Control + Biotin
No. of gilts	51	49
Wt at breeding, lb	313.70	314.20
Gestation gain, lb	153.00	156.00
Lactation loss, lb	92.00	96.20
Litter size		
Birth	9.21	9.09
21 days	7.60	7.44
42 days	7.55	7.37
Survival rate, %		
Birth to 21 days	82.50	81.80
Birth to 42 days	82.00	81.10
Pig wt		
Birth, lb	3.45	3.44
21 days, lb	12.47	12.14
42 days, lb	24.09	23.52
Litter wt		
Birth, lb	31.51	30.82
21 day, lb	93.58	89.70
42 day, lb	178.71	171.68

*Treatment means did not differ ($P > .40$).