

NUTRI-LOCK INOCULANT



Nutri-Lock Inoculants contain a specific formulation of 7 distinct strains of beneficial bacteria for the preservation of silage, haylage and high moisture corn. These select strains help assure homolactic fermentation that produce high volumes of lactic acid, thus a rapid drop in pH resulting in excellent silage preservation.

“The highest quality silage is achieved when lactic acid is the predominant acid produced, as it is the most efficient fermentation acid and will drop the pH of the silage the fastest. The faster the fermentation is completed, the more nutrients will be retained in the silage.” (J.W. Schroeder, NDSU)

The primary purpose for adding Nutri-Lock inoculant is to significantly increase the number of Lactic Acid producing Bacteria (LAB). The LAB then dominates the forages fermentation profile, multiplying and increasing in numbers. Under ideal conditions, they will double every 25 minutes. As the bacteria increase in numbers, so does the amount of Lactic acid they produce. The increased Lactic acid profile physically lowers the forages pH from 6% to approximately 3.8%. Rapid acidification of the silage pile with a very low pH inhibits

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the proliferation of pH sensitive yeast, molds and bacillus (spoilage bacteria). Additionally the lower pH environment also reduces the activity of enzymes that breakdown proteins in the feed.

Proteins can be reduced to amino acids as well as free ammonia and amines. Without proper inoculation, up to 50% of the total plant protein could be broken down. Inoculation with Nutri-Lock helps provide a controlled fermentation resulting in nutrient retention with less heating and spoiling of the crop.

The type and amount of acids produced during corn silage storage help and can give a complete fermentation picture, says Charles Stallings, extension dairy nutritionist at Virginia Tech. Ammonia nitrogen can give an idea if excessive protein is broken down during storage. Yeast and molds can indicate adverse biological processes that can lead to poor-quality silage. Below is a fermentation profile of well-fermented corn silage.

A desirable fermentation profile analysis.

pH	3.6-4.0
Lactic Acid	4% to 6%
Acetic Acid	Less than 2%
Butyric Acid	Less than 0.1%
Propionic Acid	Less than 0.5%
Ethanol	Less than 0.5%
Ammonia Nitrogen	Less than 15% of total nitrogen
Yeast and Molds	Less than 100,000 cfu/grams

Feeds high in Lactic acid are more palatable . . . much more than feeds high in Acetic and Butyric. Lactic acid is utilized by cattle as an energy source.

Control of acid production will conserve energy in the diet. Conversion from lactic acid to acetic and butyric results in energy loss in the feed, as much as 3% of dry matter. Lactic acid is the most desirable of the fermentation acids for preservation and should comprise more than 60% of the total organic acids produced.

Spoilage bacteria (clostridia, bacillus and others) will consume soluble carbohydrates



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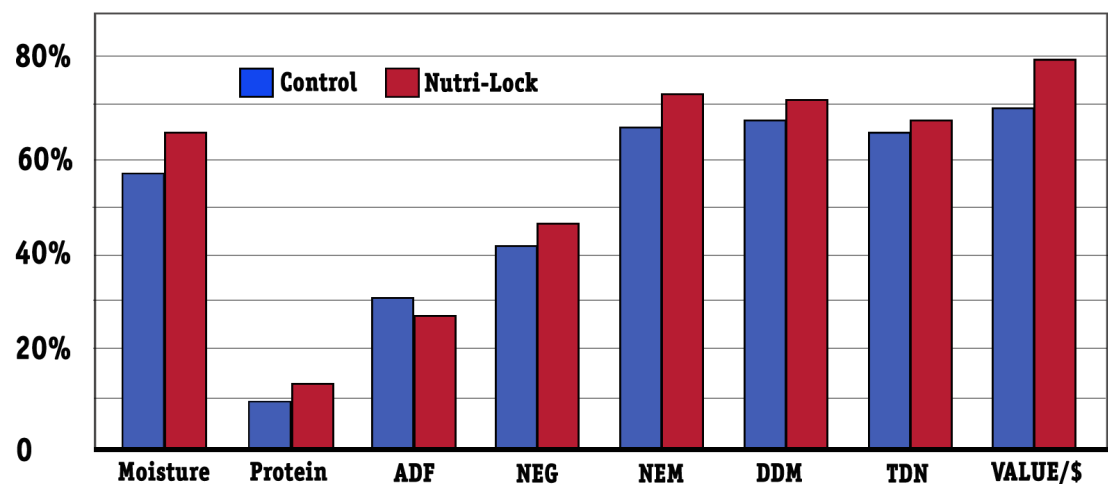
which would be otherwise available to the animal. These bad bacteria also produce butyric acid resulting in sour silage. This may be signaled by pH of 5.0 and above. Spoilage bacteria will also cause excess heat in the silage pile which results in greater dry matter losses in addition to nutrient losses.

Attention to details will help make the most consistent, high-quality silage possible.

