



WHEY AS A FEED FOR HOGS

Whey is a valuable feed for swine, and the careful feeding of it will save other feeds. This by-product of the dairy industry has been in the past all too often thrown out or else wastefully fed.

Whey contains most of the carbohydrates and minerals of the original whole milk as well as about one-fifth of the protein and a trace of the fat. Whey also contains vitamin B₂ in considerable amounts. Possibly it is the vitamin content of whey which helps to make it such a useful feed for raising pigs. Further, while the protein content of whey is small, it is of high quality, being mainly milk albumin. Thus, while the protein of whey is valuable, particularly as a supplement to the proteins in common grains, nevertheless, whey is not a protein-rich feed like skim-milk and buttermilk; rather, it is a carbohydrate feed which contains certain desirable proteins, minerals and vitamins. These facts must be borne in mind when planning the rest of the feed mixture to be used with whey.

How to Feed Whey

In various tests results have indicated separated whey to be worth about one-half as much as skim-milk. Unseparated whey would be worth slightly more than separated whey, due to its butterfat content.

There are two main problems in utilizing whey to the best advantage:—

1. What other feeds are needed with whey and the common farm grains to make a well balanced hog feed?
2. How much whey can be fed advantageously to pigs of various ages?

In general, the farm grains form the basis of hog feeding. Barley, wheat and oats are common grains used, and the proportion of these will be varied according to their price and availability, and also to the age, size and condition of the pigs. While these grains contain some protein, there is not sufficient of it. Thus, some additional protein must be provided. It is evident from several trials in feeding whey, along with the coarse grains, to young pigs that the addition of some protein-rich feed improves the ration. This is the stage in a pig's life when protein is required in ample amounts for body development, and to promote rapid and economical gains. The amount of protein-rich feed required and the length of such feeding will depend on the composition of the rest of the grain mixture, as well as the amount of whey being fed. Various feeds may be used. A mixed protein concentrate is quite suitable, or feeds such as linseed oilmeal or soybean oilmeal can be fed. All these are high-protein feeds. Another feed is middlings. Being higher in protein than the coarse grains, the addition of this feed would increase the protein in the feed mixture as well as add other nutrients. Unless a mixed protein concentrate containing minerals is used, minerals should be added to the meal mixture. A simple

mineral mixture consisting of 75 per cent ground limestone and 25 per cent iodized salt can be included at the rate of two pounds per hundred of the meal mixture.

While whey contains some vitamins, as already indicated, the vitamin A and D requirements of the pigs must be taken care of. Where pasture is used the needs of the pigs for these vitamins will be supplied through the pasture crop and sunlight. For indoor feeding, vitamins A and D may be very easily supplied by feeding small amounts of good alfalfa or clover hay. Cod liver oil is rich in vitamin D and is very effective against rickets and rheumatism, which are more common with pigs fed during fall and winter. It may be given in the feed daily at one tablespoonful per pig from weaning to about 100 pounds live weight. Hogs should not receive cod liver oil for one month or more before slaughtering as there is danger that the meat may have a fishy flavour.

The amount of whey that a pig can economically consume will vary under different conditions. During the flush season the problem is to use up the supply of whey, while later in the year there may not be enough of it. Obviously, the practical solution is to have sufficient pigs to take care of the flush whey production. From an economy standpoint several authorities suggest the feeding of one to two quarts of whey per pig daily. Generally more than this is fed. A good many practical feeders plan on feeding one to one and one-half gallons of whey per pig daily. More than this would be wasteful feeding, while less would hardly warrant the trouble. The maximum consumption of whey is governed by the amount of liquid which the pig can consume. Due to the amount of water in whey, pigs fed whey in considerable amounts have a certain distention of the digestive organs. This paunchiness detracts from the look of the pigs, and also likely from their carcass value, for there is some evidence that whey in large amounts will make thin-bellied pigs. It is good practice, therefore, to cut down the amount of whey fed during the last month of feeding.

