

## Secure farm revenue, focus on maize silage quality

To increase profit margin, basic economics tells livestock producers they can either increase income or reduce cost. Feeding represents the primary expense for dairy farmers. Maintaining good silage quality can help leverage dairy income and reduce extra farming costs such as feeding and health related costs.

### Silage quality influences feed efficiency

Improving milk yield is about improving the cow's energy intake. In high forage rations, a cow's feed intake is restricted by physical fill of the ration in the rumen. In that situation, feed intake can be improved through two options:

1. **Outsourcing extra feed** to reduce the forage ratio and massively increase energy concentration. However, when adding replacement feed, extra farming costs significantly increase, especially in the actual context of increased crop prices in the marketplace.
2. **Protect the energy potential of forage.** Farmers have made significant investments into machinery, fertilizers and/or irrigation to maximize crop value. They need to protect this investment by preserving homegrown forage with the greatest amount of digestible organic matter per kg of dry matter (OMD).



### Preserve feed potential by promoting efficient fermentation

Up to 25% of the energy of silage is found in fermentation acids. Thus, the formation of non-lactic volatile fatty acids (VFAs) represents a loss of energy for the animals. Non-lactic VFAs are inefficient. Conversely, the more efficient the fermentation, the more energy can be preserved.

Maturity of the plant material is the main factor influencing silage digestibility. However, the amount of digestible organic matter filled into the silo is affected by the fermentation process. The faster and more efficient the fermentation process, the less loss of digestible organic matter during the fermentation. Silage inoculants are microbial-based products developed to help improve and speed up the fermentation process, preserving forage value.

### Promote an effective fermentation with silage inoculants

Research trials with maize silage show how the use of appropriate silage inoculants can contribute to improve the maize fermentation profile and reduce the loss of dry matter during ensiling. This is partly due to the ability of the inoculant to promote a rapid and efficient lactic acidification at ensiling, leading to a higher lactic acid to acetic acid ratio (Figure 1). In addition, forage is more stable at feedout, reducing further losses of energy through heat formation. Such results have been confirmed in on-farm settings (Figure 2).

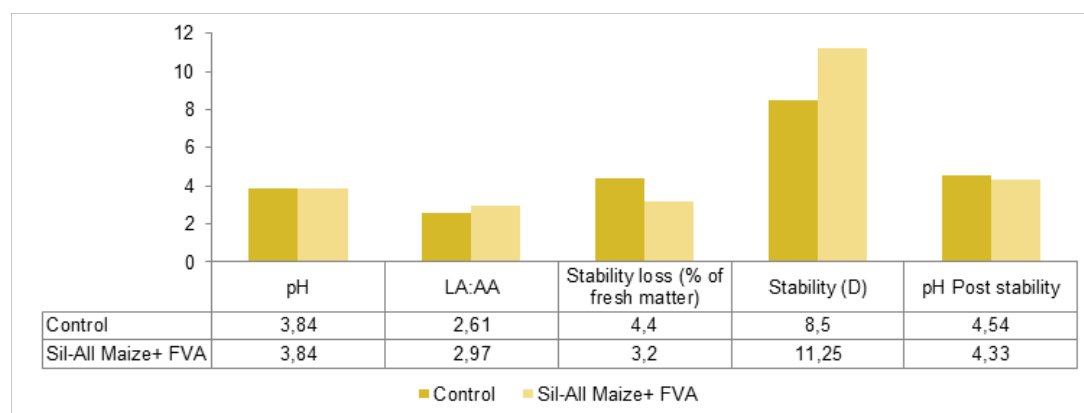


Figure 1: Effect of silage inoculant (Sil-All Maize+ FVA) on maize silage (31% DM) fermentation parameters, preservation and aerobic stability (mini silos, Ing Latre Trial Station, University College of Ghent, Belgium, June 2013).

