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Balancing Corn Silage Dairy Rations

Foster G. Owen, Extension Dairyman

The grain required to balance a ration high in corn silage is much different from the grain needed when feeding high amounts of alfalfa hay. The most common problem is failure to properly balance for protein and calcium. Here are points to take into account in balancing rations high in corn silage.

Energy. Well preserved corn silage is an excellent energy feed. Even so, it is best that corn silage not constitute the only roughage source in the ration. At least 5 pounds of hay or dry matter from low moisture haylage should be included in the ration with corn silage. Although all corn silage roughage programs have been used successfully, such rations are more likely to be nutritionally unbalanced and to result in digestive and metabolic problems. With 12 to 15 pounds of hay and silage fed free choice, nutritional problems should be minimized and forage intake maximized.

Protein. Much more protein is needed in the grain ration with high levels of corn silage than with our usual rations containing moderate to high levels of alfalfa. The percent of protein needed in the grain ration when high producing

Table 1. Protein Required in the Grain Ration with Free Choice Corn Silage and Restricted Alfalfa Hay.

<i>Restricted Alfalfa Hay Fed</i> (lb/day)	<i>Estimated Free Choice Silage Intake</i> (lb/day)	<i>Protein Need in Grain Ration</i> (%)	<i>Assumed Grain Feeding Rate</i> ^{1/} (lb/day)
5	65	22	15
10	50	18	17
15	40	15	18

^{1/}Approximate needs for large breed dairy cows producing about 50 lb. milk daily.

cows are fed restricted amounts of average alfalfa hay with corn silage available free-choice is shown in *Table 1*.

When lower levels of grain are fed, the grain mix should contain 22 percent protein and the feeding rate should be at least 8 or 10 pounds per day. Otherwise the protein in the ration will be deficient.

If protein is deficient, high producers will drop abruptly in milk yield and fresh cows will fail to reach their potential peak of production. A protein deficiency may result in the loss of thousands of pounds of milk for a single cow in one lactation. Cows also will respond quickly when a protein shortage is corrected.

Minerals. Calcium and phosphorus are the most important minerals in dairy rations. However, trace minerals must also be given special attention when feeding high corn silage rations.

Table 2. Mineral Requirements and Levels of Supplements

	<i>5 lb or Less of Alfalfa Hay Plus Corn Silage</i>	<i>10-15 lb of Alfalfa Hay Plus Corn Silage</i>
<i>Recommended Minerals in Grain Ration</i>		
Calcium	1.0%	.7%
Phosphorus	.8%	.7%
<i>Mineral Sources in Concentrate</i> ^{1/}		
Dicalcium Phosphate	2.0%	2.0%
Limestone	1.0%	-----
Trace-Min. Salt	1.0%	1.0%

^{1/}A commercial mineral with about a 2:1 ratio of calcium:phosphorus will be needed. If it contains 20-22% calcium and 8-10% phosphorus a 4% level of mineral will be needed in the grain.

Zinc, iodine, sulfur and cobalt are of most concern. With only 5 pounds of alfalfa hay, or less, plus free-choice corn silage, the concentrate ration will need to contain 1.0 percent calcium and .8 percent phosphorus. The supplemental calcium level may be reduced with higher levels of alfalfa hay. Mineral needs can be met as shown in *Table 2*. The minerals commonly included in trace-mineralized salt should supply the needed trace elements.

Vitamins. Since corn silage may lose much of its carotene (vitamin A value) before harvest and during storage, adequate vitamin A should generally be included in the grain ration to meet the cows entire vitamin A need.

If the crop is harvested green it could also be short in vitamin D. Therefore, with high corn silage rations the grain ration should contain at least 3,500 IU of vitamin A and 350 IU of vitamin D per pound to assure against shortages.

Special Needs in Supplementing Drought Damaged Corn Silage

Fortunately, drought damaged corn silage contains 85-100 percent as much useable energy as regular corn silage. Then the supplemental grain needed with drought-affected corn silage will usually be little more than when regular silage is fed.

Drought conditions increase the average protein content of corn silage. However, variation in protein is great. Therefore, unless protein analyses are available the use of normal corn silage protein values are recommended as a basis for ration formulation.

Droughted corn is often more difficult to preserve as silage than the normal crop. It may be "tough" for best chopping, resulting in a ragged, variable length chop and also may be over-dry. These conditons can result in poor packing in the silo and excessive nutrient storage losses as well as inferior quality. If silage has over-heated and has turned dark brown or black, protein digestibility may be reduced, requiring additional supplemental protein. Poor packing may also result in extensive molding and rotting.

On the other hand, if the crop is harvested when immature and very wet, it may undergo an abnormal fermentation. Thus, intake could be depressed and heavier supplemental feeding required, due to any of these preservation problems.

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