- Speed of harvesting-rapid filling of silage structure
- Maturity of crop
- Moisture content (between 65-68% moisture) essential for bacterial fermentation and aids in packing
- Length of chop- should be 1/4 to 1/2 inch. If it is too fine, to low scratch factor. Too long, makes compaction difficult and leaves too much air in silage pile
- Silage distribution and compaction
- Minimize air filtration
- Inoculation with Nutri-Lock
- Cover with oxygen barrier coverings

Efficient fermentation ensures a more palatable and digestible feed. This encourages optimal dry matter intake that in turn translates into improved animal performance.

NUTRI-LOCK SILAGE ADVANTAGES, 34 TESTED SAMPLES



Accessing values to the parameters measured in these samples, the Nutri-Lock treated silages had an average value difference 16% greater than the untreated controls. This resulted in silage that was \$10 per ton more valuable when treated with Nutri-Lock vs. the untreated silage.

As shown in this table, silages treated with Nutri-Lock are much more valuable than untreated controls. Not just in dry matter loss but nutrient density, protein and overall nutrient profiles. When you assign a value number to all of these parameters, you are getting an excellent return on your investment of Nutri-Lock. Having better quality feed for your animals that will pay even more dividends throughout the years.

Using Nutri-Lock as part of a comprehensive silage program results in sweet, fresh smelling silage with a very bright color. Nutri-Lock treated silage has minimum protein breakdown and nutrient preservation that lasts for many years (>3) at a very affordable cost.



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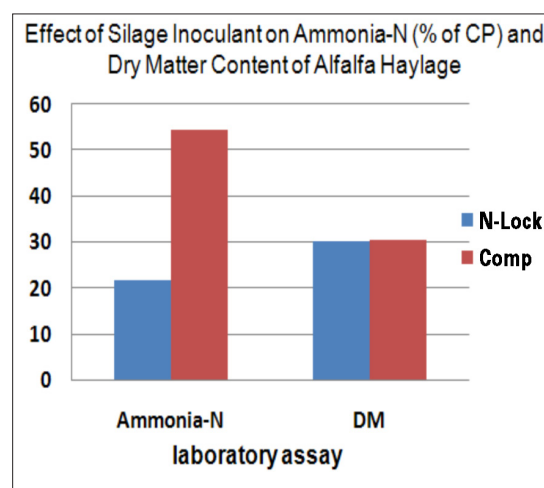
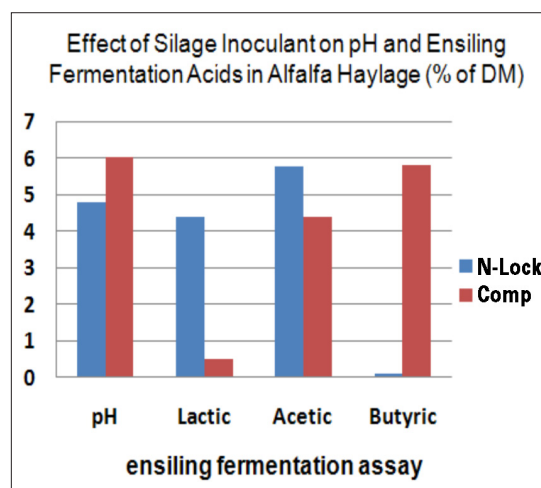
Nutri-Lock for Haylage

Effect of Nutri-Lock Silage Inoculant Compared to competitor inoculant on the Profitability of Alfalfa Haylage

Methods:

Experiment took place at a feed-yard in Southwest KS
First cutting alfalfa haylage was harvested in 2009
Silage inoculant was applied at the cutter
Bunker silo, well packed, covered with plastic and tires
Samples collected off the silo face, late spring, 10 months of storage

Results:



1. Alfalfa haylage treated with Nutri-Lock had a more efficient fermentation, lower final pH, higher concentration of lactic acid and less butyric acid
2. Haylage treated with Nutri-Lock had less protein degraded (22 % vs 54 %)
3. Nutri-Lock had better ensiling performance than competitor, and this occurred at a similar dry matter content

The Nutri-Lock advantage:

1. **17.4 lb. more DM/ton ensiled** = \$2.18 @ \$250/ton DM (DM value)
2. **38.4 lb. more CP/ton ensiled** = \$9.60 @ \$500/ton DM (protein value)
3. Total Nutri-Lock advantage = **\$11.78 per ton ensiled**



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Productivity data

- Inoculants provide a 3- 5% increase in dry matter preservation
- Dairy cows that consume inoculated alfalfa silage produce an average of 3% more milk
- Dry matter intake increase 4.9%
- Average daily gain increase 6.8%
- lbs. feed per lb gain . . . improved 1.8%
- Improved protein retention by 7%
- Minimize silage runoff or weeping
- Nutri-Lock results in less ensiling DM Loss and a bigger feed intake resulting in better overall production

High Moisture Corn Comparison

LABORATORY TEST RESULTS:

