

PASTURE GOLD

Bacterial Silage Inoculant

Dairytech Nutrition has been involved in silage inoculants for the past twenty years. Throughout that period there have been numerous changes to the products we've marketed as science develops better knowledge of fermentation and, in more recent years, animal performance relevant to various bacterial strains. At Dairytech Nutrition, we purchase bacteria for our inoculants and manufacture finished products here in Australia. Consequently, we have the advantage of upgrading bacteria species and strains in accordance with best independent research information.

Bacteria

Pasture Gold contains *Lactobacillus planterum* and *Pediococcus pentasaceus* bacteria, both registered under very stringent EU registration protocol requiring evidence of improved fermentation qualities and animal performance against control in proof trialling. Pasture Gold also contains a proprietary enzyme formulation which breaks down indigestible fibre to sugars improving digestibility.

Pasture Gold is available in either granular form or water soluble form. Pasture Gold granular can be applied via a Gandy applicator as below. Pasture Gold Water Soluble is applied using a Goldacres Upright Hysi 100lt applicator, also available from Dairytech Nutrition



GANDY POLYCAM
Capacity: 50kg



GANDY P45
Capacity: 25kg



HYSI WATER APPLICATOR
Capacity: 100Ltr

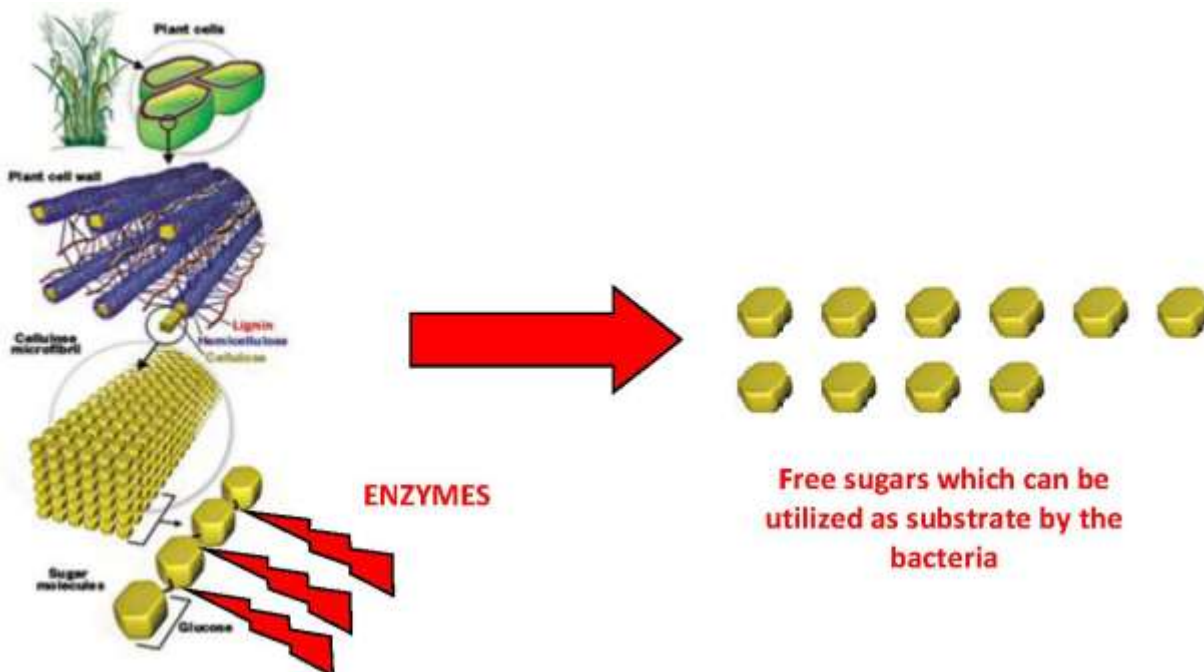
ENZYMES

Technical Bulletin

Description & mode of action

Enzymes are proteins facilitating natural reactions. All biochemical reaction involved in life need enzymes. Enzymes are also used in many industries like textile, bakery, winemaking, fruit juice, washing powders.

For silage making, 2 families of enzymes are of interest: cellulase (Beta-glucanase) and hemicellulase (Xylanase). These enzymes have the capacity to transform a part of the plant cell wall (cellulose/hemicellulose) into simple sugars (like glucose) which can be used by the bacteria.



In silage additives, enzymes are described in the label by : the activity, the strain producing the enzyme, the registration number and the guaranteed activity.

Example:

Beta-glucanase from *Aspergillus niger* MUCL 39199 (EC 3.2.1.6)

>1150 IU (DNS) /g

Xylanase from *Trichoderma longibrachiatum* MUCL 39203 (EC 3.2.1.8)

