

No 142: Stability of Buffer Feeds and Mixed Diets

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Research at the Nutreco Ruminant Research Centre (RRC) has identified that mixed diets can be subject to significant spoilage after feeding. This is of no surprise since the high moisture and nutrient content is an ideal medium for the development of yeasts and moulds which, in warm conditions, can develop rapidly causing significant deterioration of the feed quality of the mix.

The practical consequences of this include:

- Heat development from yeast and mould activity reduces feed dry matter (a rise in temperature of one degree C reduces dry matter content by 0.25%).
- Intense microbial activity in the TMR leads to processes that produce negative changes in both the taste and smell of the feed.
- Increased wastage of mixed feed can result from lower appetite.
- Loss of dietary nutrients (carbohydrates, protein, etc.) by microbial and yeast activity.
- Different kinds of mould can form harmful mycotoxins which can impact on performance and health through effects such as reduced feed intake, reduced immune status, organ lesions and fertility disturbance.

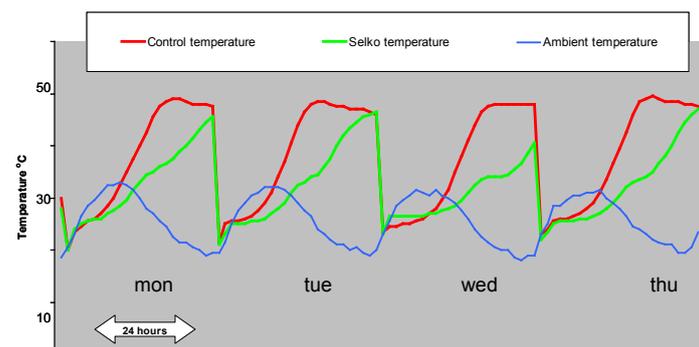
Trial results from the Netherlands

The results of the studies on mixed diets at RRC showed that:

1. Significant heating of mixed diets does occur.

At ambient temperatures of 20 to 32°C the ration temperature reached 50°C within 16 hours of mixing on each of the four days of the trial. The addition of an organic acid mixture (Selko® TMR) delayed the heating process under these conditions.

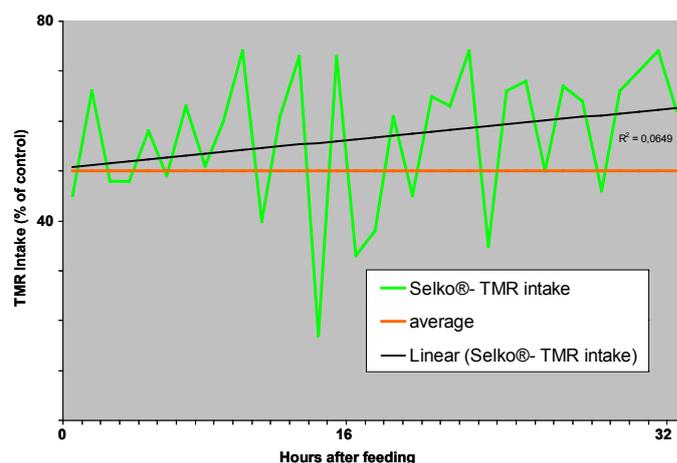
Temperature TMR Development



2. Dry matter intake is reduced by heating.

The application of an organic acid mixture (Selko® TMR) to the TMR tended to promote higher ration intake over 32 hours than the control group.

TMR Intake (RRC 2005)

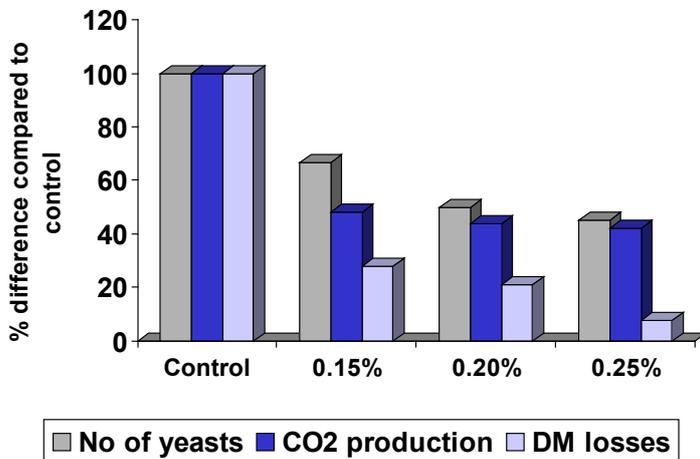


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Heating resulted in nutrient losses.

