Making silage: Choose appropriate fermentation aids

BY GEORGE F.W. HAENLEIN
Extension Dairy Specialist
University of Delaware

NEWARK, Del. – Dairy cows need to be fed year-round, but plants mature at one time and become less nutritious as they age. So we need to somehow preserve the forages we grow for cattle feed.

One solution is to make silage, using a fermentation process that produces acids which preserve the plants for later feeding. The dairy industry has been using silages for well over 150 years.

To obtain good fermentation, proper management in necessary. The crop must be harvested in the proper stage of maturity and cut rapidly to reduce respiration losses, unless wilted silage (haylage) is intended.

The silo (vertical or horizontal) must be filled evenly and packed very, very well. To insure this, equipment must be ready and functioning properly.

What happens in the silo during fermentation? For good preservation, organic acids must be produced that will "pickle" the silage mass. This is done by microbes which convert silage sugars (carbohydrates) into acids.

For the microbes to work, conditions must by anaerobic (no oxygen). If oxygen is present, there will be cell respiration instead, which will convert the sugars to carbon dioxide gas and produce heat. The gas will be a loss, the heat can damage the forage, and proteins and molds will grow. Thus, tight packing is essential to exclude oxygen from the silage mass.

Once anaerobic conditions are achieved, the proper microbes can start to produce the proper acids. Hopefully, there will be a large population of the microbes which produce lactic acid, but there can also be many others which generate products that are not useful preservers.

The fermentation must produce acids which will ultimately inhibit all microbe action. If this doesn't happen, all the carbohydrates, sugars, starches and fibers in the silage mass will be broken down, leaving silage of much lower quality.

Thus, to preserve your crop well, you must have successful fermentation. And this depends on three things: the absence of oxygen, and the presence of ample carbohydrates plus microbes that produce acids–especially lactic acid.

Over the years many products have appeared on the market to aid silage fermentation. These materials are easy to evaluate, provided one remembers these three preservation requirements.

One group of silage aids uses acids to preserve the crop directly by lowering pH. Besides phosphoric and sulfuric acids, there is formic acid, which many European dairy farmers use. Though these acids work well, many American producers dislike them because of their nature.

Another silage treatment involves adding carbohydrates to the forage in the form of grain to provide more starches and sugars to be broken down into acids. Considerable research was done on this practice in the 1930's and 1950's at Delaware and other agricultural experiment stations.

Besides giving good fermentation, researchers found that adding carbohydrates also added dry matter to absorb moisture and reduce seepage. Unfortunately, many producers have abandoned this proven method because of the large amount of grain that must be handled–200 to 300 pounds of corn per ton of green forage.

Enzymatic additives are another fermentation aid. These products contain enzymes that break down forage fibers into the carbohydrates that fuel microbe activity and acid production.

Other products add microbes to the forage. The theory behind this practice is to add acid-producing microbes, so they will dominate the process and speed up fermentation. This should cause less loss of silage substance since the acids will be produced more quietly with less heat.

Reasearch has shown that the additive must contain at least 28,000,000 microbes per ounce in order to successfully dominate a normal population of microbes. Also, the microbes must be able to function in the particular silage environment.

Lactobacillus plantarum is one microbe that has proven successful for this purpose. A mixture of Lactobacillus, Streptococcus and Pediococcus species may be useful in that they cover the range of pH usually found in silages.

Yet another approach is to add a material that inhibits the growth of yeast and molds. Propionic acid and some mineral salts will do this.

All of these treatments are useful in certain circumstances but superfluous in others. Which ones work depends on the crop to be ensiled. For example, corn in the soft dent stage is an ideal crop for fermentation. It is approximately 33 percent dry matter and has a large supply of readily fermentable carbohydrates. Normally, additives aren't much help in making corn silage if it's properly cut, filled and packed.

If you have a very wet crop (one low in dry matter, such as direct-cut small grains) or one with low carbohydrate content but high protein (such as alfalfa or small grains), an additive can be very beneficial.

The goal in silage making is to preserve a good crop for good feed at a later date. To do this, part of the plant's nutrients are used to produce acids for preservatives. It's impossible to make silage better than the harvested crop you start with, but you can minimize losses.

Good silage practices are a tremendous money-maker and an important money-saver on our dairy farms. Silage has replaced land-costly and labor-costly pasture and hay feeding. It has enabled us to produce milk at a much lower cost. Under the current cost-price squeeze on our dairy farms, we must make the best silage we can.

Boars

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performance of your pigs, the following criteria may be of some help. Select boars with:

- Average daily gain of 2.00 pounds/day or better.
- Backfat (adjusted to 230 pounds) of 1.0 inch or less.
- Feed/gain ration of 2.75 or less.
- Age to 230 pounds of 155 days or less.
- Litter size of 10 or more pigs farrowed and eight or more weaned.
- Underline of 12 or more well-spaced, fully developed teats.
- Feet and legs medium to large-boned, free-moving, with adequate cushion on front and rear legs, and equal toe size.

Where can you find performance-tested boars? Many states, conduct boar tests. Check with your extension swine or livestock specialist to find out the nearest source of performance-tested boars. They're worth the investment.

Weeds harbor Fusarium

NEWARK, Del. – A recent study conducted at the University of Delaware Agricultural Experiment Station has shown that the root systems of common weeds may serve as reservoirs of Fusarium wilt, a fungus disease capable of devastating soybean yields.

The study was conducted by former master's degree candidate John B. Helbig under the supervision of Dr. Robert B. Carroll, a plant pathologist in the department of plant science. Helbig studied 21 weed species for their potential role in Fusarium blight (Fusarium oxysporum) infection of soybeans. He found the fungus in the roots of 16 species. Among the most important were horsenettle, ivyleaf morningglory, jimsonweed, lambsquarter, tall morning glory and velvetleaf.

During the 1984 growing season Helbig took samples of root and stem tissue from 800 weed plants growing in conventional and no-tillage soybean fields at 20 locations. He observed no direct relationship between the infected weeds and tillage practices. Weeds carrying the fungus showed no signs of infection when collected in the field or when inoculated in the greenhouse with Fusarium isolated from soybean plants. This suggests that the fungus lives in a non-infective relationship with the weed root system.

Sixteen of the 17 Fusarium isolates obtained from weeds were able to infect Essex soybean plants (a highly susceptible variety) under greenhouse conditions.

The fact that weeds in soybean fields can serve as symptomless hosts of the Fusarium pathogen is important new knowledge that may eventually help farmers reduce the potential for crop damage by this blight fungus.