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Feeding Pigs Trace Mineralized Salt

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The use of trace-mineralized salt along with equal parts of steamed bonemeal and ground limestone is recommended as a mineral supplement to be self-fed to growing-fattening pigs.

Since trace-mineralized salt only costs about one cent more per pound than common salt, it appears to be relatively cheap insurance against a possible deficiency of cobalt, copper, iodine, iron, manganese or zinc in the ration.

Feeding Pigs Trace-Mineralized Salt

RICHARD C. WAHLSTROM and R. F. WILSON[1]

THE USE of trace-mineralized salt in animal feeding has increased during recent years. Experimental work at several experiment stations has shown that the addition of the trace minerals, manganese, cobalt, iron, copper and iodine, to a ration will often improve growth and feed efficiency in swine. In these experiments trace minerals have been added directly to the mixed ration and have not shown the value of a trace-mineralized salt when included in a mineral mixture fed free choice. Although trace minerals may not always be needed, the simplest manner of adding them to a ration is to self-feed a mineral supplement containing trace-mineralized salt, as was done in the trials reported here.

The mineral content of pastures and feed crops depends on the mineral content of the soil and may be influenced by the variety of the crop. The effects of continuous cropping, soil erosion, development of new crop varieties, increase in the use of fertilizers and newer knowledge of the interrelationships between nutrients will have an influence on the amount of mineral supplement needed by farm animals. Therefore, it seemed wise to investigate the value of a trace-mineralized salt in a mineral supplement fed free choice to growing-fattening pigs.

The Experiment

This experiment consisted of two trials, the first conducted during the summer of 1951 and the second during the winter of 1953-54. The trace minerals present in the salts used in these two trials were manganese, cobalt, copper, iodine, iron and zinc.

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Table 1. Results of Substituting Trace-Mineralized Salt for Common Salt in a Simple Mineral Mixture for Growing-Fattening Pigs, First Trial, Summer 1951

Items Compared	Lot 1 Basal Plus Common Salt	Lot 2 Basal Plus Trace-Mineralized Salt
Number of pigs	15	15
Average number days on feed	111	110
Average initial weight, lbs.	49.7	49.4
Average final weight, lbs.	228.3	227.4
Average daily gain, lbs.	1.61	1.62
Average daily feed consumed, lbs.		
Shelled corn	5.06	5.16
Protein supplement[a]	0.86	0.73
Mineral mixture[b]	0.03	0.04
Total feed	5.95	5.93
Feed consumed per 100 lbs. of gain, lbs.		
Shelled corn	314.2	318.0
Protein supplement	53.4	45.1
Mineral mixture	2.1	2.2
Total	369.7	365.3

[a]Protein supplement: 42 parts soybean oil meal, 30 parts tankage (60 percent crude protein) and 28 parts ground alfalfa hay.
[b]Mineral mixture: 2 parts steamed bonemeal, 2 parts ground limestone and 1 part salt.

For the 1951 trial, 30 purebred pigs averaging almost 50 pounds in weight were allotted into two comparable lots of 15 pigs each according to litter, weight, breed and sex. The pigs were confined to concrete pens. Feed and water were offered free choice. Each pig was removed from the experiment as it reached a weight of approximately 225 pounds.

The basal ration of shelled yellow corn and a protein supplement was self-fed free choice. The protein supplement was composed of 42 parts of soybean oil meal, 30 parts of tankage (60 percent crude protein) and 28 parts of ground alfalfa hay. In addition, Lot 1 was self-fed a mineral mixture of 2 parts of steamed bonemeal, 2 parts of ground limestone and 1 part of common salt. A trace-mineralized salt replaced the common salt in the mineral mixture fed to Lot 2.