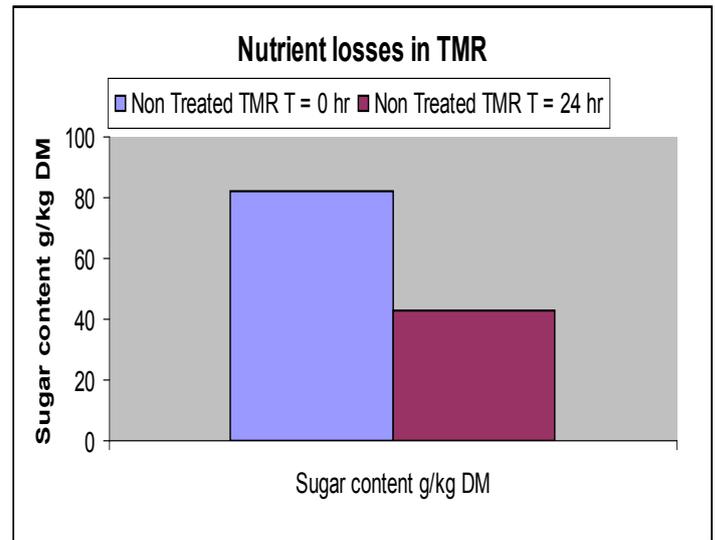
The trial using an organic acid mixture at 3 application rates (0.15, 0.20 and 0.25% of the mixed ration) showed that at 24 hours after mixing, organic acids reduced the number of yeasts present by up to 60% (and hence CO₂ production) and dry matter losses by up to 95%, when compared to the untreated control

Effect Selko® - TMR on yeasts, CO₂ production and nutritional losses (24 hours)



Considering specifically the sugar content of mixed diets, a reduction of some 40g/kg DM, equivalent to 50% of the total sugar in 24 hours, has been measured. In nutrient terms, taking the ME of sugar at 16 MJ/kg DM, the loss of sugar alone is worth 0.64 MJ/kg DM or 1litre of milk for each 8kg dry matter intake of mixed ration. Of course, other nutrients will also be lost through secondary fermentation which would further negatively impact on milk production.

Clearly, significant deterioration of mixed diets and buffer feeds can occur and since this can have a significant impact on profitability, further evaluation under UK summer conditions is warranted.

