Selko® TMR Dry

Prolong the shelf-life of TMR

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Selko

The impact of microbial activity on dairy feed quality

Roughage quality is a key success factor for efficient dairy production. Four important phases are essential to ensure a TMR contains top quality roughage once it is in front of the animals[1]:

- The initial aerobic phase in the silo immediately after harvest
- The fermentation phase
- The stable storage phase in the silo
- The feed-out phase

During this feed-out phase, the silo feed face is open, and the material is exposed to air immediately before, during, and after its removal from the silo. This is where **Selko TMR Dry** comes in.

Fresh TMR contains yeasts, moulds and bacteria and these micro-organisms reduce the feeding value as well as the palatability of your feed. Growth of micro-organisms in TMR starts once the ingredients have been exposed to oxygen in the air and is temperature dependent. On a warm day in the summer, increases in temperature of the TMR of more than 20°C as a result of growth of micro-organisms and fermentation are not uncommon. Per degree of increase of temperature, 0.25% of the dry matter will be lost, so losses of 5% of dry matter are not uncommon (Figure 1). This can result in a reduction of milk production by 10%[2], even in the absence of a drop in dry matter intake.

Figure 1: Spear-thermometer indicating 49°C at the cutting edge of a corn silage with ambient temperature of 18°C.

Trends show that as a result of global warming, circumstances in which heating of TMR occurs will be more common (Figure 2).

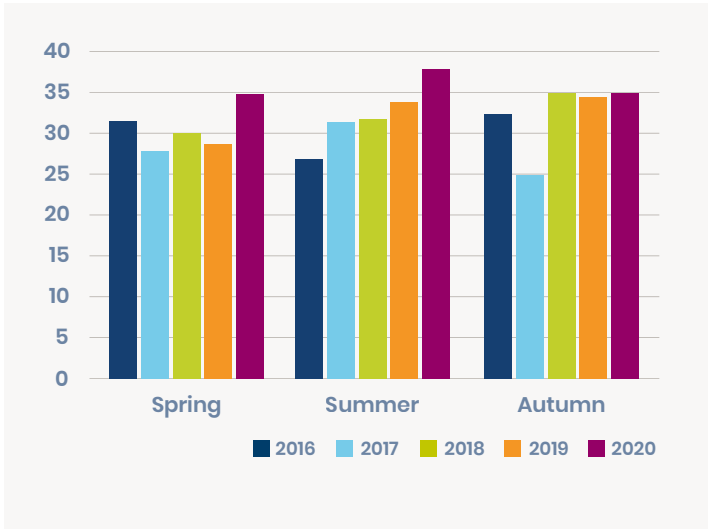

Figure 2. Heating index of grass silage in spring, summer and autumn. A heating index of 35 or above is suggestive of a serious problem with heating, leading to a significant reduction of quality of the silage.

Growth of micro-organisms results in loss of feeding value of the TMR because the most easily fermentable proteins, carbohydrates and starch are fermented into water and CO_2 (Figure 3) reducing the dry matter and therefore nutritional value of the feed.