The practice followed at the Normandin Experimental Station was to feed five pounds of whey per pound of meal in three feeds during the developing period, that is, about 15 pounds per day from weaning until the pigs reached 100 pounds live weight. Then two pounds of whey per pound of meal were fed in two feeds, during the fattening period, that is, about 10 pounds per day from 100 pounds to market weight. At these rates the pigs consumed one and one-half gallons of whey per day during the developing period and one gallon during the fattening period. No paunchiness or distention of the digestive organs was observed, and no thin-bellied pigs were produced.

If the hogs are fed from a hopper, the equivalent of the above quantity of whey may be fed daily in a separate trough.

Whey is generally pasteurized before being used for hog feeding. This health safeguard is very important for otherwise the milk from a tuberculous herd could very easily spread infection in the swine herds of a district. Thus, thorough pasteurization should be the rule with all whey used in live stock feeding.

The whey should be taken from the factory to the farm just as soon as available. It should be handled and kept in clean containers. At most factories the whey is produced daily and thus can be procured comparatively fresh. Some means of cooling may be arranged to keep it as fresh as possible. While slightly soured whey seems as good as fresh whey, all too often it is somewhat decomposed before all is fed. Badly decomposed whey or whey kept for any time in dirty whey tanks is not suitable for pig feeding.

Results of Whey Feeding at the Normandin Experimental Station

In order to determine the feeding value of whey as a supplement to grain for bacon hogs, an experiment was conducted during 1939, 40 and 41 at the Normandin Experimental Station.

Five lots of pigs were fed a basic ration consisting of equal parts of ground oats and barley plus three per cent of a mineral mixture. The following table shows the amount in pounds of skim-milk or whey fed with each pound of the basal feed mixture, and the percentage of protein supplement to the basal feed mixture.

Lot	Skim-milk		Whey		Protein Supplement	
	Up to 100 lb.	100 lb. to market	Up to 100 lb.	100 lb. to market	Up to 100 lb.	100 lb. to market
	lb. 2.5	lb. 1.0	lb.	lb.	%	%
1.....			5	2		
2.....			5	2	6.1	2.5
3.....			5	2	9.25	3.75
4.....			5	2	14.00	5.5
5.....						

The pigs were hand fed three times daily until they reached 100 pounds and twice a day thereafter. The pigs were housed in indoor pens. Up to 100 pounds in weight one ounce of cod liver oil was fed per pig daily.

The skim-milk was obtained twice a day from the Experimental Station dairy, after separating, and was fed sweet. The whey was obtained from a local cheese factory two to four hours after it was separated from the curds. There was about one per cent dilution of water in the whey. The whey was still warm when obtained and it was immediately cooled. By this means it was possible to keep the whey fresh and thus feed it to the pigs in a reasonably sweet condition even 24 hours after delivery to the piggery.

In addition to the recording of weights of pigs and feed consumption by lots by 28-day periods, official grading of the carcasses and the measurement and scoring of these by lots under the standards of the Advanced Registry Policy for Swine were obtained.

In the following table the results of whey feeding at Normandin over a three-year period are summarized:—

