Inoculant Questions Answered

Do I inoculate or not? Do I inoculate only my high value feeds? Is it necessary to inoculate corn silage? I have used inoculants in the past and can't see any difference. Have you had these thoughts, or asked these same questions, or made statements similar to these? I would bet that you have. I get questions and comments like these often in my work as a dairy nutrition consultant. I will cover several of the key points that you need to consider when evaluating whether to use a silage inoculant or what type to use.

Silage inoculants were developed as a way to guide the fermentation of feeds. Plants naturally have large quantities and varieties of bacteria, yeasts and molds on them prior to harvest. The numbers and types of microorganisms present on the plant depend on the plant type, growing conditions and health of the plant. When we make silage, we want to quickly preserve the feed by eliminating oxygen and lowering the pH of the silage to prevent the further growth of undesirable microorganisms. Making silage without using an inoculant means that we are hoping the right type of bacteria are present in sufficiently large quantities to dominate the fermentation before undesirable organisms dominate the fermentation. The goal of a silage inoculant is to provide bacteria that will grow rapidly, will dominate the fermentation and will produce the correct fermentation acids to make good quality silage.

A quality silage inoculant should be used on all ensiled feeds. A quality silage inoculant will quickly guide the fermentation towards production of lactic acid to drop the pH of the forage. A quality silage inoculant will also provide some measure of insurance against sub-optimal harvesting, chopping, filling, packing, and covering conditions. An inoculant will not make bad forage good, but it will maintain the quality of the forage better than uninoculated silage. Forage is the foundation of a dairy cows' diet. Better quality forage will allow animals to perform better. Better quality silage will allow us to keep more of our silage instead of losing it to shrink. And, better quality silage will allow us to feed less purchased high energy and high protein feeds. Cows will be healthier and perform better at a lower cost.

One key is to make sure you use an inoculant that works. That means you need to use the right type of "bugs". Specifically, we are looking for bacteria that grow rapidly in the pH range of the forage they are growing in and produce lactic acid. The most common lactic acid producing bacterial species is *Lactobacillus plantarum*. Many of the other common bacteria are *Lactobacillus* species, *Pediococcus* species and *Enterococcus* species. But, saying your silage inoculant has *Lactobacillus* bacteria in it is similar to saying you milk cows. Saying your silage inoculant has *Lactobacillus plantarum* in it is similar to saying you milk Holstein or Jersey cows. You have some idea of the genetic potential, but aren't guaranteed results for your specific situation. When you get the bacterial species you want, look at the count of the bacteria (expressed as CFU/g). Generally, you want at least 100,000 CFU/g. Having a higher amount will not necessarily improve fermentation. It is most important that the bacteria are live and vigorous.

Enzymes added to a quality inoculant will make more of the plant sugars available to the bacteria. Added enzymes can be especially helpful when plant sugar content is low. These enzymes increase dry matter recovery and dry matter digestibility of the feed. Adding enzymes that work will increase the cost of the silage inoculant.

Lactobacillus buchneri is used more commonly in silage inoculants every year. *Lactobacillus buchneri* strains produce acetic acid in a controlled amount along with lactic acid. Acetic acid is a powerful inhibitor of yeast and mold growth, so *Lactobacillus buchneri* inoculants are useful in controlling spoilage of silage. I always want to do as much as possible through management to decrease spoilage. But, in some cases, we may benefit by having more help from the inoculant, so a *Lactobacillus buchneri* inoculant may be useful. The *Lactobacillus buchneri* inoculants are going to be the most expensive of the inoculants.

Another key is to make sure the inoculant you are going to use has good research documenting its' efficacy. Multiple university research trials over different years and growing conditions on the forage type you are inoculating is highly desirable. This research backed up with field experience in your area is ideal. Be very cautious on using only "testimonials". Don't buy an inoculant only on price. Often, you get what you pay for. Quality bacteria and enzymes cost more money to manufacture than cheap bacteria. I have often told dairy producers that they are better off not spending any money on an inoculant than spending a small amount of money on an unproven or low-quality inoculant. Find the inoculants that all have the technology and research you want and then look at the price.

The final key is to make absolutely certain that you buy the silage inoculant from somebody who will ensure the product is put on the forage correctly. The right applicator has to be mounted on the chopper to make sure too much heat doesn't kill the bacteria. Water added to a liquid inoculant must not be chlorinated water or it will kill the bacteria. The inoculant must be delivered on time and stored in a cool environment. You must have somebody who will make sure that all of these steps and others are taken to ensure your success. If you won't get this kind of service from your inoculant provider, you need to use another inoculant.

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