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TANKAGE

Its Value in Swine Feeding

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SUMMARY

Based on the results of a large number of experiments the following conclusions may be drawn regarding the feeding of tankage to market hogs.

(1) Pigs receiving "grain alone" make slow and expensive gains as compared with pigs receiving grain and a protein supplement.

(2) When milk is scarce or entirely lacking for hog feeding, tankage is an excellent addition or substitute.

(3) The addition of tankage to grain increases the rate of growth and reduces production costs as well as ensuring a market hog of superior quality.

(4) The ration for pigs on pasture can be made more efficient and complete by the addition of a protein and mineral-rich feed of animal origin, such as tankage.

(5) Pigs full fed a grain ration supplemented with tankage and pen-fed from weaning time until ready for market, however, make more rapid gains and require less feed to make 100 pounds gain than similar pigs fed the same ration when running on pasture.

(6) With pen-fed hogs, the feeding of tankage right up to market weight is more economical than where this feed is discontinued either when the pigs are 110, 130 or 150 pounds.

(7) If pigs have access to good pasture the tankage can be eliminated from their ration after they reach 150 pounds without seriously influencing the economy of the ration.

(8) The grains should be supplemented with 8 to 12 per cent tankage for pigs from weaning to 100 pounds, preferably the higher level immediately after weaning, and 4 to 6 per cent tankage from 100 pounds until the pigs reach the ideal market weight of 200 pounds.

TANKAGE

ITS VALUE IN SWINE FEEDING

Grain by itself, is not sufficient to develop and bring a hog to market requirements economically. Pigs fed on grain alone make slow and unprofitable gains as compared with pigs whose rations are properly supplemented with a protein- and mineral-rich feed such as the dairy by-products, tankage, fishmeal or a commercial supplement. The dairy by-products,—skim-milk, buttermilk and whey, have been found to be the most satisfactory feeds for supplying the extra nutrients required for balancing the ration. When these are scarce or entirely lacking, however, the purchase of fishmeal in coastal districts and tankage in inland districts can be amply justified on the basis of grain saved. In this publication the results of experiments on tankage feeding at the Dominion Experimental Station, Lacombe, Alberta, and methods of using this feed most advantageously in hog feeding are discussed. The recommendations will apply to most districts across Canada.

What is Tankage?

Tankage is a packing-house by-product consisting mainly of thoroughly cooked and sterilized powdered meat and bone scraps. The best grade of tankage is guaranteed to contain 60 per cent protein, about 9 per cent fat, and 20 per cent minerals. Another grade used extensively in swine feeding in Western Canada is guaranteed to contain 50 per cent protein, the reduction in protein content being due mainly to the increased proportion of bone in the products. Results of well-controlled determinations indicate that the protein of tankage is digested to the extent of 76 per cent by pigs. Tankage comes in the form of a brown powder, not attractive from the standpoint of odour, but nevertheless, palatable to pigs. It is for sale at most abattoirs, feed stores and some seed houses.

Because of its high protein content and valuable supply of minerals in the form of calcium and phosphorus, tankage is probably the most widely used supplement for hog feeding, excepting for those districts in which dairy by-products are available. When an adequate amount of skim-milk or buttermilk is available there is little necessity for the purchase of supplementary feeds.

Results with Tankage

Over the past 15 years a number of experiments have been conducted at Lacombe, to determine the feeding value of tankage. These tests included comparisons of hogs fed tankage inside and on pasture, hogs in dry lot fed grain alone and grain and tankage, and hogs fed grain alone on pasture and grain and tankage on pasture, as well as tests to determine the optimum level of feeding tankage both inside and on pasture.

Inside

Experimental results indicate that pigs confined inside to sanitary feeding pens and fed a grain ration properly supplemented with feeds high in proteins, mineral substances and vitamins make faster and more economical gains than pigs fed similar feeds under outside conditions in a pasture lot. In a test conducted during the summer of 1934, Yorkshire pigs fed inside on a grain ration supplemented with salt, tankage and cod liver oil made more rapid gains and required less feed to make 100 pounds gain than similar pigs fed outside with access to an annual pasture mixture of oats and rye on a ration the same except that cod liver oil was not included. The saving in feed amounted to approximately 40 pounds for each 100 pounds increase in live weight of the pigs. The results of this test would indicate that where sanitary

feeding pens are available and when protein supplements are provided in adequate amounts, pasture is not necessary for growing and finishing bacon hogs. However, for growing gilts and boars for breeding purposes, or for carrying breeding stock, boars and sows, pasture and exercise are very valuable.

Dry Lot

The following table shows the relative performance of two groups of pigs, one fed grain supplemented with tankage in dry lot and the other fed grain alone in dry lot. In this experiment tankage was fed at the rate of 8 pounds to 92 pounds of grain throughout the test. The results are based on four experiments conducted at Lacombe.

Tankage vs. No Tankage for Growing Pigs in Dry Lot

—	Group 1	Group 2
	Grain and tankage	Grain only
Number of pigs.....No.	33	33
Days required from 40 pounds to 200 pounds.....Days	131	190
Grain eaten per 100 lb. gain.....Lb.	477	656
Tankage required per 100 pounds gain.....Lb.	36	.....

