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Director's Digest

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# USE OF MEAT AND BONE MEAL AND FEATHER MEAL FOR RUMINANTS

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Animal byproducts have not been traditionally used as sources of protein in cattle feeds; however, with the modern feeding practices and the use of least cost formulation there are many times when meat and bone and feather meal may provide an economical source of certain nutrients for cattle feeds.

In 1957 (Barrick, Gregory, Wise) work was initiated at the North Carolina Agricultural Experiment Station on a high protein concentrate to supplement ground ear corn for fattening cattle. An attempt was made to formulate a 60% protein supplement, 1 lb. of which would be equivalent to 2 lb. of the commonly used 30 to 32% supplements. The favorable price of meat and bone meal at that time and high content of protein, phosphorus and calcium made it an economical ingredient in such a supplement.

The 60% protein supplement which was formulated contained 500 lb. of meat and bone meal, 300 lb. of urea, 1,000 lb. of alfalfa meal, 30 lb. of sale, 70 lb. of limestone and 100 lb. of animal fat. It was fed at the rate of 1 lb. per head daily and was compared with a 32% protein supplement containing 1,301 lb. of soybean meal, 280 lb. of molasses, 280 lb. of alfalfa meal, 104 lb. of steamed bone meal and 34 lb. of sale which was fed at the rate of 2 lb. per head daily. Vitamin A concentrate and stilbestrol were added to each supplement at a rate to provide the same daily intake per animal.

Yearling steers with an initial weight of 700 lb. were fed for 156 days starting July 2. Each supplement was fed with ground snapped corn. A limited amount of grass hay was fed the early part of the experiment. Due

primarily to high summer temperatures, the gains were not good on either supplement the early part of the feeding period and gains for the total period averaged 2.11 lb. per day on the low protein supplement vs. 2.17 lb. per day on the high protein supplement. With the low protein supplement, 743 lb. of ground snapped corn and 88 lb. of supplement were required per 100 lb. of gain while 769 lb. of corn and 44 lb. of supplement were required with the high protein supplement.

Cost of gain was in favor of the high protein supplement $19.76 vs. $20.34 per hundred. The steers receiving the meat and bone meal, urea supplement were a little slower to accept it initially but after they were on feed both supplements were readily consumed.

## COMPARISON TESTS

In a second experiment (Wise and Barrick, 1959) the two supplements were again compared as supplements to ground ear corn with yearling steers implanted with stilbestrol. The rate of gain was essentially the same for both supplements in this trial, (2.59 vs. 2.55 lb. per head per day), but the feed cost was reduced approximately $3 per head with the high protein supplement. This was due primarily to the lower cost of supplement.

In a subsequent experiment (Wise and Barrick, 1959) the meat and bone meal, urea supplement was self-fed free-choice and compared with the same supplement mixed with the ground ear corn at feeding time. Although the steers fed the supplement free choice were slow to consume the desired amount initially, they soon adjusted to it and averaged consuming 0.94 lb. per day for a 100 day feeding period with rate of gain and feed efficiency essentially the same for both treatments.

In the high protein supplement, approximately 21% of the protein was supplied by the meat and bone meal and most of the remainder by urea. In addition the meat and bone meal supplied all of the supplemental phosphorus and much of the calcium.

Dyer and Fletcher (1958) conducted studies to determine if meat meal contained a supplementary growth factor for fattening cattle. Although a growth factor was not demonstrated, steer performance was just as good with 2.18% to 6.75% meat meal in the diet as when soybean meal provided the same amount of protein.

In early experiments reviewed by Morrison (1956) tankage or meat scrap fed as the only protein supplement to beef cattle did not give quite as good performance as the oil meals with which they were compared. Gerlaugh (1932) reported that fattening calves performed just as well on a supplement of equal parts of tankage, linseed meal and cottonseed meal as one containing equal parts of linseed meal and cottonseed meal. Palatability was a factor in some of the studies reported by Morrison but it was not a problem in the studies of Gerlaugh when tankage was used in a mixed protein supplement.

