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## Microbes in Agriculture — Weighing the Differences Between Silage Additives and Inoculants

The quality of silage you feed your livestock is affected by several critical factors. First, the silage that is fed out can't be any better than the crop that was put into the silo. If that crop is harvested at less than peak nutrient value or damaged by weather, the nutrient value of the silage will naturally be lower.

Silage management practices also have a major impact on quality. Using the proper length of cut, packing the silage well and protecting it effectively from exposure to air are all important in preventing loss of nutrients and dry matter.

Another factor critical to the production of high quality silage is the presence of certain types of bacteria which preserve the ensiled crop through the process of fermentation. Studies have shown, however, that nature does not always provide these bacteria in numbers great enough to ensure a rapid, efficient fermentation. So even if you harvest your crop at peak nutrient value and use the best silage management practices, you can't be sure of getting the highest quality silage consistently, year after year.

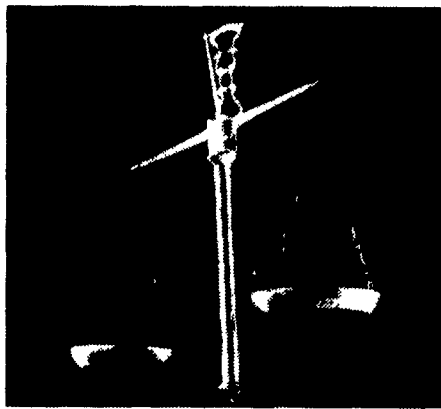
Several methods have been developed to make up for this shortfall in nature. One is the use of silage additives. Another is inoculation of silage with bacteria to promote fermentation.

### A Mixed Bag of Additives

There are three major categories of silage additives in use today: acids, nutrients and enzymes.

Since the material in a silo is preserved by acids produced during fermentation, it would seem logical to improve preservation by adding acid directly rather than relying on the natural process.

The problem is, in order to ensure preservation, you would have to add at least 10 pounds of acid per



*When it comes to selecting the most effective product for improving silage quality, a producer has many choices to weigh.*

ton of silage, which can be a very expensive proposition. The usual recommended rate of application for acids is too small to have a significant impact on preservation. Also, acids can be dangerous to handle and corrosive to equipment.

The addition of nutrients such as molasses, whey, urea or ammonia can obviously increase the feed value of silage. But, whether these additives actually aid in fermentation and preservation of the ensiled material itself is less certain. In theory, nutrient additives such as molasses will provide additional carbohydrate "fuel" for fermentation. However, as with acid, it takes several pounds of additive per ton to promote such an effect. In view of their cost, nutrient additives should be considered more for the feed value they may add to silage than as aids to fermentation.

Another silage additive category is enzymes. Enzymes are non-living substances produced by living organisms during such processes as digestion. They can be compared to the tools a workman needs to do a job. Just as these tools cannot do the work by themselves, so enzymes added to silage cannot produce acids without live bacteria being present. And enzymes cannot reproduce and spread through the silage as bacteria do.

### Inoculation: An Active Approach

None of the silage additives just described increase in volume after being added to the silage. However, assuming the bacteria in a silage inoculant are alive and capable of reproducing, they will multiply quickly and spread through the silage, producing a rapid, efficient fermentation which preserves the ensiled material with a minimum loss of dry matter and nutrients.

It is very important that the bacteria in a silage inoculant be of the right type. For example, bacteria which can produce an efficient fermentation in milk do not have the same effect in silage. Ideally, the bacteria in a silage inoculant are not only alive and capable of reproducing, but are also specially selected from those strains best adapted for silage fermentation.

These two criteria have been applied to the development of new Pioneer<sup>®</sup> brand 1177 silage inoculant. 1177 is a product of the same kind of intensive genetic research and quality control which have made Pioneer a leader in hybrid seeds.

Used in combination with good crop and silage management practices, 1177 can help you overcome the shortfalls in nature which may have prevented you from getting the best silage possible.

1177 silage inoculant is available from your Pioneer sales representative. Ask him for more information about it.

One in a series of articles devoted to improved silage making sponsored by Pioneer Hi-Bred International, Inc.

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