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THE EFFECT OF SELENIUM ON PIGS OF DIFFERENT HAIR COLOR

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It has been suggested that levels of certain trace elements in hair may be associated with the dietary intake of the element. High levels of selenium in the diet have been shown to increase hair selenium in swine and also in cattle. The possibility that the degree of selenium toxicity is related to hair color has been proposed for cattle, horses and swine.

This study was conducted to determine if storage of selenium in the hair of pigs varied with their color and also to determine if hair color was related to degree of selenium toxicity.

Experimental Procedure

Ten black, 10 red and 10 white pigs, approximately 5 to 6 weeks of age were used in this study. The black pigs were out of crossbred dams and a Chester White sire; however, five of the 10 pigs had typical Hampshire white-belt markings. White pigs were also out of crossbred dams but were sired by boars from three breeds - Chester White, Duroc and Hampshire. The red pigs were purebred Durocs. A 20% protein corn-soybean meal supplemented diet was fed to two pigs of each color pattern. The remaining eight pigs of each color were fed this same diet supplemented with sodium selenite to provide about 8 ppm of selenium. Pigs were housed in an environmentally regulated building with feed and water provided ad libitum during the 35 day experiment.

Hair samples were obtained from all pigs at the beginning and termination of the experiment and analyzed for selenium content. Blood samples were obtained at the end of the experiment for selenium analysis.

Results

Rate of gain, selenium content of hair and blood selenium levels of black, red and white haired pigs are shown in table 1. There were no significant differences among the three hair colors in gain, hair selenium or blood selenium level when pigs were fed the control diet. However, when the diet containing 8 ppm of selenium was fed the rate of gain of red pigs was significantly reduced compared to black or white pigs. Red pigs

were also more severely affected by dietary selenium as four of the eight red pigs exhibited selenium toxicity symptoms. Two of the pigs developed posterior paralysis and two pigs developed a separation of the hooves at the coronary band. None of the black pigs or white pigs showed any external signs of selenium toxicity. Weight gains of black or white pigs fed the selenium diet were similar. However, the gains were somewhat less than that of the black pigs and white pigs fed the control diet.

Table 1. Results of Dietary Selenium on Pigs of Different Hair Color

Item	Black	Color of hair	
		Red	White
		<u>Control Diet</u>	
Avg initial wt, lb	20.2	18.0	20.7
Avg daily gain, lb	1.45	1.03	1.28
Initial selenium in hair, ppm	.65	.83	.74
Final selenium in hair, ppm	.98	1.08	1.15
Selenium in blood, ppm	.20	.19	.18
		<u>Selenium Diet</u>	
Avg initial wt, lb	19.9	18.2	20.2
Avg daily gain, lb ^a	1.06	.37	1.12
Initial selenium in hair, ppm	1.02	.62	.68
Final selenium in hair, ppm ^a	12.2	3.7	10.5
Selenium in blood, ppm	1.8	1.8	1.8

^a Red significantly different from black or white (P<.01).

Adding 8 ppm of selenium to the diet resulted in an increase in the selenium content of hair. The initial selenium content of hair was approximately .75 ppm, with no difference among colors. At the final sampling, hair selenium varied from 3.7 ppm in red hair to 10.5 and 12.2 ppm in white and black hair, respectively. The selenium content of red hair was significantly less than that of black or white hair.

Blood selenium level increased when selenium in the diet increased. However, there were no relationships between blood selenium level and hair color or selenium toxicity signs.

Summary

Young weaned pigs of three colors, black, red or white, were fed diets containing 8 ppm of selenium for five weeks to study the relationship of hair color to selenium content of hair and selenium toxicity in swine. The results indicate that growth rate is the most sensitive index of selenium toxicity in swine and that red pigs are more susceptible to selenium toxicity than black or white pigs. It was also shown that the selenium content of hair is influenced by dietary selenium level but that hair color is also related to hair selenium level. Red hair contained less selenium than black or white hair. Blood selenium levels reflected dietary selenium levels but did not reflect the differences in selenium toxicity signs observed in pigs of different colors.