

Partial mixed rations for grazing dairy cows



A series of experiments at Agriculture Victoria Ellinbank were conducted to investigate the milk production response to feeding supplements as a partial mixed ration (PMR).

KEY MESSAGES

Increasing climate variability has led to reduced availability of pasture in south-eastern Australia. This has been associated with an increase in the use of bought-in feeds to supplement grazed pasture on many dairy farms.

- Providing supplementary feeds to grazing cows as a partial mixed ration can lead to greater milk production than feeding equivalent amounts of energy as cereal grain in the dairy and forage in the paddock.
- The milk response to PMR is no greater than the response to cereal grain and pasture silage unless cows are offered at least 10 kg DM total supplement (7.5 kg DM grain).
- For the milk production benefits of PMR to be realised, half the daily allocation needs to be fed twice per day, as opposed to the whole allocation being fed once per day.

WHAT IS A PARTIAL MIXED RATION?

A PMR is defined as a total mixed ration (TMR) fed to dairy cows in between bouts of grazing, and which therefore makes up only part of the cows' diet (as opposed to a total mixed ration, which provides 100% of the diet).

Typically, a PMR comprises approximately 75% grain such as wheat, barley, maize or canola, with the balance made up of forage (for example, pasture silage, legume hay, or maize silage).

A PMR is usually, but not always, fed to cows with a mixer wagon on a feed pad, before or after milking and either once or twice a day.

Some farmers have been using PMR systems for many years. However, until recently, there has been little research worldwide into the effects of PMR on milk production and animal health.

WHY USE PMR?

Feeding systems based around the use of PMR are mostly used by farmers needing or choosing to feed high amounts of supplements. Traditional strategies for feeding supplements to grazing cows involve cereal grain or pelleted concentrates fed in the dairy at milking time, with forage fed separately in the paddock.

When fed at high amounts, however, cereal grain can lead to reduced milk production responses due to inefficiencies in rumen fermentation brought about by a low and variable ruminal fluid pH.

Feeding supplements as a PMR, on the other hand, can alleviate this problem by allowing the opportunity to include components that provide a more slowly digestible starch source (e.g. maize grain) or greater buffering capacity (e.g. canola meal and Lucerne hay).



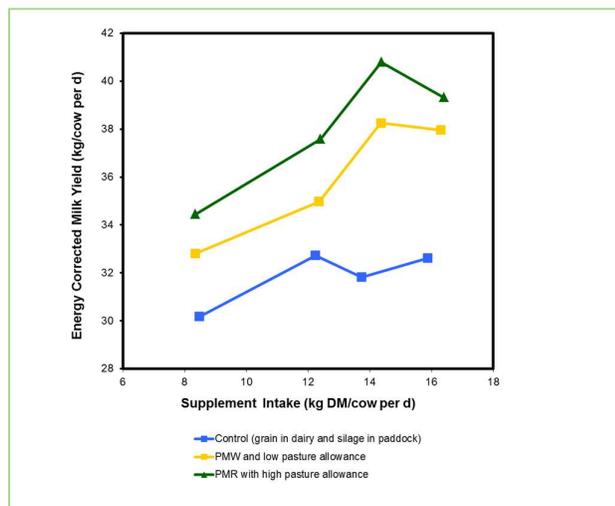
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MILK PRODUCTION RESPONSES TO PMR

Recent research has shown that, under some circumstances, milk production responses to feeding supplements as a PMR can be greater than when equivalent amounts of metabolisable energy is fed as cereal grain in the dairy and forage in the paddock. These advantages were usually only obtained when more than 10 kg DM total supplement (7.5 kg grain) were fed per cow per day, indicating that unless farmers are feeding at least that amount they may not be getting full value from the capital investment of a mixer wagon and a feedpad.

In experiments conducted at Agriculture Victoria Ellinbank, feeding supplements as a PMR (containing canola meal, maize grain, Lucerne hay and wheat grain) has led to increases in energy-corrected milk (ECM) production of between 2 and 5 kg/day per cow, compared to feeding the similar amounts of ME as barley or wheat, with pasture silage fed in the paddock (see figure below). The magnitude of response depended on stage of lactation and amount of supplement fed, but was associated with the maintenance of milk fat concentration in milk from the PMR cows compared with a steady decrease in fat concentration as cows consumed more barley or wheat.

The precise mechanisms underpinning this milk production response are still uncertain but could include increased appetite and intake in PMR cows (due to canola), differences in digestion and absorption of nutrients and improved ruminal pH (due to more slowly digestible starch and increased buffering capacity), and the disruption of pathways for milkfat synthesis in cows fed large amounts of cereal grain.



ONCE DAILY OR TWICE DAILY FEEDING?

In experiments at Ellinbank the milk production benefits of feeding PMR were only conferred 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

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ACCESSIBILITY

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