Forage Fermentation Program

OBJECTIVE:

Helps increase the ROI to livestock operations by enhancing feed quality for energy and nutritional value through the predigestion of high moisture forages, roughage, corn silage and grains.

GENERAL INFORMATION:

Forage Enhancer,™ used in combination with **Fermentation Minerals™** on high moisture forages, roughage, corn silage or grains, improves the feed value and utilization by livestock.

Forage Enhancer contains numerous groups of beneficial anaerobic microorganisms that improve the quality of fermentation. They also break down and reduce the complex carbohydrate structures in plants such as lignin, cellulose and hemicellulose, which are less digestible by the animals, and make these feed nutrients more bio-available in the animal's digestion process. In addition to producing essential nutrients, minerals, growth regulators, vitamins and enzymes that greatly aid the animal's dietary needs, these beneficial microbes also help control pathogenic populations. When applied to feed, these microorganisms preserve and enhance the quality. **Forage Enhancer** helps prevent molds, improves taste and nutrient value of feed. It allows higher moisture content during the forage process without spoilage or mold and can also be used for organic production. High moisture forages that already have mold can also be treated and thus prevent forage loss. **Forage Enhancer** is an anaerobic microbial preservative.

Fermentation Minerals are a select group of micronized natural ores that stimulate the beneficial anaerobic microorganisms in **Forage Enhancer** during the fermentation process of high moisture feed as well as enhance the digestion process of ruminant animals.

INGREDIENTS:

Forage Enhancer: Consumable probiotic culture and organic cane molasses.
Fermentation Minerals: A select group of micronized natural ores along with colloidal and ionic trace minerals.

DIRECTIONS FOR USE:

Apply to 20 to 70 percent moisture forage, roughage (straw, corn stalk, etc.), corn silage or high moisture grains at the following rates:

Feed Type	Forage Enhancer/Ton	Fermentation Minerals/Ton
High Moisture Forages/Corn Silage	1 to 2 pints/ton	½ oz/ton
High Moisture Roughage	2 quarts/ton	½ oz/ton
High Moisture Grains	1 quart/ton	½ oz/ton

Mix the **Forage Enhancer** and **Fermentation Minerals** together. Apply a very light spray to the surface area of the plant materials being treated.

On high moisture roughage such as corn stalks, oat or wheat straw use liquid molasses at 5 to 10 ounces/ton as a transition food for the microbes.

Performance in large squares is better than round bales. On unwrapped round bales, use one quart per ton. Wrapping the harvested crop is best for complete fermentation. The outer layer of unwrapped round bales may show some white yeast growth because of increased oxygen content. This is not mold; it is a beneficial yeast growth, which will not harm the animal. Livestock find this very palatable.

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The Fermentation & Predigestion of High Moisture Forages

Complex Plant Structures

In many forage plants, the carbohydrate fiber complexes such as hemicellulose, cellulose and lignin are partial or non-digestible in the rumen. These various plant structures can comprise up to 80 percent or more of the plant's total biomass. These complex carbohydrate structures hold a vast reserve of potential energy and nutrition if it can be made available to the animal for nutrient uptake. Since the normal rumen cycle is short and doesn't allow time for these complex carbohydrate structures to break down, it doesn't release the energy and nutrition to the animal.

If the molecular structure of any potential nutrient is too large for absorption by the villi and microvilli in the intestinal tract, it will be excreted as manure, and the potential value is lost.

Reduction of Fibers - Improved Nutrient Uptake

Appropriate beneficial anaerobic microorganisms, in high moisture fermentation conditions, encompass the concept of predigestion by increasing the breakdown time of the complex carbohydrate structures for an extended period of time before the forage is consumed by the animal.

Glucose is a **carbohydrate** and the most important simple **sugar** in animal and human metabolism. It is one of the primary molecules that serve as energy sources for plants and animals. Glucose is a simple sugar or a Monosaccharide in the Hexoses group (Aldohexose) and contains six Carbons, twelve Hydrogens and six Oxygen molecules. Glucose is readily usable in cellular respiration. Many hemicellulose structures contain from 500 to 3000 glucose units. Various cellulose structures can contain from 7000 to 15,000 glucose units, and lignin structures contain more than 15,000 glucose units. These complex structures need much more time to be dismantled into smaller units before they become usable to the organism consuming them. Extended fermentation, prior to animal digestion, is the key to converting complex carbohydrates into usable energy and nutrition.

Microbial Metabolites

Forages are evaluated on a dry matter basis for proteins, digestible fibers—carbohydrates, and mineral ratios. Values such as RFV (Relative Feed Value), RFQ (Relative Feed Quality) or TDN (Total Digestible Nutrients) are assigned to the forage. However, when the correct blends of beneficial anaerobic microorganisms that contain a complete spectrum of minerals that are adequate and essential for the cellular and enzymatic functions of the biology are employed, they begin the decomposition and reconstruction of the forage materials into far superior nutrient compounds, which is more readily absorbed by the animal. Through the fermentation and predigestion processes, the microbes produce both fat and water soluble vitamins, organic acids (volatile fatty acids- acetic acid, butyric acid, propionic acid and essential fatty acids, linoleic or Omega 6, which converts to arachidonic acid – AA, and linolenic or Omega 3, which converts to eicosapentaenoic acid - EPA), proteins and amino acids, digestive and metabolic enzymes, growth stimulators, hormones, mineral compounds and much more than was ever constructed by the plants. This superior formulation of new and additional nutrients not only increases nutritional intake, but produces antibiotics that control and eliminate pathogenic organisms and compounds in the fermenting forages. This benefit continues into the rumen or digestive system, which offers a host of health and immune boosting benefits to the animal.

Conclusion

Biological fermentation and extended predigestion result in reduced carbohydrate structures for increased feed conversion and nutrient uptake to the animal. These superior, nutrient forms of vitamins and minerals not only improve growth and production, but pathogen and disease control are also realized through the use of completely natural and organic methods that eliminate the need for toxic and harmful commercial antibiotics.