The second trial, conducted during the winter of 1953-54, differed from the first trial in that 100 weanling pigs were allotted into two replicates of two lots each. Thus each of the four lots contained 25 pigs. Two of these lots (one in each replicate) received common salt and the other two lots received trace-mineralized salt. The pigs were managed in a similar manner to that described for the first trial except that they were removed from the experiment at approximately 200 pounds. The ration differed in that the protein supplement was composed of 40 parts of soybean meal, 40 parts of tankage and 20 parts of ground alfalfa hay plus 60 grams of aureomycin[2] per ton. The mineral mixture was fed in a ration of equal

[2]Aurofac 2A supplied by Lederele Laboratories, Pearl River, New York.

parts of steamed bonemeal, ground limestone and salt. Trace-mineralized salt was fed to Lots 1 and 3 and common salt to Lots 2 and 4.

The Results

The results of the first trial are summarized in Table 1. During this trial the pigs made very satisfactory gains with good feed efficiency. However, there was essentially no difference in rate of gain between the two lots. Also, there was no practical difference in feed efficiency between the two lots, although Lot 2, which received the trace-mineralized salt, consumed 8.3 pounds less protein supplement while consuming only 3.8 pounds more corn.

A summary of the results of the second trial is given in Table 2. Though the differences in average gains between the two treatments were small, the trend was quite similar in each replicate. The lots of pigs fed the trace-mineralized salt gained faster than those fed common salt in their mineral mixture. This average difference of 0.09 pound per day faster gain was reflected in a shortening of the feeding period by five days.

The amount of feed required to produce each 100 pounds of gain was very similar in one replicate and slightly in favor of the lot receiving added trace minerals in the other replicate. These differences were small and are no doubt due to chance.

The average total amount of mineral supplement consumed by the

Table 2. Results of Substituting Trace-Mineralized Salt for Common Salt in a Simple Mineral Mixture for Growing Fattening Pigs, Second Trial, Winter 1953-54

	Replicate 1		Replicate 2		Average Rep. 1 & 2	
	Lot 1	Lot 2	Lot 3	Lot 4		
Items Compared	Basal Plus Trace-Mineralized Salt	Basal Plus Common Salt	Basal Plus Trace-Mineralized Salt	Basal Plus Common Salt	Basal Plus Trace-Mineralized Salt	Basal Plus Common Salt
Number of pigs	24[a]	25	25	25	49	50
Average number days on feed	108	114	114	118	111	116
Average initial weight, lbs.	33.7	33.5	36.8	36.8	35.3	35.2
Average final weight, lbs.	205.9	202.6	203.8	202.1	204.9	202.4
Average daily gain, lbs.	1.59*	1.49	1.47	1.40	1.53*	1.44
Average daily feed consumed, lbs.						
Shelled corn	5.05	4.71	4.32	4.33	4.69	4.52
Protein supplement[b]	0.74	0.65	0.68	0.68	0.71	0.67
Mineral mixture[c]	0.05	0.05	0.06	0.05	0.06	0.05
Total feed	5.84	5.41	5.06	5.06	5.46	5.24
Feed consumed per 100 lbs. of gain, lbs.						
Shelled corn	318.1	317.0	293.9	308.1	306.0	312.6
Protein supplement	46.7	44.0	46.3	48.5	46.5	46.3
Mineral mixture	3.1	3.1	3.8	3.4	3.4	3.2
Total	367.9	364.1	344.0	360.0	355.9	362.1

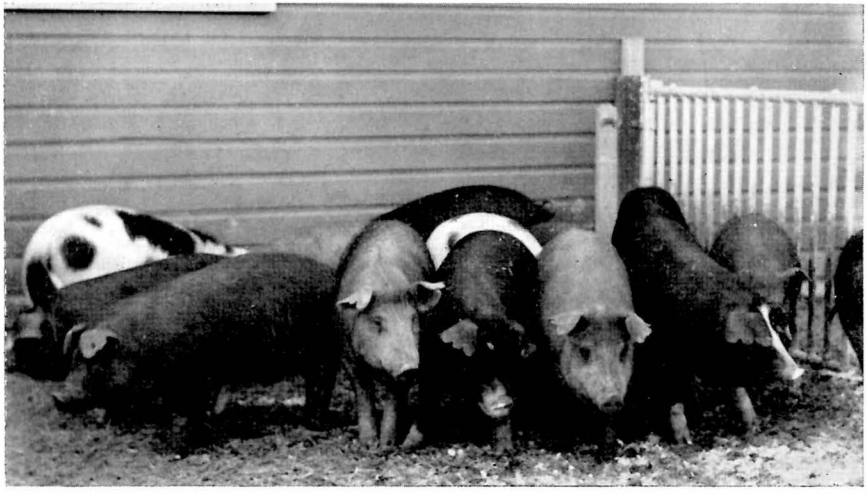
[a]One pig removed due to a prolapse of the rectum.
[b]Protein supplement: 40 parts soybean oil meal, 40 parts tankage and 20 parts ground alfalfa hay plus 60 grams of aureomycin per ton.
[c]Mineral mixture: equal parts of steamed bonemeal, ground limestone and salt.
*Significantly greater at the 5 percent level, than the corresponding lot fed common salt.