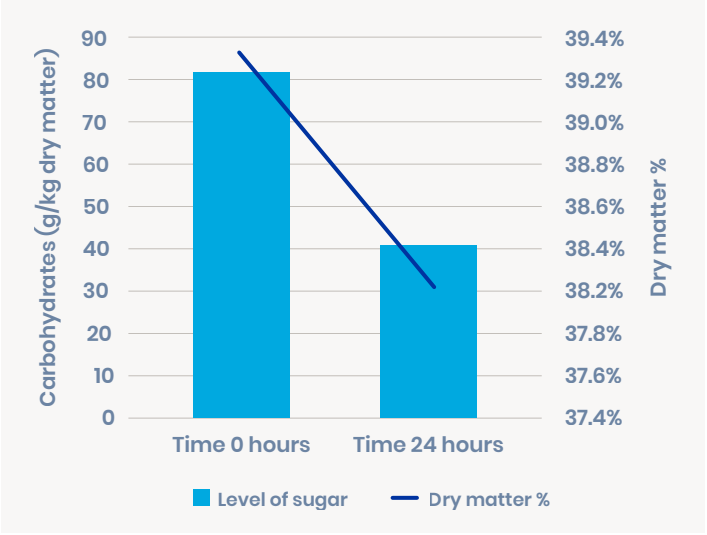

Figure 3. Effect of fermentation on sugar levels (light blue bars) and dry matter percentage (dark blue line) of an untreated TMR. Sugar level was reduced by 50% over a period of 24 hours.

Heating is defined as an increase of 10°C of the TMR above the ambient temperature. It is important to realise however that significant growth of yeasts can already occur at much lower temperatures of the TMR. Several studies[3] have shown that growth of yeasts in a TMR will result in a drop of both dry matter intake and milk production (Figure 4).

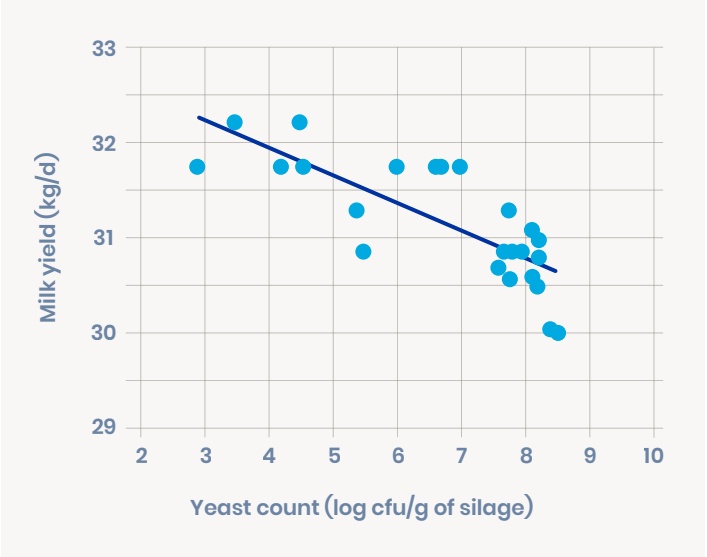

Figure 4. Relationship between milk production and yeast count in aerobically unstable high-moisture corn.

With feed costs accounting for 60% of the variable costs on a dairy farm, it is important to reduce growth of yeasts, moulds and bacteria. This in order to maintain animal performance and increase your income over feeding costs. Once environmental temperatures start rising, performance of the herd is under pressure for three reasons. Firstly, animals could potentially suffer from heat stress resulting in a decrease of dry matter intake. Secondly, the reduction of palatability will lead to a further reduction of dry matter intake. Lastly, the feeding value per kg of dry matter consumed will drastically go down.

How can we reduce the negative impact of microbial growth?

The quality of the initial raw materials has a big impact on the level of yeasts, moulds and bacteria. Contamination at harvesting should be avoided as much as possible, and silos should be closed as well as possible to reduce exposure to oxygen. Growth of micro-organisms can be reduced further by using silage preservation products.

Contamination of the raw material with micro-organisms can never be avoided completely. Even if the harvesting and conservation of the silage has been optimal, low levels of micro-organisms will be present at feed-out. Once the silage is opened, the raw material will be exposed to oxygen and moisture. In silages with a low product density, air easily can penetrate 1 meter from the surface[4]. As a result, micro-organisms will be triggered to grow again. Particularly if ingredients with a high moisture content are being used or if water is being added to the TMR, heating can become a serious problem. This is where **Selko® TMR Dry** comes in.

Selko TMR Dry inhibits growth of micro-organisms

Selko TMR Dry is a synergistic blend of organic acids. Organic acids are known for their growth inhibiting properties on micro-organisms like moulds, yeasts and bacteria. When used in a TMR, growth of micro-organisms is inhibited which controls fermentation and as a result heating of TMR. Studies showed that yeast count in TMR treated with Selko TMR Dry was around 91% lower at 12 hours and around 83% lower at 24 hours after TMR production compared to untreated control (Figure 5).