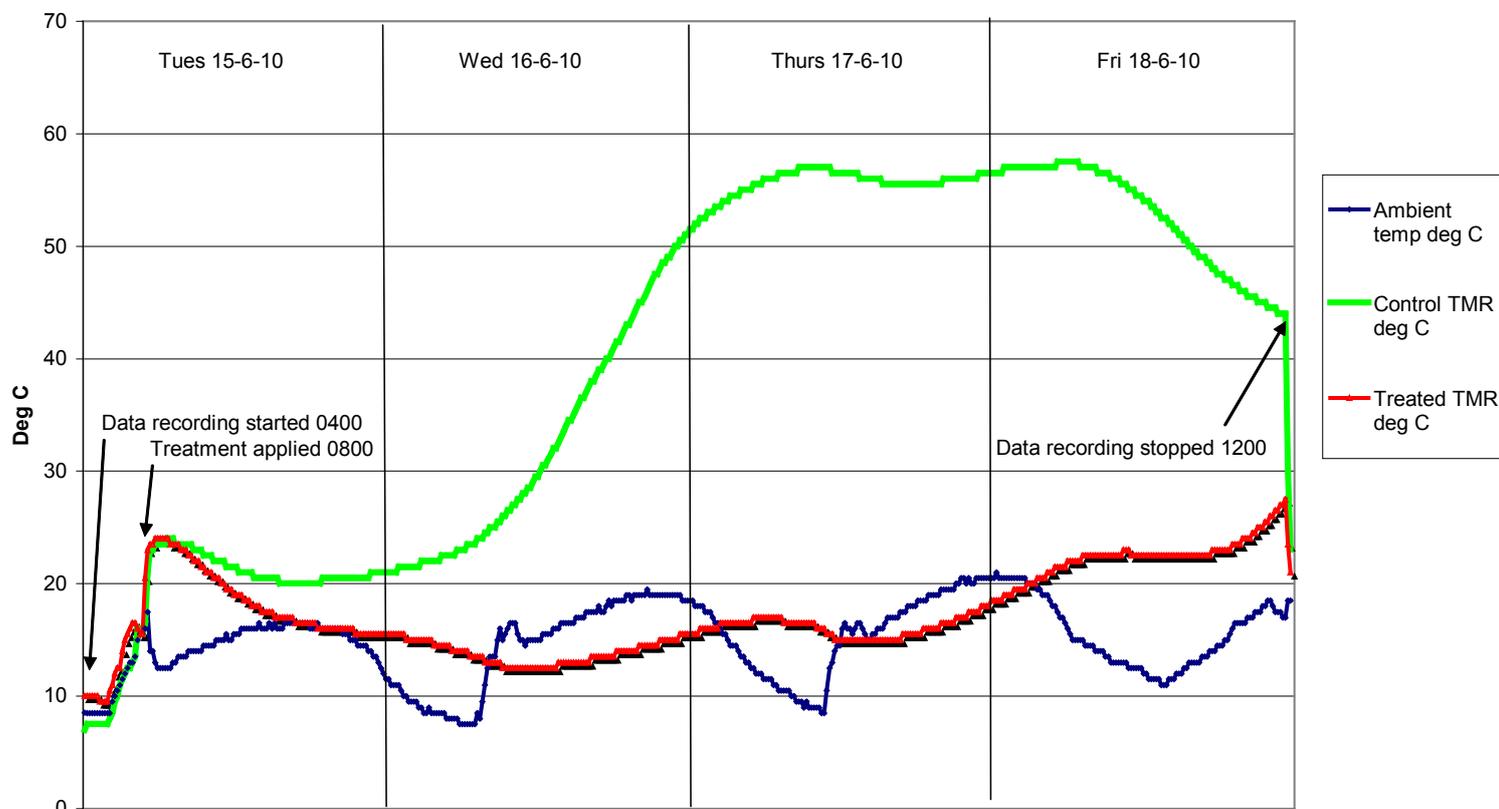


Trial results under UK summer conditions

A mixed ration composed of grass, maize and whole crop silages with straights (including soya, soya hulls and wheat) was fed to dairy cows with restricted access to very limited summer grazing. Selko® TMR was applied to the ration for comparison with the equivalent untreated control mixture and ambient and ration temperature was monitored in samples isolated within bowls in the feed passage for four days after mixing. The application of Selko® TMR was twice the regular treatment rate since one objective of the trial was to evaluate dispersion.

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Selko TMR Trial (Quixhill) June 2009



The results showed:

- The ambient temperature during the 3 day trial period ranged from 8 to 21°C. This is considerably below the peak of 32°C reached in the Dutch trial.
- The untreated TMR temperature started to rise around 24 hours after mixing. This is understandably later than the Dutch study due to the lower ambient temperature
- The temperature continued to rise for a further 24 hours, peaking at over 50°C and remained at high level for the remaining period of the test.

- There was visible moulding in the untreated samples by day 3 of the trial.
- Selko® TMR was well dispersed in the ration.
- The Selko® treated TMR remained at a stable temperature for 3 days after treatment.

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Practical application in UK Mixed Diets

Trials clearly show that mixed rations will deteriorate after mixing which can lead to reduced nutrient intake, lost performance and possible health issues. The rate of deterioration will be influenced by nutrient composition but ambient temperature will be a critical factor. Our research would suggest that when temperatures exceed 25°C, the rate of heating and spoilage of mixed rations accelerates such that mixes remain fresh for just 16 hours. At below 20°C, however, feed quality starts to decline only after 24 hours.

We therefore recommend Selko® TMR application to stabilize mixed rations where:

- Ambient temperatures exceed 25°C for any period.
- Rations are prepared for feeding over more than a 24 hour period whenever the temperature is above 10°C. Typical examples include buffer feeds and mixed diets for feeding through the weekend or specialist dry cow mixed rations.

Economic assessment of the benefit of Selko® TMR suggests that, based only on sugar as a lost nutrient, its application could save 1 litre per cow per day in lost milk. Increased intake of other nutrients, reduced exposure to mycotoxins and less feed wastage are other notable benefits which could improve performance health and fertility.

Selko® TMR Product Features

Selko® TMR is a specific liquid combination of organic acids, all of which are approved for use in cattle feeding systems.

The advantages of Selko® TMR are:

- Selko® TMR is highly effective against yeasts and moulds. This high level of activity is due to the strong synergistic effects between the different organic acids.
- Selko® TMR is non-corrosive (pH 5.5 - 6.0), non-toxic and completely biodegradable.
- Selko® TMR has a low vapour density and is user-friendly.
- Selko® TMR is easily and effectively distributed through the TMR mix.
- There is no lag-phase before the product begins to work.

Further information can be obtained from the Frank Wright Trow technical department on 01335 341102.