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A COMPARISON OF THREE METHODS OF IRON ADMINISTRATION
IN PREVENTING BABY PIG ANEMIA

R. D. Magstadt, R. W. Seerley and R. C. Wahlstrom

Baby pig anemia is a serious nutritional disease. It is primarily due to a lack of iron in the diet of the young pig.

Pigs are born with very little stores of iron in their bodies. Also, sow's milk does not contain enough iron to meet the pig's requirements. Therefore, young pigs which subsist on milk alone commonly become anemic at about three weeks of age. The fastest growing pigs are the first to show symptoms because they require more of this essential nutrient. Symptoms of anemia are: (1) respiratory difficulties shown by thumping of sides, (2) paleness of skin, (3) emaciation, and (4) roughness of the hair.

There are many methods available to prevent anemia in young pigs. The most common methods that have been used are: (1) iron injection given intramuscularly, (2) providing clean soil in the corner of the pen, (3) painting sows' udders with cupric sulfate paste, (4) giving iron orally, by mouth in the form of pills, (5) licking devices, and (6) compounds mixed into the drinking water.

The objectives of the trials reported here were to measure the relative effectiveness of an intramuscular iron dextrin compound, a ferrous choline citrate compound added at four different levels in the drinking water and a ferrous fumerate pellet implanted intramuscularly for the prevention of iron deficiency anemia.

Experimental Procedure

A total of 505 Hampshire, Yorkshire and Duroc pigs were used in this experiment. All pigs were raised in farrowing crates with their dam, and water was provided ad libitum. Birth weight, 5 week weaning weight and percent survival records were kept on all pigs. All pigs were bled at three days of age prior to treatment, at 2 weeks of age and at 5 weeks of age. Hemoglobin and hematocrit levels were determined from the blood samples.

The experimental treatments were:

1. Iron dextrin intramuscular injection of 200 mg. of elemental iron
2. Ferrous fumerate pellets implanted under skin of neck (4 pellets each contained 62 mg. of iron)
3. Ferrous choline citrate in drinking water - 15 gm./gal. of water (1500-1650 mg. available iron/gal.)
4. Ferrous choline citrate - 10 gm./gal. of water (1000-1100 mg. available iron/gal.)
5. Ferrous choline citrate - 5 gm./gal. of water (500-550 mg. available iron/gal.)
6. Ferrous choline citrate - 1 gm./gal. of water (100-110 mg. available iron/gal.)
7. Control - no supplemental iron

The iron injection and pellet implants were given at three days of age and ferrous choline citrate supplementation in the water was started on day three and given through day thirteen.

Results

A summary of the three trials is shown in table 1. The pigs given intramuscular iron injections and those given pellet implants had higher hemoglobin and hematocrit values, heavier 35 day weights and a higher percentage of survival than the control pigs or those given iron at a low level in the drinking water. Pigs receiving 10 or 15 grams of ferrous choline citrate had weaning weights similar to those pigs that received iron by implanted pellets or intramuscular injections. The level of hemoglobin and hematocrit did decrease, however, and percent survival was reduced.

Table 1. Effects of Three Methods of Iron Administration
in Preventing Anemia of Pigs

	Control	Ferrous choline citrate				Pellet implant	Iron injection
		1 gm.	5 gm.	10 gm.	15 gm.		
Birth wt., lb.	2.7 (35) ^a	2.8 (34)	2.8 (69)	2.8 (77)	2.8 (100)	2.7 (89)	2.7 (101)
Weaning wt., lb.	19.2 (28)	16.1 (30)	19.6 (58)	21.9 (65)	21.1 (83)	22.2 (80)	20.9 (92)
% survival	80.0	88.2	84.1	84.4	83.0	89.9	91.1
3 days prior treatment							
Hemoglobin, gm. %	8.9	8.4	8.6	8.8	9.1	9.4	9.4
Hematocrit, gm. %	28.6	30.8	30.4	31.0	31.3	29.3	31.5
14 days							
Hemoglobin, gm. %	7.5	7.7	8.3	8.8	9.1	10.1	9.9
Hematocrit, gm. %	25.8	24.3	29.3	30.4	32.0	32.2	33.5
35 days							
Hemoglobin, gm. %	7.0	7.3	8.3	8.9	9.3	11.1	10.8
Hematocrit, gm. %	23.2	24.9	32.3	35.5	35.5	36.3	37.2

^a () Number of pigs in each group average.

It was noticed in a high percentage of the litters, and especially large litters, that there was considerable variability of efficiency of the ferrous choline citrate in water at all levels. This was especially true of the lower levels. For an unknown reason one or two pigs in a big litter apparently would not drink enough water to prevent them from becoming anemic.

One gram of ferrous choline citrate in the drinking water was not enough to maintain adequate hemoglobin and hematocrit levels. Five grams per gallon of water did keep the pigs from showing clinical symptoms of anemia, but when blood samples were taken hemoglobin and hematocrit levels were lower than both injection methods and the 10 and 15 gm. level in water.

The control group which received no form of iron supplementation had a very high incidence of clinical symptoms of anemia. The pigs showed symptoms of anemia as was witnessed by a rough hair coat, slow growth, heaving or thumping of side and a pale skin color. The hemoglobin, hematocrit, 35 day weight and percent survival of the control pigs were very low.

This research illustrates that intramuscular iron dextrin injections, implants of iron-containing pellets and ferrous choline citrate supplied in the drinking water at the 10 and 15 gm. per gallon levels prevent anemia quite well. However, it appeared that the iron injection and the pellet implant method are more consistent and effective in preventing anemia.