Get More Out of Your Corn Silage with BioStabil® Mays

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Corn silage is successfully grown around the world in most climates, but timely harvesting and correct ensiling procedures are required to ensure the highest quality is achieved. Adding BioStabil® Mays to harvested material will ensure protection against a wide range of pathogens, maintaining forage quality and delivering animal performance.

On most dairy and beef farms today, we see corn silage in the ration. Why is corn silage so popular in milk and meat production?

In many different geographical regions around the world, corn silage is the main ingredient of cattle diets. It provides an excellent source of energy along with fiber to stimulate chewing activity. It has a high value not only from the animal's perspective in terms of a high nutrient content to support production, but also from the profitability and economic point of view of the farmer, as it is able to improve feed efficiency and achieve high levels of animal performance.

The maize plant, although originally from Central Mexico, has adapted and grows well in a wide range of climates and on many different types of soil. Even in regions with unpredictable rainfall, corn for ensiling grows and remains a more reliable source of nutrients than other forages. However, in order to become a valuable and palatable diet ingredient, it must be harvested in a timely manner and preserved appropriately. If the ensiling process of a very good corn crop is poorly executed, problems will arise for the farm manager and the animals at feed-out.

IN BRIEF

- Corn silage is used in ruminant diets globally as an excellent source of energy and fiber.
- While corn is able to grow in many climates, the quality of corn silage is greatly affected by time of harvest and the ensiling procedures used.
- The silage harvest typically occurs when either plant condition or harvesting conditions are compromised, increasing the likelihood of the silage being contaminated with pathogens.
- Adding BioStabil® Mays to harvested material will protect against pathogens before ensiling, ensuring that silage quality and subsequent animal performance are as high as possible.

What could farmers do better when managing corn plants for silage?

The best methods for growing corn and preserving silage come from the very good farms. However, in practice, crop management looks very different from farm to farm.

Some farms manage silage perfectly well and others not so well. It often happens that a good crop brought in from the field dramatically loses its nutritional value during storage in pits and silo bunkers, and during feeding out. Heating of the silage in storage and on the feeding table is very common. Small changes due to improper management of the fermentation stage happen very often, leading to complaints about reduced feed intakes.

Why is harvest time so important in silage production?

In practice, the maize harvest for silage takes place in one of two ways. It either falls in the very busy time of late summer, when there is increased workload and a shortage of time, machinery and people due to all the other necessary work that must be carried out, resulting in the maize harvest being delayed. Alternatively, harvest falls in early autumn as one of the last fieldwork tasks of the year, in the period of lower

temperatures, shortening days and frequent rainfall, which hinder or prevent the entry of machines into fields. Neither of these situations is ideal.

If late summer harvesting happens in southern countries, the undesired drying of leaves, stems and kernels promotes the development of fungi and other harmful microorganisms. These are then transported with the plants and stored in the silo. Over time, starch in the kernels changes into a less available form. The dried leaves and stalks become less digestible for the animals and more difficult to cut down into short pieces for proper compaction. There is likely to be a high level of mycotoxin contamination, causing further problems when the contaminated silage is fed.

With early autumn harvesting more popular in cooler regions located further north, maize has a very slow start after planting due to the reduced soil temperature. In many cases, the corn must be harvested before the grain is fully matured, due to the high risk of early frost. In those regions with prolonged periods of coolness accompanied by abundant, long-lasting rains, the harvest of immature plants is further hindered by poor field conditions, preventing the use of harvesting machines. Both scenarios cause further problems with ensiling and feeding out.

What kind of problems can we expect with delayed harvest or harvest of immature plants?

Any delay to the silage harvest will increase the risk of contamination with fungi, molds and yeast. This causes both aerobic and anaerobic instability of the ensiled material, leading to a significant reduction of nutrients.

Dried plants are more difficult to cut and many leaves are left uncut, having slipped through the knives of the harvester, making them resistant to compaction. Proper compaction of such a material is almost impossible; a lot of oxygen will remain hidden in the stems, which will cause further problems with yeast activity and a general instability of the ensiled material due to heating.

