

# THE EFFECT OF VIRGINIAMYCIN ON PERFORMANCE AND CARCASS COMPOSITION OF SWINE

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## Story in Brief

A trial involving a total of 60 littermate pairs of Yorkshire barrows and gilts in two replicates was conducted to determine the effect of virginiamycin on gain, intake, efficiency of gain and carcass composition. Average daily gain was improved by 10 percent during the growing period, by 1.6 percent during the finishing period and by 4.5 percent for the overall growing-finishing period when compared to pigs receiving the non-medicated control diet. A similar trend was observed for increased feed intake in pigs fed virginiamycin. Feed efficiency of pigs fed virginiamycin or the non-medicated control diet was similar during both the growing and finishing periods. Carcass composition with the exception of backfat thickness was not affected by the inclusion of virginiamycin in the diet.

## Introduction

Virginiamycin is commonly fed to swine in the U.S. to increase gain and efficiency of gain. At least three modes of action have been suggested for these phenomena. These are a metabolic effect, a disease control effect and a nutrient sparing effect. Although it is possible that a part of the antibiotic response could be through a direct affect on the metabolic processes in the host animal including a shift in the partitioning of energy from fat to lean tissue synthesis, research in this area has been limited.

Preliminary research (Berthelsen, J.D., 1981) indicated that Stafac, a product of SmithKline corporation, decreases backfat and increases percent muscle when fed at the rate of 10 grams per ton of complete ration to growing and finishing pigs. This study was conducted to determine the effect of virginiamycin on gain, feed efficiency and carcass composition of littermate pairs of growing-finishing swine.

## Experimental Procedures

A total of 60 littermate pairs of Yorkshire barrows and gilts in two replicates were allotted to two treatments consisting of either a negative control diet or a diet containing 10 grams of virginiamycin per pound during the growing and finishing period (Table 1). A 0.75 percent lysine corn-soybean meal ration was fed to all pigs during the growing period (51 to 120 lb) and the lysine was reduced to 0.62 percent during the finishing phase (120 to 230 lb). Pigs were housed in solid concrete floored pens containing self-feeders and nipple waterers with 6 pens of 10 pigs in each replicate. The ratio of barrows to gilts was maintained constant across pens. Pigs were slaughtered at approximately 230 pounds and carcass weight, backfat at the 10th rib, and longissimus muscle area were determined. From these data, the percent muscle was calculated

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**Table 1. Composition of experimental rations**

Ingredient	Growing %	Finishing %
Corn, ground	77.60	82.56
Soybean meal, 44%	19.13	14.36
Dicalcium phosphate	1.70	1.52
Calcium carbonate	0.82	0.81
Salt	0.50	0.50
Vitamin-trace mineral mix <sup>a</sup>	0.25	0.25
Sta ac <sup>R</sup> (1 g virginiamycin/lb) <sup>b</sup>	---	---
Total	100.00	100.00
Lysine, %	.75	.62
Calcium, %	.75	.70
Phosphorus, %	.65	.60

<sup>a</sup>Supplied 4,000,000 IU vitamin A, 300,000 IU vitamin D, 4 g riboflavin, 20 g pantothenic acid, 30 g niacin, 800 g choline chloride, 15 mg vitamin B<sub>12</sub>, 10,000 IU vitamin E, 2 g menadione, 200 mg iodine, 90 g iron, 20 g manganese, 10 g copper, 90 g zinc and 100 mg selenium per ton of feed.

<sup>b</sup>SmithKline Animal Health Products, Philadelphia, PA; supplied 10 g/lb of virginiamycin per ton of feed for the treated littermate pair during both the growing and finishing periods.

using procedures outlined by the National Swine Improvement Federation (Hubbard, 1981).

