

High-Protein Feed

lamb and steer feeding trials show beet by-product satisfactory

G. P. Lofgreen, J. H. Meyer, and W. C. Weir

A new beet by-product, MC-47, was found as satisfactory a livestock feed as blackstrap molasses when used as a supplement to hay for maintaining lambs, or as a supplement to a low-protein ration for fattening steers.

Actual usage will depend on comparative costs to other feeds, availability, and adaptability to other feeding operations.

MC-47 is produced in large quantities as a liquid residue when a flavoring agent—monosodium glutamate—is manufactured from beet molasses. This residue contains on the average approximately 20% crude protein—nitrogen X 6.25—18% ash and 26% nitrogen free extract. The material contains no fat or crude fiber. Of the 20% crude protein approximately 11.5% is in the form of amino acids, the end products of the digestion of proteins.

Because large quantities of MC-47 are being produced in California, it seemed desirable to study its possible value as a livestock feed.

Two feeding trials were undertaken to compare MC-47 with common blackstrap molasses as a feed for sheep and cattle.

Sheep Trial

Forty head of wether lambs averaging 60 pounds in body weight were divided at random into four lots of 10 head each. The rations of the four lots were:

Lot No.	Type of ration
1	Alfalfa hay plus 20% molasses
2	Alfalfa hay plus 20% MC-47
3	Oat hay plus 20% molasses
4	Oat hay plus 20% MC-47

The lambs were allowed free access to their feed and the amount eaten was measured daily. The gains in body weight of the four lots were measured over a period of 49 days. The average daily gains for lots one through four were 0.21, 0.23, 0.10 and 0.04 pounds, and the daily feed consumption was 2.75, 2.93, 1.83 and 1.77 pounds.

The difference in the gains of the lambs receiving molasses and MC-47 on alfalfa hay was not significant. The two lots on alfalfa also required approximately the same amount of feed to produce a pound of gain. Thus under these conditions the MC-47 appeared to be equal to molasses in feeding value.

The lambs fed molasses and oat hay appeared to gain more than those receiving the MC-47. Because the data were inconclusive, two more lots of 10 lambs each were fed oat hay and molasses or oat hay and MC-47 for a period of 56 days.

There was little difference in the gains of the two lots, both groups gaining very poorly. Those fed MC-47 gained 0.05 and those fed molasses 0.02 pounds per day. The oat hay used was of poor quality and the lambs would not consume enough to produce satisfactory gains. It is not possible, therefore, to draw definite conclusions from those lots that were fed oat hay.

From a consideration of the data on all six lots it appears that the MC-47 and blackstrap molasses are of approximately equal value when fed as a supplement to hay for maintaining lambs.

Trial with Steers

Because of the high protein content of MC-47 in comparison to blackstrap molasses—20% as compared to 3%—it appeared that it might be used as a supplement to a low-protein ration. A feeding trial was initiated to study MC-47 and blackstrap molasses as supplements to a low protein ration used for fattening steers.

Twenty-four head of two-year-old steers were divided into three lots of eight animals each. All lots were full fed on rations consisting of oat hay as the only roughage and a concentrate mixture made up of 49% ground barley, 50% dried beet pulp and 1% common salt.

The beet pulp fed to lot one contained 25% MC-47 solids while that fed to lot three contained 25% molasses solids. The pulp that was fed to lot two had nothing added.

The average initial weights of the animals in lots one, two and three were 983, 980 and 970 pounds respectively. All lots of the steer trial were on full feed for a period of 71 days.

Because of the higher protein content of MC-47 beet pulp the ration fed to lot one contained 11.1% crude protein while the plain-pulp ration fed lot two contained 9.4% and the molasses-pulp ration contained 8.9% crude protein. The following results were obtained:

	Lot 1	Lot 2	Lot 3
Average daily gain, lbs.	2.42	2.21	2.28
Feed consumed per day, lbs.:			
Oat hay	7.9	6.4	7.7
Concentrate mixture	17.6	17.1	16.6
Total	25.5	23.5	24.3
Feed required per cwt. gain, lbs.:			
Oat hay	326	289	335
Concentrate mixture	727	774	728
Total	1053	1063	1063
Feed cost per cwt. gain:	\$32.81	\$35.88	\$34.43
Net return per steer:	23.44	18.24	20.33

The differences in daily gains among the three lots were not statistically significant. Because of the slightly higher gains, the greater feed efficiency and the lower cost of the MC-47 ration the lot-one steers returned \$5.20 and \$3.11 more per head than the lot-two and three steers. Since the difference in gains was not significant one could not always expect to obtain the slightly higher rate of gain on steers fed MC-47. If equal gains were made, however, the net return would be greater from the steers fed MC-47 if the cost of MC-47 remains below that of molasses.

Comparative Value

The steer trial should be a good test of the comparative value of MC-47 and molasses solids for fattening two-year-old steers since 16.4% of the dry matter of the ration fed to lot one was made up of MC-47 solids and 17.1% of the dry matter of the ration fed to lot three was made up of molasses solids. This amounted to 3.4 and 3.6 pounds of MC-47 and molasses solids consumed per head per day. On the liquid basis this would amount to 5.4 pounds per head per day of MC-47 and 4.9 pounds per head per day of molasses.

The MC-47-fed steers showed little appetite for salt and rarely touched their salt block while lots two and three each consumed over twice as much salt as lot one. This is due to the high salt content of the MC-47 solids.

Under the conditions of this experiment, the solids from MC-47 were as satisfactory as those from blackstrap molasses for fattening steers.

G. P. Lofgreen is Assistant Professor of Animal Husbandry, University of California College of Agriculture, Davis.

J. H. Meyer is Instructor in Animal Husbandry, University of California College of Agriculture, Davis.

W. C. Weir is Assistant Professor of Animal Husbandry, University of California College of Agriculture, Davis.

The above progress report is based on Research Project No. 776.