It will be noted from the above table that grain alone gives exceedingly poor results when fed to growing and fattening pigs in dry lot. The feeding of tankage to hogs at the rate of 8 pounds to 92 pounds of grain (without pasture) brought about a 45 per cent increase in daily gains, and the tankage-fed pigs reached market weight 59 days earlier than those fed grain alone. As well as the saving in time with the feeding of tankage, there was a 17 per cent decrease in cost of gains. The folly of feeding hogs on such an unbalanced ration as grain alone (without pasture) is shown by the fact that in these trials 100 pounds of tankage saved 497 pounds of grain, or in other words, with each hog 286 pounds of grain would be saved by feeding 58 pounds of tankage with grain over the period from 40 pounds to market weight of 200 pounds.

Pasture

In other tests, with hogs on pasture, the results show the margin of profit in feeding tankage to be lower than with hogs in dry lot. The following table summarizes the results of three experiments in which a combination of grain and tankage was compared with grain alone for hogs on oat and rye pasture. Tankage was fed at the rate of 8 pounds to 92 pounds of grain throughout the test.

Tankage vs. No. Tankage for Growing Pigs on Pasture

—	Group 1	Group 2
	Grain, Tankage, Pasture	Grain, alone, Pasture
Number of pigs.....No.	25	25
Days required from 40 pounds to 200 pounds.....Days	129	167
Grain eaten per 100 lb. gain.....Lb.	435	570
Tankage required per 100 lb. gain.....Lb.	34	.....

These results show that even when pigs have good pasture in addition to a full feed of the cereal grains, better results are secured when tankage is added to the ration to balance it more completely. In these trials the pigs fed tankage reached market weight 38 days earlier than those fed grain alone on pasture, and 100 pounds of tankage was found to replace 397 pounds of meal. Even on good pasture the addition of tankage stimulated the gain of the pigs and saved feed.

Tankage Supplies Minerals

In addition to its protein content, tankage is also a valuable source of minerals. In an experiment at Lacombe, three lots of pigs were fed a basic ration of grain and tankage. The first group received only these feeds, while the other two each received in addition an allowance of a different commercial mineral supplement in the proportion recommended by the manufacturer.

The lot in which the pigs received no special mineral supplement not only made slightly greater daily gains in this experiment but it also produced a greater net profit than either of the lots which had received commercial minerals in addition to grain and tankage.

Thus, when tankage is fed, there is apparently no advantage in adding extra minerals. When no tankage is fed, however, other experiments at Lacombe have shown that mineral supplements will materially increase the rate of gain and decrease grain requirements.

When tankage is at all reasonable in price it is more profitable to feed grain and tankage than grain and minerals, but it is always decidedly more economical to supplement the grain ration with either tankage or minerals than to feed grain alone.

When to Feed Tankage

The demand for protein and mineral matter to furnish the building material for the rapidly developing muscular tissues and for a sound body framework in the young growing pig is very heavy. In the fattening animal, the requirement is largely for body maintenance and is, therefore, smaller than in the case of the young, rapidly growing pig.

To obtain information as to the economy of feeding tankage in the ration of growing and finishing hogs (fed inside) when the supplement is discontinued at different stages of development, four experiments involving 84 pigs were conducted at Lacombe. In these tests, four groups of pigs were fed tankage to various stages of growth, the first from weaning to 110 pounds; the second, until the pigs reached 130 pounds; the third, until 150 pounds; and the fourth, until the pigs reached market weight of 200 pounds. In all four lots tankage was added to the grain ration at the rate of 12 per cent until the pigs weighed 110 pounds, and when tankage was fed thereafter it was supplied at the rate of 6 per cent.

In all lots of this experiment the addition of tankage to the ration produced faster and more economical gains than in the previous experiments where grain was fed alone. The group fed tankage right up to market weight not only made the most rapid but also the most economical gains. Thus, the addition of tankage over the full feeding period more than paid for itself. It would seem, therefore, that the value of tankage lies not only in getting the young pigs away to a good start but also in its ability to make for higher and more economical gains during the fattening period.

In a similar experiment except that the pigs were on pasture, the results with 90 pigs showed that tankage exerted no influence on the rate and economy of gains after the pigs attained an average weight of 150 pounds. The feeding of tankage to pigs on pasture until they reached 80 pounds however, proved highly beneficial and its special value on pasture would seem to be in its ability to get the young pigs away to a good start.

Although the experiments reported indicate that pasture effects some saving of grain when no supplement is fed, and a slight saving of tankage when tankage-fed lots are compared, pasture is not necessary for growing and fattening bacon hogs where balanced rations are fed and suitable inside accommodation is available. It is, however, as mentioned previously, valuable with breeding stock.