pigs in these two trials was approximately 5 pounds per pig. Since in the first experiment the mineral supplement was composed of 20 percent salt and in the second experiment 33.3 percent, the actual amount of salt consumed per pig, either common or trace mineral, ranged from 1 to 2 pounds during the entire growing-fattening period. By this method of mixing the salt in the mineral supplement and feeding the supplement free choice, approximately 0.25 percent of the total feed consumed was salt. This is less than the generally recommended level of 0.5 percent of salt in grain mixtures for swine.

The increased rate of gain which was observed in the second trial, but not in the first, when the pigs were fed trace-mineralized salt may have been due to several reasons. In the second trial the pigs were younger when started on the experiment. It is known that the younger and smaller pig has a higher requirement for many of the essential nutrients than it does during the later growth stages. Therefore, it is possible that the younger pigs used in the second trial did not obtain an adequate supply of trace minerals from the basal ration, while those in the first trial may have fulfilled their needs from the basal ration. Evidence supporting this theory is shown when the average daily gain of the two lots during the course of the experiment is examined. In the second trial the difference in rate of gain, in favor of the pigs fed trace-mineralized salt, was much greater during the early part of the trial than during the latter period.

The inclusion of an antibiotic in the protein supplement in the second trial may also have influenced the mineral requirements of the pigs. In some instances antibiotics

The breeds of pigs used in this experiment



have been reported to increase the animal's requirements for specific nutrients. Therefore, it seems possible that they may have had an effect in the trials reported here.

Another possible reason for the difference between trials is that slightly more mineral supplement was consumed by the pigs during the second trial and the supplement contained a higher percentage of trace-mineralized salt. The amount of trace-mineralized salt consumed by the pigs in the second trial was almost two and a half times as much as was consumed by the pigs in the first trial. Although the requirement of the pig for the trace minerals is very low,[3] it is possible that the lot receiving the trace-mineralized salt in the first trial did not consume enough of this mixture to give it any benefit over the control lot.

The difference in the trace mineral content of the two basal rations is not known. As mentioned previously, feeds vary considerably in their content of trace minerals, therefore, the fact that the feeds used in these two trials may have been furnishing different levels of the trace minerals cannot be overlooked.

[3]"Recommended Nutrient Allowances for Swine. 1950." National Research Council, Bul. No. 2.

Summary

One hundred and thirty weanling pigs were used in two trials to study the effect of replacing common salt with trace-mineralized salt in a simple mineral mixture.

Pigs receiving a mineral mixture of equal parts of trace-mineralized salt, steamed bonemeal, and limestone offered free choice gained 0.09 pound per day faster than those which received common salt in the mineral supplement. Very little difference in feed efficiency was obtained in this trial.

In a similar trial, but with heavier pigs, in which the salts composed only 20 percent of the mineral supplements, there was no difference in rate of gain between the two treatments.

Approximately 1 to 2 pounds of salt were consumed per pig during the period from weaning to market weight. Since the cost of trace-mineralized salt is about one cent per pound more than common salt the added expense is not significant.

A mixture of equal parts of steamed bonemeal, ground limestone and trace-mineralized salt may be considered a good mineral mixture for self-feeding pigs under South Dakota conditions.