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Measuring the Quality and Quantity of Fermentation Bacteria in Silage Inoculants

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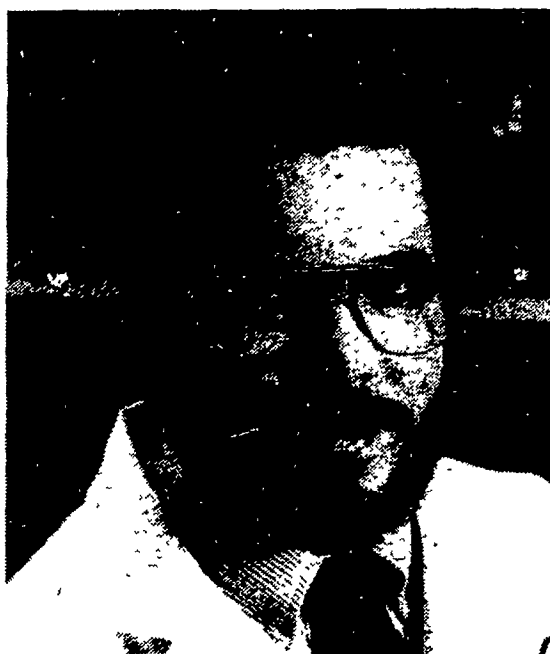
Two criteria often used in comparing different silage inoculants are (1) the quality or performance capacity of the fermentation bacteria in the product and (2) the quantity or actual numbers of these bacteria. Both these criteria are valid measures; however, each must be carefully used and interpreted.

Labels on most silage inoculant products list the species of bacteria contained in the product. One of the most common of these is *Lactobacillus plantarum*. However, the species *L. plantarum* includes a very large number of strains with differing capabilities for producing good silage. And the label may not indicate which of these strains are included in any given product.

An Analogy To Seeds

All strains of soybeans belong to the species *Glycine max*; all strains of wheat belong to the species *Triticum aestivum*. But, as soybean and wheat growers know, all strains of *G. max* and *T. aestivum* are not the same. Different strains provide different yields, different degrees of resistance and a variety of other desirable or undesirable characteristics.

The same holds true for different strains of *L. plantarum*. Minute, naturally occurring changes in genetic makeup can result in a strain that is more effective than others in fermenting a wide variety of forages... that is more efficient in production of lactic acid... or that produces by-products which help bind up excess water.



Identifying, isolating and reproducing such strains for inclusion in a silage inoculant requires examining hundreds of strains and conducting thousands of tests. And once a superior strain is identified and isolated, there is no assurance that it will retain the desired properties. A production strain must be tested and retested to ensure that the characteristics for which it was originally selected are maintained... minimizing genetic 'drift.' So inclusion of the same strain in different products does not guarantee comparable product activity. The entire process of producing a silage inoculant requires a skilled and professional research and production team and a large investment in quality control procedures.

Are Numbers Significant?

Silage inoculants are also compared on the basis of the number of viable organisms per gram. In making such comparisons, it is necessary to know whether this figure refers to the bacterial count at the time the product was produced or at the time it is sold and used.

The number of viable bacteria in any inoculant product will be reduced as storage time is extended. Whether or not this reduction is gradual or rapid will depend largely on how the product was originally produced and how it is handled and stored prior to use.

The technology and methods used in drying, formulating and packaging the product can have a significant impact on how long the bacteria in it will remain viable. Viability can also be adversely affected if the product is exposed to excessive temperature or moisture during the course of distribution, handling and storage.

Pioneer® brand 1177 silage inoculant tests well against both quality and quantity criteria. 1177 is the product of an ongoing, intensive research effort. This effort is aimed at isolating and reproducing those strains of *L. plantarum* which have been identified as being most effective for silage making for a wide range of crops and conditions. Strict quality controls and ongoing testing programs minimize the chance of genetic 'drift' or change in the strains which go into 1177.

1177 is produced using a unique drying method which assures that fermentation bacteria will be alive and ready to reproduce when added to silage. 1177 is distributed, handled and stored through the same channels and with the same care as Pioneer® brand seeds. This minimizes any chance of damage to the product. And supplies of 1177 are held in the field for no more than one year to assure good bacterial activity.

One in a series of articles devoted to improved silage making and sponsored by Pioneer Hi-Bred International, Inc. 1177 silage inoculant is available from your Pioneer sales representative. Ask him for more information about it.