Efficacy of Iron Proteinate Fed to Sows in Meeting the Iron Needs of Baby Pigs

David A. Schoneweis[1] and Gary L. Allee

Summary

Two trials involving 33 litters of pigs and more than 1,300 blood samples demonstrated that feeding iron proteinate (250 PPM) to the sows during the last one-third of gestation and lactation is not an effective way to supply the iron needs of baby pigs if they have limited access to the sows' fecal material.

Introdution

Baby pigs must be supplied with supplemental iron shortly after birth to prevent iron-deficiency anemia. The most common method of supplying supplemental iron is by iron injections. Although effective, that method is time consuming. Numerous studies have demonstrated that increasing the iron content of the sow's ration during gestation, with the hopes of increasing the iron stores of the baby pig or increasing iron content of sow's milk, is not a successful way to supply the baby pig's iron needs. Recently, swine researchers with a renewed interest in that approach, have been using a protein-iron chelated compound (iron proteinate).

We evaluated the effectiveness of adding iron proteinate (iron methionate) to the ration of sows during late gestation and lactation as a method of meeting the iron needs of baby pigs.

Experimental Procedures

Trial 1. Nineteen second-litter crossbred sows were randomly assigned to treatments 30 days before the first sow was to farrow. The basal (15% protein sorghum-soybean meal) ration contained these added trace-mineral levels (PPM): copper 10, iodine 3, iron 100, manganese 100, zinc 100. Iron proteinate was added to the basal ration to supply an additional 250 PPM iron. Sows were fed 4½ pounds per day during gestation and were fed the same ration ad libitum during lactation. Sows were farrowed in a totally slatted-floor farrowing house and were not removed from the stalls during the 28-day lactation. Sow fecal material was pushed through the slats once each day. Blood samples were taken from the pigs, to determine hemoglobin (Hb) and packed cell volume (PCV), within 24 hours after birth and then weekly for 4 weeks. Approximately two-thirds of the pigs in each litter received 150 mg. of iron intramuscularly after the initial bleeding and one-third of the pigs in each litter received no supplemental iron (negative controls).

Trial 2. Fourteen crossbred sows were randomly assigned to either the basal ration or the basal ration + 250 PPM iron from iron proteinate. Blood samples were obtained from the sows immediately post-farrowing and weekly for the next 4 weeks to determine the Hb and PCV. Management of

[1]Department of Surgery and Medicine.

sows and litters was identical to that of trial 1.

Results and Discussion

Feeding iron proteinate to sows during the last 30 days of gestation and during the 28-day lactation had no effect on pig weights at birth or 28-day weaning weights in either trial (tables 26 and 29). Similarly, feeding iron proteinate to sows during the last 30 days of gestation did not affect hemoglobin levels or packed cell volume of their pigs at birth, 1 weeks, 2 weeks, 3 weeks, or 4 weeks in either trial (tables 27 and 28). Pigs that did not receive supplemental iron (negative controls) became progressively anemic during the 28-day lactation, even though the pigs had access to the sows' feed. Supplementing the sows' rations with iron proteinate did not affect hemoglobin levels or packed cell volumes in the sows at farrowing or during the 28-day lactation period, as determined by samples collected weekly.

These trials demonstrate that feeding iron proteinate (250 PPM) to sows during gestation and lactation is not an effective method of supplying the iron needs of the baby pigs under the conditions of these experiments (limited access to sows' fecal material).

Table 26 . Effect of feeding iron proteinate to sows on pig birth and weaning weights (trial 1).

	No. litters	Litter size	Birth wt.,lbs.	Litter size at weaning	28-day weaning wt.,lbs.
Basal ration	12	11.5	3.1	8.0	13.6
Basal ration plus iron proteinate	7	9.1	3.1	7.1	14.3

Table 27 . Effect of feeding iron proteinate to sows on hemoglobin and packed cell volume of pigs (trial 1).

	Hemoglobin			
	150 mg. iron dextran		No iron injection	
	Basal ration	Basal ration + iron proteinate	Basal ration	Basal ration + iron proteinate
Birth	9.4	9.7	8.7	9.8
1 week	9.7	10.0	7.7	8.0
2 weeks	11.1	11.2	6.3	6.2
3 weeks	10.4	10.7	5.9	5.7
4 weeks	9.6	10.3	4.8	5.6
	Packed cell volume			
	150 mg. iron dextran		No iron injection	
	basal ration	Basal ration + iron proteinate	Basal ration	Basal ration + iron proteinate
Birth	28.0	29.5	27.2	30.2
1 week	30.3	31.9	24.0	24.9
2 weeks	34.7	36.6	20.5	21.9
3 weeks	33.5	35.5	20.0	21.5
4 weeks	33.7	33.8	19.0	20.9

Table 28 . Effect of feeding iron proteinate to sows on hemoglobin and packed cell volume of pigs (trial 2).

	Hemoglobin			
	150 mg. iron dextran		No iron injection	
	Basal ration	Basal ration + iron proteinate	Basal ration	Basal ration + iron proteinate
Birth	9.4	8.6	8.5	8.8
1 week	8.5	8.2	6.5	7.2
2 weeks	10.0	8.9	6.1	7.3
3 weeks	10.5	9.6	5.4	6.2
4 weeks	10.0	9.5	5.1	6.6

	Packed cell volume			
	150 mg. iron dextran		No iron injection	
	Basal ration	Basal ration + iron proteinate	Basal ration	Basal ration + iron proteinate
Birth	29.5	26.5	27.7	30.0
1 week	29.8	29.4	23.3	25.4
2 weeks	33.8	30.6	22.8	27.9
3 weeks	35.5	33.3	20.7	24.4
4 weeks	33.4	31.8	20.0	25.3

Table 29 . Effect of feeding iron proteinate to sows on birth and weaning weights (trial 2).

	No. litters	Litter size	Birth wt., lbs.	Litter size at weaning	28-day weaning wt.,lbs.
Basal ration	6	11.7	3.2	9.0	13.6
Basal ration plus iron proteinate	8	11.8	2.9	8.9	14.3

Table 30 . Effect of feeding iron proteinate to sows on hemoglobin and packed cell volume (trial 2).

	Packed cell volume		Hemoglobin	
Sow	Basal ration	Iron proteinate	Basal ration	Iron proteinate
Farrowing	32.8	31.7	10.2	11.1
1 week post-farrowing	33.8	31.8	11.3	9.8
2 weeks post-farrowing	29.2	28.1	9.4	9.3
3 weeks post-farrowing	30.8	31.3	9.6	9.9
4 weeks post-farrowing	28.0	31.8	9.2	10.0