Plants harvested with a relatively low dry matter content in rainy, wet conditions are exposed to significant soil pollution with high risk of *Clostridia*, *Listeria* and *Enterobacteriaceae* contamination.

All pathogens that are present on plants will also be present in the storage silo, competing for nutrients including carbohydrates and proteins. During their growth, microorganisms will also carry out their own fermentation. For example, the presence of *Clostridia* leads to higher levels of butyric acid, and alcohol is a result of yeast fermentation in the silage. The result is not only a significant reduction in the nutrient content of the stored material but also poor palatability. *Listeria* is responsible for abortion and mastitis problems on farms. *Enterobacteriaceae*, which is very common in wet silage, converts plant sugars into acetic acid, ethanol and CO_2 with high nutrient loses, a bad smell and compromised palatability.

Is there a method to prevent these undesirable microorganisms from getting into the ensiled material or to kill them before storage?

Unfortunately, there is no such method. We cannot shake or wash them out of the plants prior to ensiling. Nor can we use a chemical treatment as the forage needs to be safe and palatable for the high-producing animals it is being fed to.

The only way to reduce the microorganism content is by creating conditions in the ensiled material that will quickly stop or at least limit their growth. Unfortunately, this is not an easy task. When the growth of *Clostridia* and *Enterobacteriaceae* limit the rapid reduction in pH, yeast and *Listeria* can still cope with only slightly acidic conditions. Compaction and elimination of oxygen will also not always work as yeast and *Clostridia* are not affected by oxygen reduction. Yeast can survive under both aerobic and anaerobic conditions and *Clostridia* needs anaerobic

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Table 1.
Control of harmful microorganisms present in silages

Parameter	Microorganisms				
	Listeria monocytogenes	*Clostridia*	*Enterobacteriaceae*	Yeast	Molds
Anaerobiosis Compaction	+++	—	+++	+++/-	+++
pH *L. brevis* *L. plantarum*	+++	+++	+++	—	—
Lactic acid* (fermentation) *L. brevis* *L. plantarum*	+++	+++	+++	—	—
Acetic acid* (Feed out) *L. kefiri* *L. brevis*	+	+	++	+++	+++

— Low inhibition + High inhibition * Factors influenced by inoculants

conditions for growth and reproduction. *Table 1* shows some methods of controlling microorganisms.

Is there a method that will limit the growth of harmful microorganisms in such a complicated situation?
BioStabil® Mays from BIOMIN is a new solution for ensiling corn with such a wide range of pathogens. BioStabil® Mays is an inoculant with a broad spectrum of protection covering a wide range of harvested corn dry matter contents. BioStabil® Mays contains a unique combination of the strains that effectively fight the pathogens during the ensiling process of maize plants (*Table 1*).

This unique combination of strains includes:

- *L. kefiri,* a novel hetero-fermentative bacterial strain that works very efficiently against aerobic yeast, causing secondary fermentation in high dry matter silages.
- *L. brevis*, also a hetero-fermentative strain that works very effectively in low dry matter silages, with strong pH reduction and high efficiency in reducing *Clostridia* and *Listeria* in ensiled materials.
- *L. plantarum*, a strong homo-fermentative strain leading the fermentation process, limiting *Enterobacteriaceae* and other coliforms.

Does using Biostabil® Mays on silage guarantee the best quality corn silage for efficient milk and meat production?
In the past, different methods have been tried with varying results. The search for even better results is still ongoing but today, BioStabil® Mays offers the best solution for silage production.