Feedstuffs	Moisture	D.M.	Protein	TDN	DDM	Value as Fed	Value DM
Sample #14 Hi Moist Corn with Control	26.3	73.7	7.8	81.2	83.76	\$150.39	\$204.08
Sample #15 Hi Moist Corn with NUTRI-LOCK	26.5	73.5	8.2	88.8	86.8	\$190.02	\$258.51

TEST RESULTS:

NUTRI-LOCK = \$258.51

Control = \$204.08

Nutri-Lock Advantage = 26% Better than Controls

**High moisture corn treated with Nutri-Lock gold was nutritionally worth 26% more than untreated control.*



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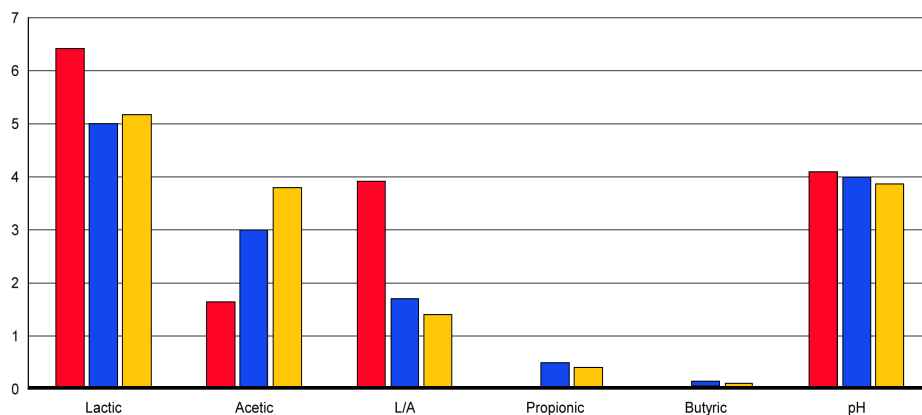
Fermentation Report

VIT-E-MEN CO/ LIFE PRODUCTS
JACOBS 1

Feed Type: CORN SILAGE
Statement ID: JACOBS 1
Description:
Sample #: 18904970
Date: 01/18/2013

Component	DM Basis	Goal	Typical Value for DM Range 28 - 30
Dry Matter, %	29.12		
Lactic Acid, %	6.42	> 4	5.17
Acetic Acid, %	1.64	< 3	3.79
Lactic/Acetic Ratio	3.91	1.6 - 3.0	1.40
Propionic Acid, %	0.00	< 1	0.40
Butyric Acid, %	0.00	< 0.1	0.03
IsoButyric, %	0.00		
Total Acids, %	8.06	7.0 - 12.0	9.40
pH, as sampled	4.10	< 4	3.86
Crude Protein, %	10.98		
Ammonia, CPE %	0.51		0.78
Amm-N, % of Total N	4.67	8.0 - 15.0	9.20
VFA Score	8.53	6.0 - 10.0	

Your results vs. typical & goal values



Legend: Red bar = your results (Nutri-Lock). Blue bar = goal value. Yellow bar = typical values.

Typical values: Averages including normal and abnormal values. They are provided only as a reference.

Goal values: In general, greater lactic and L/A values are desirable along with lower values for the remaining analysis (other organic acids).

Analysis of 2012 corn silage from Central Nebraska. Results typical for corn silage treated with Nutri-Lock and properly packed in a timely manner.



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Species of Bacteria

Pediococcus Acidilactici - most dominant silage bacteria discovered. Will make more lactic acid per unit of time, with varying temperatures and moisture and will ferment any crop in the silo. Won't quit till the job is done.

Enterococcus Faecium - Very tough bacteria, not as fast as pediococcus but will survive under most any conditions, will dominate in the fermentation under the worst of conditions.

Lactobacillus Plantarum - Will ferment very rapidly under "optimum" conditions (temperature and sugar source) to get lactic acid in the pile.

Lactobacillus Brevis - Like plantarum, it will dominate under "ideal" conditions. Produces lactic acid and other end products that promote stability at feed out.

Lactobacillus acidophilus - a very good lactic acid producer under ideal conditions and will produce other substrates during fermentation to aid in aerobic stability during feed out.

Enterococcus Cremoris - Tough bacteria that survive and will produce lactic acid under very challenging conditions. Add to the stability of the pile

Enterococcus Diacetylactis - Very hearty lactic acid producing bacteria that will survive under all practical field conditions. Add to the stability of the primary fermentation.

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Having a blend of different species of bacteria that are active at varying levels and conditions, significantly adds to the stability of the primary fermentation of fermented feed-stuffs. All inoculants lower pH with lactic acid up front at varying rates. Nutri-Lock's combination of bacteria is better able to manage primary fermentation and with its secondary fermentation is able to HOLD the desirable, sweet, and fresh smelling silage for over a year (even beyond 3 years). No one else can do this. Nutri-Lock works in corn silage, high moisture corn, small cereal grain silage and alfalfa haylage, like nothing else can.



To purchase Nutri-Lock or for further information
please call Life Products @ 800-658-3120

www.lifeproductsinc.com