Morrison's (1956) summary of work with meat meal and tankage for dairy cows indicates that they have been quite acceptable as a source of protein in concentrate mixtures for lactating cows with no effect on the flavor or odor of the milk.

Hydrolyzed feather meal has been investigated as a source of protein for sheep, beef cattle and dairy cattle. It has proved to be a suitable source of protein although difficulty with feed intake may be encountered.

Jordan and Croom (1957) investigated feather meal as a source of protein for fattening lambs. They found that a protein supplement consisting of equal parts of corn and feather meal or equal parts of corn, soybean meal and feather meal gave just as good performance as soybean meal when fed to lambs being fattened on corn and timothy hay. The authors reported that even though the feather meal had a tankage aroma it was not objectionable to the lambs and the diets containing feather meal were consumed in just as large amounts as those in which the supplemental protein came from soybean meal.

Hydrolyzed feather meal was compared with soybean meal as a source of supplemental protein for wintering steer calves (Wise and Barrick, 1963). Hereford steer calves with an average initial weight of 550 lb. were wintered for 112 days on iso-nitrogenous diets consisting of orchard grass hay, minerals and 5 lb. of a 17% corn-protein mixture with the supplemental protein coming either soybean meal or hydrolyzed feather meal. During the first part of the feeding trial the calves did not readily consume the corn, feather meal mixture and the gains were less for this period. After the calves became adjusted to it, the feather meal mixture was consumed in the amount fed and gains for the last half of the trial were identical with those for the calves receiving the soybean meal. For the 112 day period the average daily gain was 1.86 for calves receiving the soybean meal and 1.73 for calves receiving the feather meal.

Rakes, et al (1968) investigated the use of hydrolyzed feather meal as a protein supplement for lactating dairy cows. Grain mixtures in which none, one third, two thirds, or all of the supplemental protein in a 16% corn-soybean meal concentrate mixture was replaced with feather meal protein were compared with lactating cows. The cows were randomly allotted to one of the four treatments approximately 15 days prepartum and allowed to become accustomed to the different feeds. From the time of calving until 12 weeks postpartum, the grain mixtures were available free choice during two 2 hour periods daily. The animals also had free access to corn silage for a 12 hour period and to alfalfa-grass hay for a 6 hour period daily.

In this trial the level of concentrate consumption tended to decrease with each increment of hydrolyzed feather meal although the difference was not statistically significant. Feed intake was 26.2 lb. per cow per day on the corn-soybean meal mixture and 19.4 lb. per day on the corn-feather meal mixture. During the period of the trial there were no significant differences in fat-corrected milk production or body weight changes.

A second trial was conducted to observe the effects on feed intake of lactating cows when varying amounts of feather meal were substituted abruptly for soybean meal in a corn-soybean meal diet to which cows were accustomed. Concentrate consumption was markedly decreased as a result of sudden change to feather meal. The decrease in average daily concentrate intake for the three days following the change was 31.3%, 41.2% and 70.9% when one third, two thirds or all of the supplemental protein supplied by soybean meal was replaced by protein from feather meal.

The trials with cattle indicate that an adjustment period helps to minimize problems encountered in obtaining acceptability of feed containing feather meal. For lactating cows requiring a high concentrate intake feather meal even in relatively small quantities may tend to restrict intake.

## SUMMARY

Meat and bone meal is a suitable ingredient in ruminant feeds and should be considered for use when favorably priced as a source nutrients. A review of the feeding value of various feedstuffs in relation to their price over a period of time indicates meat and bone meal will find frequent usage in some areas of the country if least cost formulation is used.

Due to intake problems associated with feather meal, its use will be limited where high intake is essential as for lactating cows and finishing cattle.

Its most favorable usage would be in rations for stocker or growing cattle where a high intake is not required. If such cattle are started on feed with a feed containing feather meal, intake is not seriously hampered. If animals on a high feed intake are switched abruptly to a feed containing appreciable amounts of feather meal, intake will probably decline.