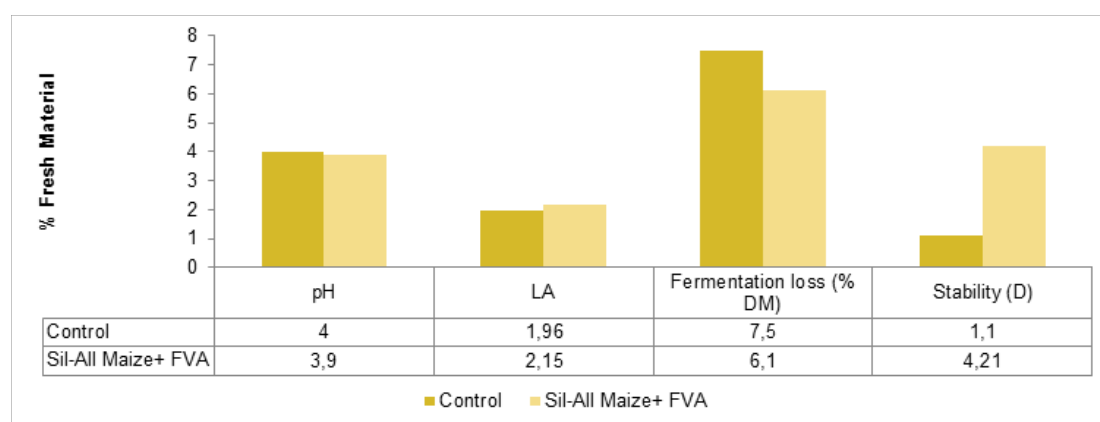


Figure 2: Effect of silage inoculant (Sil-All Maize+ FVA) on maize fermentation parameters and aerobic stability (32% DM silage, bunker silos, Stara Raca Trial Station, Croatia, June 2014)

### Silage quality and protein metabolism

The ability of cows to convert feed protein into milk is also dependent on silage quality. During fermentation of silage, different microorganisms degrade plant protein into peptides, amino acids and finally ammonia nitrogen. When cows eat silage, ammonia nitrogen is used by the bacteria in the rumen for protein synthesis. The more proteins are available, the better animals perform (milk or meat production).

### Control fermentation process to maximize animal production

The efficiency of the protein synthesis in the rumen is dependent on the immediate availability and nature of ammonia nitrogen, carbohydrates and amino acids available in silage. If carbohydrates are not immediately available in sufficient amounts in the rumen, ammonia nitrogen is removed from the rumen, transported to the liver, converted into urea and lost in urine. Therefore, the less plant protein

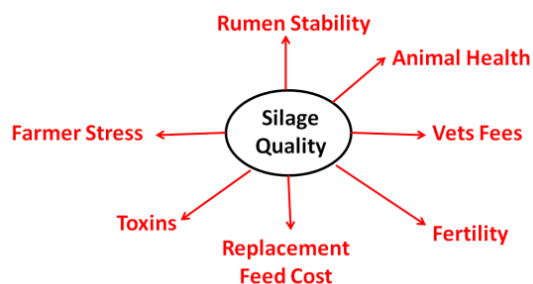
degraded during the fermentation of silage, the more feed protein the cow can use directly for milk production.

### Healthy silage for healthy cows

The quality of silage impacts not only nutrition, but also other aspects of animal production, such as animal health, another criteria of farm profitability. First, the development of molds in poor quality silage can lead to the production of mycotoxins, which greatly impact animal health. The decomposition of proteins or amino acids by undesired bacteria in silage can also lead to the formation biogenic amines (histadine, putrescine, cadaverine, spermidine, tyramine, etc.). Biogenic amines have been linked to various health issues such as ketonemia, systemic histaminosis and reduced nitrogen degradability. A positive correlation exists between increasing dry matter and reduced biogenic amine concentration and between a faster fermentation and reducing biogenic amine. Use of heterolactic inoculant to increase the speed of fermentation can therefore help to limit biogenic amines formation (1). Moreover, poor aerobic stability at feedout can also lead to the development of aerobic bacteria, which have an impact on animal health, but also on food quality and safety, such as enterobacteria, butyric acid producing *Clostridia*, or *Listeria* spp. Optimal silage fermentation and preservation can thus have an indirect impact on animal health and help reduce health related costs.

### Conclusion

There is more than one benefit to ensuring good quality silage. While feed efficiency can be optimized, extra costs can be reduced. The greater the silage quality, the less the replacement feed costs and, generally, the greater the animal performance. In addition, health related costs can be reduced, as well as long term revenue improved.



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### Reference

(1) Van Os et al, J Agroc Sci 1995; 125: 299-305