

Milk fat reduction in grazing dairy cows



Feeding supplements as a partial mixed ration can alleviate milk fat reduction.

KEY MESSAGES

The concentration and composition of fat in milk has a large influence on the yield, quality and range of subsequent dairy products. It is one of two milk components on which milk payment systems are based, and although its farm gate price is generally less than half that of protein, its concentration in milk is more variable and can be manipulated more easily with farm management strategies.

- Providing high amounts of supplementary grain to grazing cows commonly leads to substantial reductions in milk fat concentration.
- Milk fat reduction can be avoided by careful selection of supplementary feeds.
- Feeding supplements as a mixed ration containing maize grain and canola meal can lessen the disruption to rumen fermentation and increase milk fat concentrations.

WHAT IS MILK FAT REDUCTION?

Milk fat reduction (MFR), also sometimes known as milk fat depression, is generally recognised as being a substantial, long-term and diet-induced reduction in the concentration of milk fat below what would normally be considered for a cow, or herd of cows, at a particular stage of lactation.

Milk yield and production of other milk components are not affected, and dry matter intake usually remains stable.

WHAT CAUSES MILK FAT REDUCTION?

The risk factors associated with MFR reduction are:

A high intake of polyunsaturated fatty acids

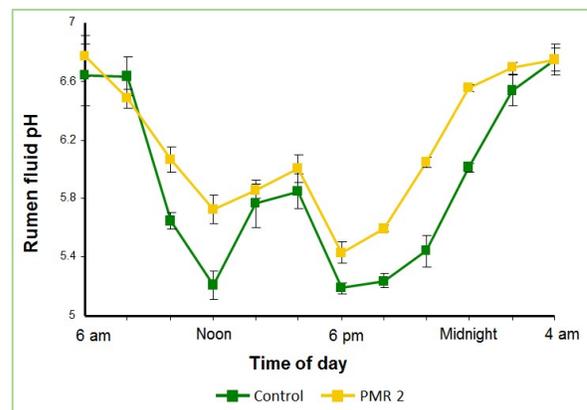
This is relevant to pasture-based dairying systems because pasture can contain high levels of fat (up to 6%), the fatty acids of which are predominantly linolenic acid (C18:3). Commonly used supplements also contain high amounts of polyunsaturated fatty acids (e.g. canola and maize contain linoleic acid C18:2).

A disruption to rumen fermentation

When large amounts of supplements are ingested quickly, such as when cows are 'slug' fed cereal grain in the dairy at milking times, the pH of ruminal fluid declines rapidly to levels below those at which the efficiency of rumen digestion is compromised.

Production of specific biohydrogenation intermediates

When rumen fermentation is disrupted, there can be a shift in biohydrogenation pathways and slower, less complete biohydrogenation of polyunsaturated fatty acids (biohydrogenation process converts unsaturated fatty acids to saturated fatty acids). This, in turn, can lead to increased flow of specific, bioactive intermediates into the lower digestive tract, which can subsequently inhibit lipogenic enzymes in the mammary gland and reduce milk fat synthesis and cause MFR.



Milk fat reduction in grazing dairy systems

FEEDING A PARTIAL MIXED RATION CAN ALLEVIATE MFR

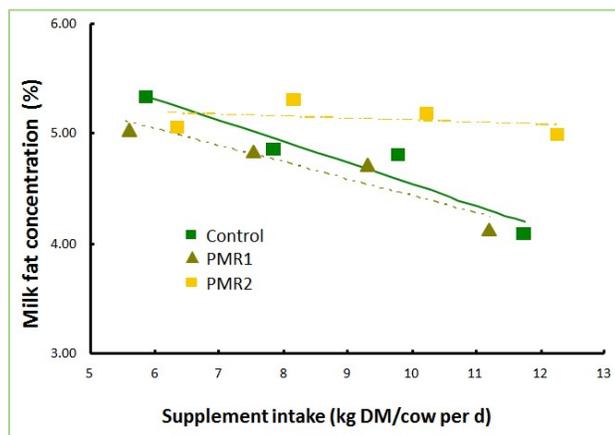
One strategy for alleviating MFR by nutritional means is to feed the supplement component of the diet as a mixed ration, formulated to remove some of the 'insults' to the rumen and promote a less volatile ruminal pH and more stable rumen fermentation.

Experiments at Agriculture Victoria Ellinbank have consistently shown that the decline in milk fat concentration commonly observed when increasing amounts of supplementary cereal grain are fed are reduced or absent when equivalent amounts of supplementary energy are fed as a PMR in which some of the wheat grain has been replaced with maize grain and canola meal.

The arrested decline in milk fat concentration with increasing supplement intake is presumably due to:

- (i) The maize grain providing a more slowly degradable source of starch, which promotes post-ruminal digestion and reduces the build-up of the products of digestion in the rumen. This in turn reduces the magnitude of the daily variation in ruminal fluid pH and increases mean daily ruminal pH.
- (ii) The canola meal providing a buffer against low ruminal fluid pH and fluctuations in pH.
- (iii) An overall reduction in disruptions to rumen fermentation and the likelihood of biohydrogenation intermediates interfering with milk fat synthesis in the mammary gland.

The figure below shows the milk fat concentration at different supplement amounts for cows fed pasture plus either a control diet of cereal grain in the dairy plus pasture silage in the paddock; a PMR diet of cereal grain and pasture silage combined into a mixed ration and fed on a feedpad twice daily (PMR1); or a PMR diet of cereal grain, maize grain, maize silage and lucerne hay combined into a mixed ration and fed twice daily on a feedpad (PMR2).



ONCE DAILY OR TWICE DAILY FEEDING?

In experiments at Agriculture Victoria Ellinbank the milk fat benefits of feeding PMR were only apparent when each day's allocation of PMR was offered as two equal portions each day (one after each milking). No benefits were apparent when the entire day's ration was offered at once.



Further Information

Dr Martin Auld

Phone: (03) 5624 2222

Email: martin.auldist@ecodev.vic.gov.au

ACCESSIBILITY

If you would like to receive this publication in an accessible format, please telephone Agriculture Victoria, Ellinbank on (03) 5624 2222.

This document is also available in Word format at www.agriculture.vic.gov.au/dairy/tools-and-resources