VALUE OF WHEY FOR BACON HOGS

	Lot 1	Lot 2	Lot 3*	Lot 4	Lot 5
Supplements developing period	2.5 lb. skim-milk	5 lb. whey	5 lb. whey 6.1% protein supp.	5 lb. whey 9.25% protein supp.	5 lb. whey 14% protein supp.
Supplements fattening period	1 lb. skim-milk	2 lb. whey	2 lb. whey 2.5% protein supp.	2 lb. whey 3.75% protein supp.	2 lb. whey 5.5% protein supp.
No. of pigs.....	No. 15	15	10	15	15
Av. initial weight.....	lb. 59.1	57.7	60.9	57.7	56.1
Av. final weight.....	lb. 203.5	203.6	202.3	204.2	202.9
Av. daily gain.....	lb. 1.62	1.59	1.59	1.58	1.59
Meal consumed per pig.....	lb. 471	446	429	431	407
Milk or whey fed per pig.....	lb. 655	1,226	1,224	1,247	1,205
Protein supp. fed per pig.....	lb.	14.9	22.4	31.7
Milk or whey fed daily during developing period.....	lb. 9.1	15.5	16.1	15.4	15.0
Milk or whey fed daily during fattening period.....	lb. 6.3	12.1	11.7	11.4	10.8
Meal eaten per 100 lb. gain.....	lb. 326	305	303	294	277
Milk or whey fed per 100 lb. gain.....	lb. 454	840	865	851	821
Protein supp. fed per 100 lb. gain.....	lb.	10.5	15.3	21.6
Grading on Rail:					
A—select.....	No. 9	5	6	6	9
B1—bacon.....	No. 6	10	4	9	6
Av. carcass score.....	% 76.7	73.7	76.5	70.3	75.7
Value of whey per cwt. when skim-milk worth 15 ct. per cwt.....	ct.	10.2	10.8	6.7	7.0

* Results of two years' tests.

This experiment indicates that the feeding of whey resulted in a lower consumption of meal per 100 pounds of gain than with skim-milk feeding. Whey feeding, however, produced less top quality carcasses than skim-milk. Whey fed alone had a relative value of 10.2 cents per 100 pounds when skim-milk was valued at 15 cents per 100 pounds.

When a protein supplement was added to the meal mixture in increasing amounts as in lots 3, 4 and 5, the consumption of meal per 100 pounds of gain was still further reduced. The relative value of whey was increased slightly with the addition of a small amount of protein supplement but decreased sharply as the amount of protein supplement in the meal mixture was further increased. Thus, from 10.2 cents when whey was fed alone, its value was increased to 10.8 cents and decreased to 6.7 and 7.0 cents per hundred pounds as increased amounts of protein supplement were included in the feed mixture.

The inclusion of a protein supplement with grain and whey improved the carcass quality of the pigs. This improvement from the addition of protein is apparent both from the rail grading and carcass scores.

Summary and Conclusions

Whey is a carbohydrate feed containing valuable proteins, minerals and vitamins.

Results indicate that whey is up to 70 per cent as valuable as skim-milk in pig feeding.

A mixture of ground grains suitable to the size and age of the pigs is the basis of whey feeding. Such grains as barley, wheat and oats are suitable.

With the addition of a protein supplement to grain and whey, less grain is required and the carcass quality of the pigs is improved.

Considering both carcass quality and economy of production, a small amount of protein supplement in addition to whey seems the most useful. Starting at 6 per cent protein supplement and decreasing later to 2.5 per cent gave good results in the tests reported.

Linseed oilmeal, soybean oilmeal, middlings, alfalfa and clover hay, and pasture are other useful feeds to supply additional protein to a whey and grain ration for hogs.

Minerals and vitamins are also necessary in the ration of the whey-fed pigs. A simple mineral mixture can be added to the grain. To supply vitamins, pasture crops and sunshine will help in outdoor feeding, while for indoor feeding small amounts of good alfalfa or clover hay, or cod liver oil, can be used.

During the flush season of peak production whey can be liberally fed to pigs under 125 pounds. However, above this weight the proportion of whey to grain should be cut down in order to avoid the possibility of paunchy, thin-bellied pigs. For finishing, not more than two pounds of whey should be fed with each pound of grain.

As a health safeguard, whey should be thoroughly pasteurized before feeding to pigs.

It is important to feed whey as sweet as possible. To this end it should be taken from the factory as soon as available and kept in clean containers. Cooling will help to keep it sweet. Badly decomposed whey is not suitable for pig feeding.

Whey is a valuable feed in pig feeding. Do not waste it. With whey and grain, along with supplements as required, hog carcasses of top grade can be produced.

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