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Corn Silage for Dairy Cattle

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Corn silage as a dairy cattle feed is receiving new attention by researchers and dairy cattle feeders. New varieties and growing practices are producing yields of 25 and more tons corn per acre. Larger herds and more mechanization with dry lot feeding have focused new attention on the use of corn silage as a major part of the roughage. Research work shows favorable results when corn silage is the only roughage, particularly when urea is used to increase the protein.

The tons of dry matter per acre possible with present high yields make corn highly competitive with pasture programs, particularly with larger herds which make efficient pasturing more difficult. The excellent forage characteristics of corn silage and its value in the ruminant ration have caused more than a 100% increase in the use of corn silage in the last fifteen years.

Nutritive Value

Corn which is well eared and harvested at the dent stage will have a somewhat higher net energy value compared to other roughages produced under average conditions. The percent protein is considerably lower and requires that particular attention be given to adequate protein supplementation, especially for high producing cows. Tables 1 and 2 show the results of recent research at Cornell University and indicate some of the possibilities for greater use of corn silage in dairy cow feeding.

Table 1. Corn Silage-Hay Comparison (First Year)[1]

	All hay	Med. hay	Low hay	All silage
Feed consumption, lbs./day				
Hay	28.0	13.0	9.0	.....
Corn silage	.....	30.0	36.0	52.0
Forage dry matter	24.6	20.1	18.2	14.8
Grain	17.6	18.2	18.6	19.9
Actual milk, lbs./day	46.6	47.7	50.3	52.5
4% fat corrected milk, lbs./day	44.4	44.4	46.8	49.3
Butterfat, %	3.7	3.5	3.5	3.6
Solids (not fat), %	8.7	8.7	8.6	8.7

[1] Ten cows per group, 280-day trial.

Table 2. Corn Silage-Hay Comparison (Second Year)[1]

	All hay	All silage
Number of cows	7	8
Feed consumption, lbs./day		
Hay	27.9	.....
Corn silage	.....	54.0
Forage dry matter	24.4	14.9
Grain	19.0	18.6
Actual milk, lbs./day	48.3	51.0
4% fat corrected milk, lbs./day	42.9	47.4
Butterfat, %	3.4	3.7

[1] 280-day trial.

A reduction in forage dry matter occurred with the all-silage feeding. The level of milk production indicates there was a higher energy from less dry matter.

Table 3 gives the results of a three-year trial at the University of Maryland.

Table 3. Milk and Fat Production for a Three-Year Period

	Corn silage		Corn silage and hay	
Lactation	Milk (lbs.)	Fat (lbs.)	Milk (lbs.)	Fat (lbs.)
First	13,293	537	14,035	525
Second	14,953	593	14,205	505
Third	14,113	590	14,965	565

Results of this research show that dairy cows will perform satisfactorily when fed silage as the only roughage or when fed a hay-silage ration properly supplemented with grain. However, the all-silage program is not without some problems in protein and energy and mineral balance; therefore, careful attention should be given to these parts of the total feed. The feeding of an all-corn silage forage is not a common practice.

The versatility of corn silage in dairy cattle feeding has been very thoroughly demonstrated by years of controlled research and by actual feeding practices followed for many years. All of these show that cows respond readily to roughage feeding programs with varied levels of hay and corn silage.

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Protein Level Important

High corn silage rations require special attention to the protein level. This is particularly true for high producing cows.

Average analyses show alfalfa hay 15.8%, wilted alfalfa silage 6.3%, and corn silage 2.3% crude protein. A feeding program with two-thirds corn silage and one-third alfalfa hay would require 16 to 18% crude protein in the grain ration. One-half hay and one-half silage will require 14 to 16% crude protein in the grain.

Urea for Protein

The addition of 10 pounds of 42% feed grade urea per ton of corn silage at 30 to 35% moisture is a low-cost method of increasing the crude protein content of the silage. However, there are some losses of the urea, particularly with high moisture in the silage. The urea must be very evenly mixed with the silage. The addition of 10 pounds of urea per ton of silage will about double the crude protein content. When very good legume hay is fed free choice, or makes up about one-half of the ration, urea may be added to the grain as needed, instead of putting urea in the silage.

Harvesting

For maximum dry matter yield and palatability, corn silage should be harvested at the firm or dough stage, with moisture about 35% and denting started. It should be cut fine and evenly distributed in the silo. It is best to harvest on the immature rather than the mature side of plant growth.

Mineral Needs

Amounts of calcium, phosphorus, iodine, and salt provided may be somewhat lower with heavy corn silage feeding. Be sure these minerals are added to the grain mix and also available as free choice.