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Corn silage as cattle ration

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Quick Facts

- Corn silage is the main ingredient in most feedlot rations.
- The changing of a green growing forage crop into a high quality feedstuff called "silage" requires proper handling procedures.
- Silage results from the preservation of wet or moist forage crops or crop residues through an acidification process; acidification is called the "ensiling" process.
- Successful ensiling is dependent on maturity and moisture content of the silage material, buffer capacity of the crop, water-soluble carbohydrates present in the crop and speed of fermentation.
- Making and preserving good silage is more dependent on proper harvesting, packing and storing practices than anything else.
- Silage additives have offered little, if any, advantage over good harvested and stored silage itself.
- Colorado produces some of the best corn silage in the United States; the state's large cattle feeding industry is a ready market for all the corn silage that can be produced.

Colorado is one of the leading cattle feeding states in the nation. The popularity of cattle feeding is due to several factors, one of the main ones being the ability to produce corn on the irrigated acreages of the state.

Corn silage is the main ingredient of most feedlot rations. Ensiling the growing corn crop at its peak nutrient value offers the most potential in maximizing the productivity of farm land and provides an excellent source of nutrients for the cattle feeding industry.

The changing of a green growing forage crop into a feedstuff called "silage" does not just happen. It requires proper handling procedures to obtain a high-quality feedstuff.

Just what is silage and what takes place in the ensiling process?

"Silage is the feedstuff resulting from the anaerobic (without oxygen) preservation of wet or moist forage crops or crop residues by acidification." The term acidification refers to the process of reducing a raw product, with a neutral or close to neutral pH (usually 5.8 to 6.5), to a pH of about 4.0. The reduction of pH or acidification process is what is commonly called the "ensiling" process.

The ensiling or acidification process must be permitted to happen in an oxygen-free atmosphere (anaerobic conditions) if the right kind of action is to take place that prohibits the growth of wasteful aerobic bacterias and oxidative enzymes of the plant material. There are several different acid-forming bacteria found in the natural feedstuffs, and the goal in making good silage is to allow the "best" bacteria to operate and control or inhibit the action of undesirable bacteria.

Factors having the most influence on the success of an ensiling process are

- maturity and/or moisture content of silage material,
- buffer capacity (acid and basic chemical components present),
- water-soluble carbohydrates available (sugars, starches, etc.), and
- speed of fermentation.

Maturity and/or moisture. It has been demonstrated not only by researchers at CSU but at many other universities that for obtaining the best "ensiled" product the ideal moisture level should be in a range of 72 to 66 percent or 28 to 34 percent dry matter. This usually will correspond to early dent stage of maturity for corn and 1/10 to 1/3 bloom for alfalfa.

Water-soluble carbohydrates. In order for beneficial bacteria to work and get the "ensiling" process started, there must be adequate water soluble carbohydrates available for the bacteria to utilize and turn into lactic acid. It has been suggested that at least 6-percent water-soluble carbohydrates should be available. This is no problem in normal corn silage, but immature corn silage as well as alfalfa and grasses can be lacking in these carbohydrates, thus creating a more difficult task for ensiling.

Speed of fermentation. The ensiling process should not take over four or five days for best results. Most silages will be completely ensiled or stabilized by 10 to 12 days. Even though the filling of many silos will just be started by that time, fermentation starts as soon as the green chop is put into the silo. Thus, it is evident that there is vital importance of doing a good job of packing each day and not waiting until the last day to do the whole job.

Making Silage

Much talk can be made about proper fermentation, bacteria, additives and so forth, but what it really boils down to is that making and preserving good silage is more dependent on proper harvesting, packing and storing practices than anything else. Trying to find a product to improve silage that was poorly prepared will only make money for the person selling the product.

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Here are a few steps in making good silage:

1) First, the most important thing is to cut the crop at the right time. It has been found that crops in early to mid-dent stage at a dry matter content of 28 to 32 percent make good silage.

2) The chop should be fine—½- to ¾-inch (1.3- to 1.9-centimeter) length cuts. A good anaerobic atmosphere or a good pack cannot be obtained with coarse-cut silage, and the end product will be less nutritious. Keeping sharp knives at all times with adequate power to handle the cutter are the two most important factors in making good chop for silage.

3) Packing. It should be remembered that the ensiling or fermentation process starts as soon as the forage is put in the pit, so every load of silage should be packed as if it was the last. Get the air out of the silage. The producer's most reliable workers should be driving the packing tractors. Too many workers leave the pack overnight like they just dumped it and ran. Each night at quitting time, the silo should be thoroughly packed. The way to tell if a good job of filling and packing has been done is at the time the face of the silo is opened in the fall. There should be very uniform color, texture, size of cut and the silo will look like it was filled all in one day. There may be different varieties and maturities of crops that will alter this somewhat, but if the above guidelines are followed, chances of uniformity will be much better.

Silage Additives

There have been several products introduced these past few years that have claimed to assist or enhance the ensiling process and/or improve the nutritive value of silage. These products and/or additives can be classified as four basic types. They are 1) nutrient additions (grain, molasses-ammonia, urea, etc.), 2) direct additions of acids (lactic acid), 3) aids to acidification (bacteria and/or enzymatic inoculants), and 4) preservatives.

Generally speaking, these additives have not been consistent in their response, especially in the case of corn silage, and have offered little, if any, advantage over good harvested and stored silage. Nutrient additions, whereby additional nitrogen has been added to the silage, have shown a sparing effect on supplemental protein needs. However, the economics of the process, the trouble of adding it and the reduction in flexibility of the silage have about ruled this out. The author concludes that in Colorado, where producers have excellent storing conditions, good corn to put up and heavy equipment to pack the silos, silage additives have little, if any, benefit to offer most producers.

Level of Silage to Feed

Recently, considerable research has been directed at investigating the best combinations of corn silage and grain to obtain the maximum in utilization and efficiency. It has been discovered that to squeeze the most out of corn silage and grain, a producer should feed an all-silage ration. Whenever grain is added to a silage ration, the digestibility is reduced, mainly in the starch fraction. Thus, CSU recommendations at the present time are to feed a high-silage ration in the early part of the feeding program and then switch fairly rapidly to a high-concentrate ration. A high-concentrate ration is considered to be one that contains about 85 percent concentrate and 15 percent roughage.

Summary

Colorado produces some of the best corn silage in the United States. Production of corn silage is a means of harvesting the most nutrients from farm land. Colorado has a large cattle feeding industry that is a ready market for all the corn silage that can be produced. Following good harvesting and storing practices will produce as good a product as possible.

Silage additives, for the most part, have little to offer in the production of high-quality corn silage. Feeding programs should be designed to feed high levels of silage in the early part of the feedlot program and then shift rather rapidly to a high-concentrate ration for finishing, in order to obtain the most from the corn silage.