How to Feed Tankage

Tankage may be fed in either of two ways. One is to put the tankage in a small self-feeder in the pen and allow the pigs to help themselves, while receiving at the same time a satisfying ration of either dry grain or slop feeds. The other system is to feed the tankage mixed with the chop feed in proportions as high as 12 per cent by weight of the total grain ration to weanling pigs and smaller amounts to older pigs depending to some extent on the other ingredients in the rations.

Tankage can be used as a single protein supplement, or in a mixture with other protein supplements to supply the nutrients lacking in grains. In cases where the dairy by-products, skim-milk and buttermilk, are not available in sufficient quantities to properly balance the hog ration, a smaller amount of tankage than ordinarily recommended should be used to make up the deficiency.

Quantity to Feed

The following table summarizes the results of a series of four experiments to determine the amount of tankage required with farm-grown grains to obtain the most economical gains with pen-fed pigs.

Average of Four Experiments on the Protein Supplementary Requirements of a Barley-Oats Ration for Pen-Fed Hogs

—	Tankage 10% until 110 lb. — Tankage 5% from 110 lb. to market	Tankage 8% until 110 lb. — Tankage 4% from 110 lb. to market	No Tankage Both Periods
Number of pigs.....No.	24	24	24
Days required from 40 lb. to 200 lb.....Days	117	120	151
Grain eaten per 100 lb. gain.....Lb.	334	341	419
Tankage required per 100 lb. gain.....Lb.	24	20	.....

The reader will observe that cutting the tankage allowance down to 8 per cent and 4 per cent as compared with feeding larger amounts, resulted in slower gains and a higher grain requirement for 100 pounds increase in live weight. The results of these tests show 100 pounds of tankage to have an average meal replacement value of 372 pounds of meal from the cereal grains.

This and other experiments would indicate that after weaning, pigs should receive 8 to 12 per cent of tankage up until they are 100 pounds in weight, and from then until market weight they should receive 4 to 6 per cent tankage.

Grain Saving Ability of Tankage

The results of eleven tests as reported in the preceding pages show each pound of tankage eaten to have an average meal replacement value of 4·18 pounds of meal from the cereal grains because for each 100 pounds of gain made 28·5 pounds of supplement saved 119·25 pounds of grain.

The average daily gains of the pigs in all lots receiving tankage exceeded the average of those fed grain alone by 33 per cent. In terms of time saved, this would mean that the tankage-fed pigs would go to market about a month to a month and half earlier than those fed no tankage.

Effect of Tankage Feeding on Carcass Quality

The use of tankage in tests conducted at Lacombe not only resulted in higher daily gains and effected a great saving in grain, but it had a very beneficial effect on the general health and thrift of the pigs as well as on the type and quality of their carcasses. The pigs fed the meal rations without additions were dry in the hair, unthrifty in appearance and persisted in rooting up their lots. The serious check in the growth of the young pigs fed the non-supplemented grain ration tended to produce a heaviness of middle and a coarseness of bone which reduced the chances of the hogs grading top quality when they finally reached the market. It is also noteworthy that pigs fed only grain grew too big a frame and an objectionable depth of chest before they were finished. When sold within the correct market weights, their carcasses, because of lack of finish, dressed out thin and flabby. In order to produce proper finish it was necessary to feed them until they became overweight and were graded "heavy". The marketing of this kind of hogs causes large annual losses to farmers. Equally important is the fact that the poor-grade bacon produced from these hogs is a constant menace to the standing of Canadian bacon on the British market.

In order to produce a hog of the proper type and finish within the desired weights, there should be no check in its development from weaning, or even birth, until it is marketed. The feeding of a grain ration supplemented with tankage has been shown to bring about these desired results.

Tankage vs. Other Supplements

In considering the comparative value of tankage and other sources of animal protein, a great mass of data is available which necessarily cannot be reviewed within the scope of this publication. It is evident from a study of these data, however, that in supplementary value, skim-milk or buttermilk excels any other single feed, although tankage is an excellent substitute. In experiments comparing tankage of animal origin with materials of plant origin such as linseed oilmeal and alfalfa meal, it was found that the pigs fed these latter did not make so rapid nor so economical gains as those fed tankage. It is concluded, therefore, that linseed oilmeal and alfalfa meal should not be considered as complete substitutes for tankage. They are useful, however, to combine in small quantities with animal proteins in adding variety to a mixed supplement.

The Feeding of Tankage to Breeding Stock

If skim-milk or buttermilk is not available tankage may be advantageously used to bring about the necessary protein level in the ration of boars and sows. An amount of tankage equal to from 5 to 10 per cent of the meal ration will prove satisfactory for the growing or breeding boar. For mature in-pig sows the grain ration should be supplemented with about 5 per cent tankage. For gilts which are carrying their first litter it is well to add at least 8 per cent tankage to the grain ration as an additional supply of protein which the young sows will require in order to nourish their litter properly in addition to continuing their own bodily growth and development. Nursing sows require rations of higher protein level than dry stock to meet the needs of lactation. If milk is not available, 10 pounds of tankage to each 100 pounds of a grain mixture of equal parts of oats and barley or oats and wheat is to be recommended in order to ensure a good flow of milk.

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