### Results and Discussion

Results for the growing, finishing and combined growing-finishing periods are presented in Tables 2, 3 and 4 respectively. Average daily gain for pigs receiving virginiamycin was improved by 10 percent ( $P < .01$ ) during the growing period, by 1.6 percent during the finishing period and by 4.5 percent ( $P < .08$ ) for the overall growing-finishing period when compared to pigs receiving the non-medicated control diet. Average daily feed intake followed a pattern similar to that observed for average daily gain with pigs fed virginiamycin consuming more feed during the growing ( $P < .1$ ), finishing and combined growing-finishing periods although these differences approached significance only during the growing period. Feed efficiency of pigs fed virginiamycin or the non-medicated control diet was similar during both the growing and finishing periods.

The response of improved performance in pigs fed virginiamycin is generally consistent with numerous other reports. Other studies at OSU (Maxwell et al., 1981) indicated that pigs fed virginiamycin grew 6 percent faster ( $P < .05$ ) and were 4 percent ( $P < .1$ ) more efficient than pigs fed a non-medicated control diet during the growing period.



Table 2. Swine performance and feed intake during the growing period

Virginiamycin	Antibiotic level g/ton	
	0	10
Pigs per treatment, no	58	58
Pens per treatment, no	6	6
Avg initial wt, lb	51.8	52.1
Avg final wt, lb	120.4	120.9 <sup>b</sup>
Avg daily gain, lb	1.59 <sup>a</sup>	1.75 <sup>b</sup>
Avg daily feed intake, lb	4.34 <sup>c</sup>	4.60 <sup>d</sup>
Feed per lb gain, lb	2.70	2.62

<sup>a,b</sup>Means in the same row with different superscripts differ (P<.01).

<sup>c,d</sup>Means in the same row with different superscripts differ (P<.10).

Table 3. Swine performance and feed intake during the finishing period

Virginiamycin	Antibiotic level g/ton	
	0	10
Pigs per treatment, no	58	58
Pens per treatment, no	6	6
Avg initial wt, lb	120.4	120.9
Avg final wt, lb	230.2	230.9
Avg daily gain, lb	1.89	1.92
Avg daily feed intake, lb	6.10	6.36
Feed per lb gain, lb	3.40	3.50

The effect of virginiamycin on carcass composition is presented in Table 4. Neither carcass weight, longissimus muscle area, percent muscle nor carcass length was affected by dietary treatment. Adjusted backfat at the 10th rib, however, was higher in pigs fed virginiamycin than in pigs fed the non-medicated control diets. It is interesting to note that backfat thickness at the 10th rib increased only .03 inches in gilts but increased by .14 inches in barrows. This resulted in a sex by treatment interaction which approached significance (P<.1). This is consistent with our previous observation (Maxwell et al., 1981) that faster growing antibiotic-fed pigs had a higher backfat thickness than pigs fed the non-medicated control diet. This study suggests that the mechanism by which virginiamycin improves gain and efficiency of gain does not involve alterations of carcass composition.

**Table 4. The effect of virginiamycin on swine performance during the growing-finishing period and carcass composition**

Item	Virginiamycin level g/ton	
	0	10
Pigs per treatment, no	58	58
Pens per treatment, no	6	6
Avg initial wt, lb	51.8	52.1
Avg final wt, lb	230.2	230.9
Performance		
Avg daily gain, lb	1.76 <sup>c</sup>	1.85 <sup>d</sup>
Avg daily feed intake, lb	5.37 <sup>a</sup>	5.65 <sup>b</sup>
Feed per lb gain, lb	3.13	3.16
Carcass Measurements		
Adj carcass wt, lb	167.06	168.23
Adj longissimus muscle area, sq in	4.25	4.22
Adj backfat at 10th rib, in	1.06 <sup>a</sup>	1.15 <sup>b</sup>
Adj muscle, %	51.99	51.02
Adj length, in	33.7	33.3

<sup>a,b</sup>Means in the same row with different superscripts differ (P<.01).

<sup>c,d</sup>Means in the same row with different superscripts differ (P<.05).

#### Literature Cited

- Berthelsen, J.D. 1982. Proc. G. A. Young Conference, Lincoln, Nebraska: 25-32.
- Maxwell, C.V. et al. 1981. M.P. 112:235-240.
- Hubbard, A.D. 1981. Guidelines for Uniform Swine Improvement Programs. U.S.D.A. Science and Education Administration. Program Aid 1157.