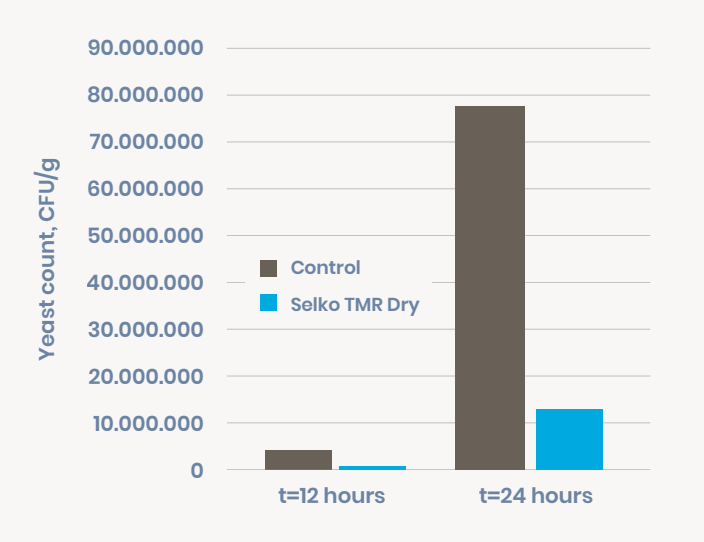

Figure 5. Effect of Selko TMR Dry on the growth of yeast in a TMR after 12 and 24 hours

In the same study it was found that, as a result of the reduction of yeast growth, increases in temperature of TMR was delayed by at least 12 hours in TMR treated with Selko TMR Dry (Figure 6).