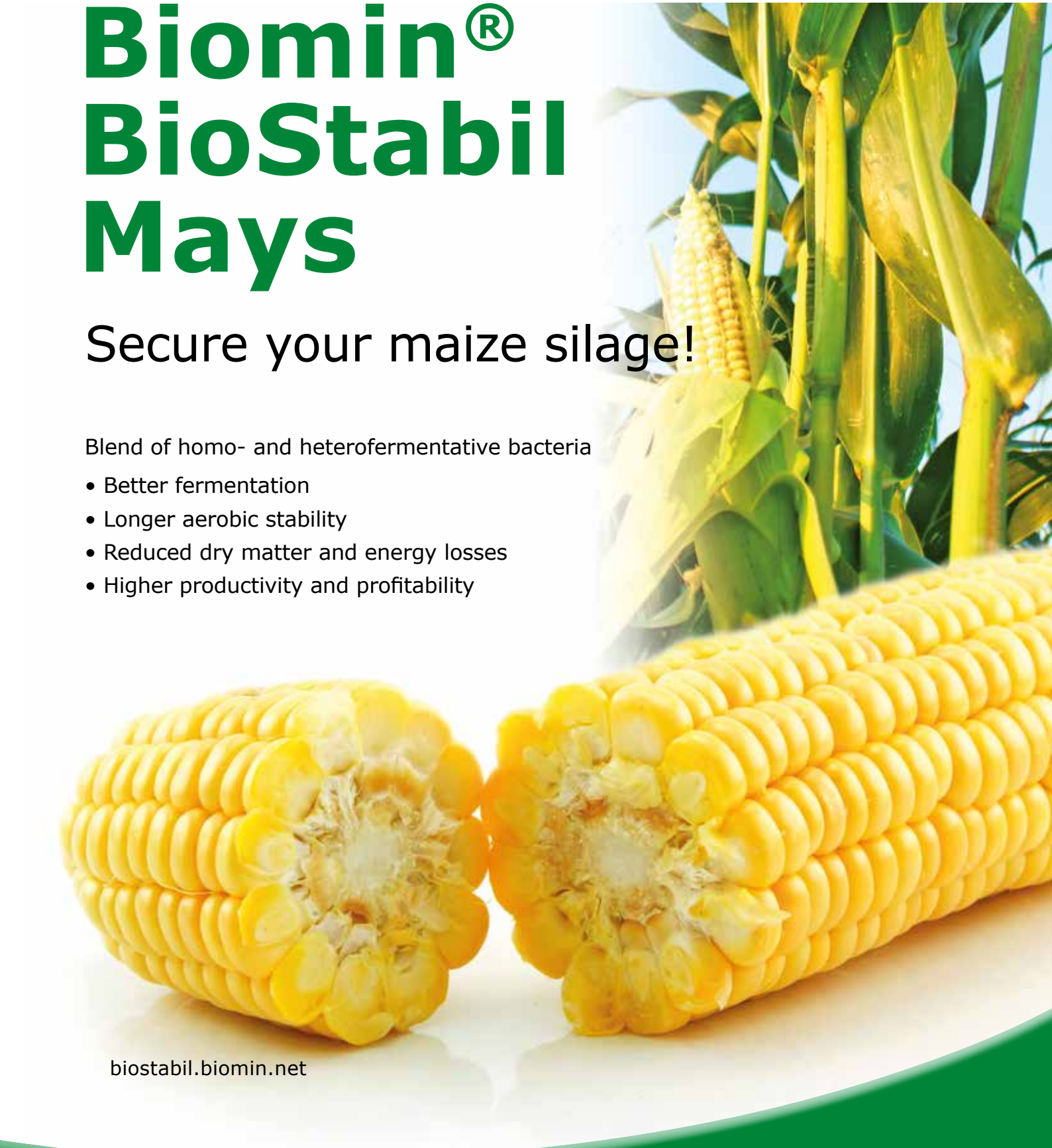
Forage is the main component of the ration. In order to reduce costs on farm, forage quality needs to be high. With high-quality, well-preserved forage, we can expect high dry matter intakes and better digestibility of nutrients, followed by enhanced feed conversion, and ultimately higher farm profitability.

Proper silage management consists of:

1. Proper harvest and timely storage of the harvested material
2. Adequate cutting length of the material with crushing of the kernels
3. Uniform application of BioStabil® Mays on harvested material
4. Compaction, compaction, compaction
5. Timely covering of the compacted material
6. Ongoing silage face management

Biomin® BioStabil Mays

Secure your maize silage!



Blend of homo- and heterofermentative bacteria

- Better fermentation
- Longer aerobic stability
- Reduced dry matter and energy losses
- Higher productivity and profitability

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