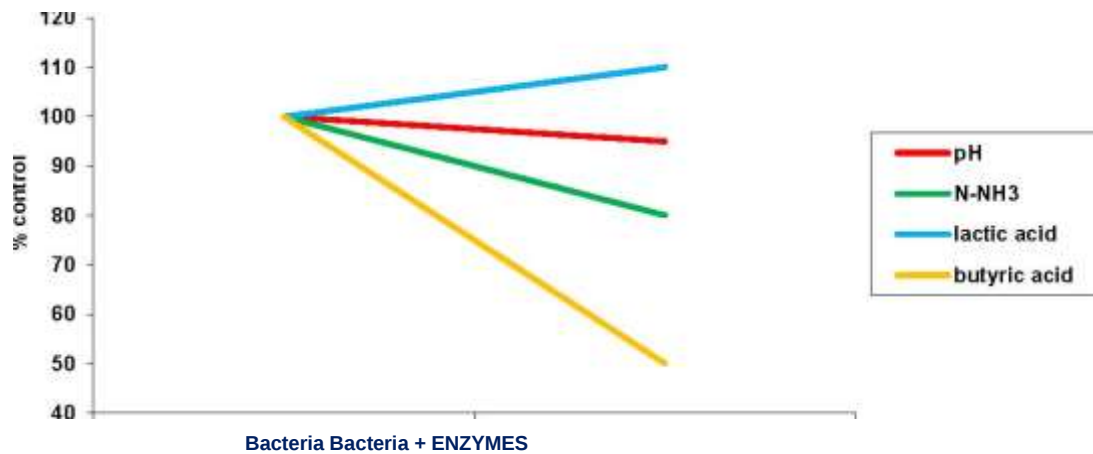
>6000 IU (DNS) /g

Benefits of using enzymes when making silage

- Fermentation aid

Silage preservation is based on the production of lactic acid by lactic bacteria. To produce lactic acid these bacteria need some food which is simple sugars (also named water soluble carbohydrate, "WSC" in silage analysis). The quantity of these sugars is dependent on the plant and the growing conditions. As example, legumes like alfalfa are naturally poor in WSC. In this case the bacteria do not have enough sugar to produce the quantity of lactic acid needed to preserve the silage. The use of cellulase and hemicellulase increase the quantity of food available for the bacteria to make sure that they will be able to drop the pH at a good level by producing enough lactic acid.

Efficacy of specific ENZYMES on fermentation (INRA registration trials)

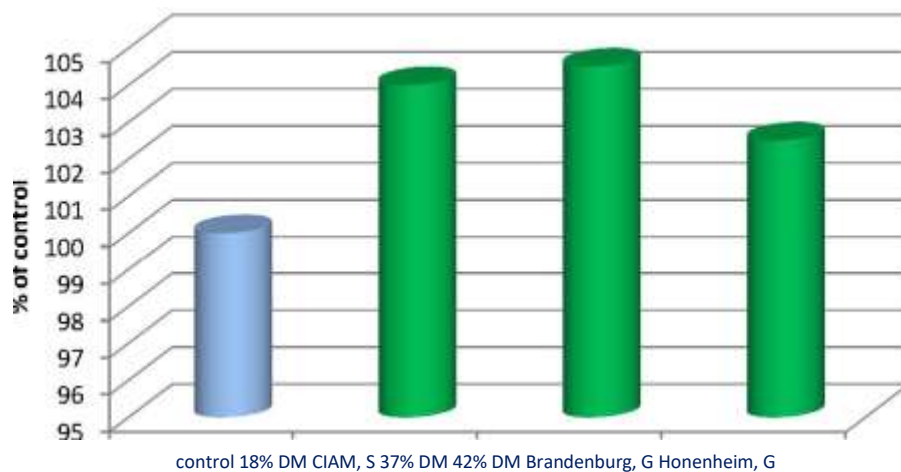


-Digestibility aid / Feeding value improvement

Even if the rumen microflora is able to digest the cellulose, this digestion takes time and is never 100% achieved during the transit time. The use of cellulase and hemicellulase at ensiling is pre-digesting a part of the cellulose increasing the digestibility of the forage by the animal and consequently increasing the energy available from this forage. As example, a decrease of 10g/Kg DM of NDF is equivalent in term of energy to 13Kg of wheat per tonne of DM ensiled, or the equivalent of 30 litres of milk per tonne DM.

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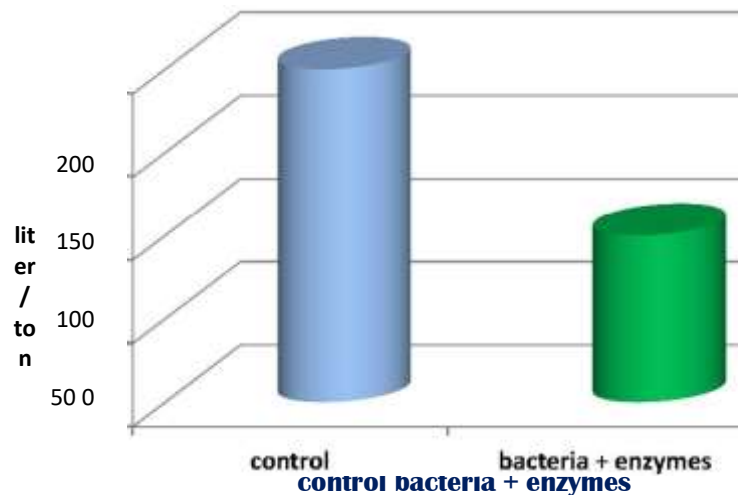
Digestibility improvement of silages treated with a silage additive containing enzymes



-Effluent reduction

When silage dry matter is low, some effluents are released during the storage. These effluents are rich in nutrient (like protein) which are washed out of the silage. By “opening” the cell walls, cellulase and hemicellulase are increasing the surface of absorption of the effluent by the plant. More nutrients are retained into the silo and stay available for the animals.

Effect of silage additive containing enzymes on the quantity of effluents of a 18% DM grass silage (ADAS, UK)



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Enzymes efficacy and dose

Enzymes are very concentrated and active compounds. Few grams per ton are used in many industries (bakery, winemaking, animal feed/). The activity units are not standard (each producer as his own activity) this is why the enzymes efficacy has to be evaluated from the product efficacy data and/or the registration instead of comparing the numbers written in the label. Enzymes are so active that the quantity per treated tonnes has to be precisely defined to make sure that the benefits (fermentation, digestibility and effluent reduction) will be obtained without destroying the plant structure which is necessary for a good rumination.

Activity & pH

All cellulase and hemicellulase are not adapted to silage conditions. Each enzyme has an optimal pH of activity. Enzymes have to be selected on their ability to be active during all the fermentation process.

Effect of pH on enzymes activity