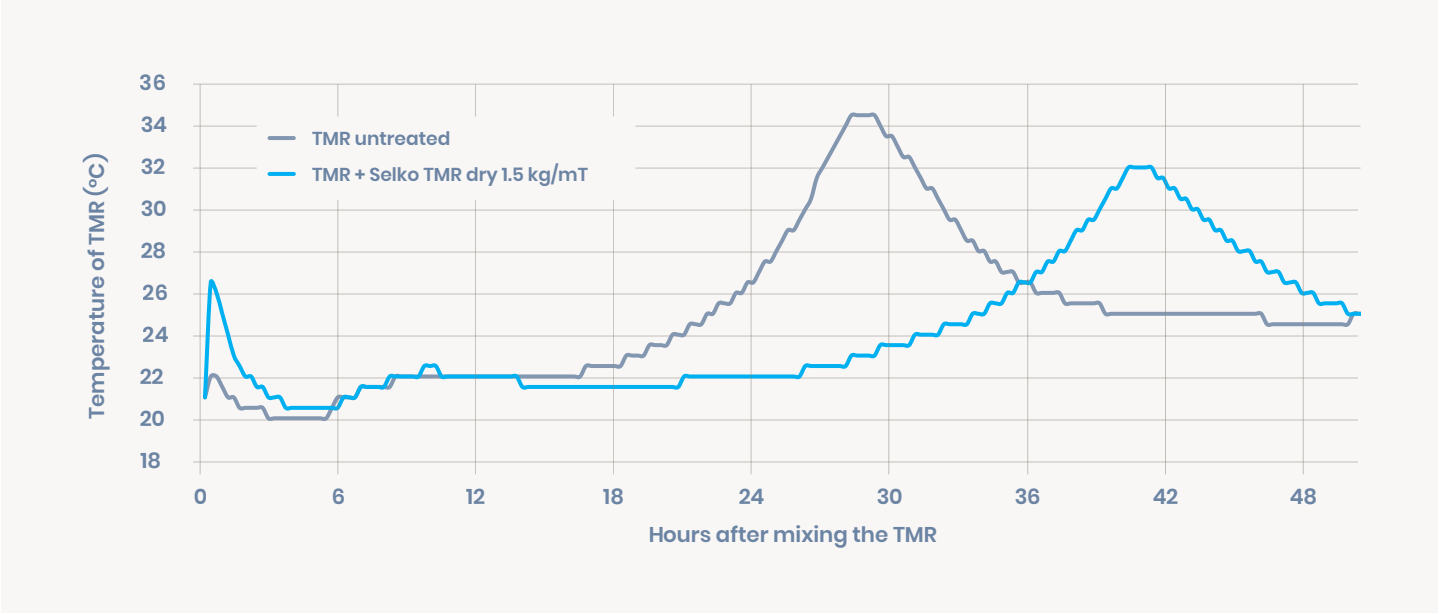

Figure 6. Temperature stability of a TMR treated with Selko TMR Dry compared to untreated TMR.

"Feed intake is an important driver of milk production on my farm. Since I use the Selko TMR product, palatability of my ration is secured. If cows eat 0.5 kg of dry matter extra, they will produce 0.7 kg of milk more. For a herd with the size I have, this means 200 kg of milk per day extra, more than enough to justify the investment in a organic acid based TMR stabilizer."

Farmer Ceusters, Geel, Belgium:
- 250-275 dairy cows
- Annual production of 10.600 kg of milk per cow

EXPERT OPINION

Preserve nutritional value and maintain palatability of your ration with Selko TMR Dry

Selko TMR Dry is presented as a powder, which makes it very convenient for mixing into a TMR. The standard amount of Selko TMR Dry to be added to the feed is 1.5-2.0 kg of Selko TMR per 1,000 kg of TMR. When loading the mixing wagon, it is recommended to load the raw materials with the highest risk for heating first. When bicarbonate is being used, add it after all other ingredients have been mixed.

It takes approximately 5-7 minutes to produce a uniform mixture of product and feed. The use of Selko TMR Dry depends strongly on the quality of the raw materials, the humidity and the outside temperature.

Add 2 kg of Selko TMR Dry to 1,000 kg of TMR if the risk of heating is high:
- If grass silage with more than 45% of dry matter or corn silage with more than 38% dry matter is included in the TMR
- If the cutting edge of the silage is irregular
- If water is being added to the TMR
- If the environmental temperature is above 21 °C
- If the feeding frequency is once per 2 days
- If a premix of ingredients is being made

Use Selko TMR Dry to preserve the value of your ration

- Selko TMR Dry reduces the growth of microorganisms like moulds, yeasts and bacteria
- This reduces aerobic fermentation and as a result, the temperature of your TMR will not increase as fast
- Because the growth of microbes is inhibited, they consume less of the nutrients, which helps maintain the nutritional value of the TMR.
- The ration will remain palatable, resulting in an increase in dry matter intake

These benefits result in a great return on investment for your farm.

References

1) Borreani, G, Tabacco, E, Schmidt, R.J, Holmes, B.J. and R. E. Muck (2017). Silage review: Factors affecting dry matter and quality losses in silages, J. Dairy Sci. 101:3952–3979.
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3) Hoffman, P. C. and S. M. Ocker (1997). Quantification of milk yield losses associated with feeding aerobically unstable high moisture corn. J. Dairy Sci. 80(Suppl. 1):234.

For more information about the science behind Selko visit:

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Selko is the Feed Additives brand of Nutreco. In an era defined by global trends that include increased regulation, pressure to reduce antibiotics, climate change, raw material shortage, and scarcity of land use, the demand is rising rapidly for sustainable and safe feed-to-food production. Selko products and services help to achieve this.

Selko specializes in research-proven feed additives to animal feed that help reduce harmful microorganisms and mycotoxins at various stages in the feed-to-food chain, leading to improved quality at the feed mill and fa rm level.

We offer a wide range of solutions related to health and mineral optimization. All aiming to support animal health and help reach your animals' full production potential. This way, we help you get the best results for you, your animals and your customers.

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