

Profitability of short - term partial mixed ration feeding decisions

Introduction

Feeding a well-balanced mixed ration should enable grazing dairy cows to consume more feed and produce more milk than cows fed supplements as grain in the dairy and forage in the paddock. Feeding mixed rations also provides greater flexibility in the range of feeds that can be used.

Agriculture Victoria's Flexible Feeding Systems project comprised a series of experiments to measure the milk response to different ways of feeding supplements. The research program provides the first data on milk production responses to partial mixed ration (PMR) feeding for Australian conditions.

The milk responses to PMR feeding relationships from the Flexible Feeding Systems project were used in this study to examine the profitability of short-term (weekly, monthly, seasonal timeframe) PMR feeding decisions. A short-term decision was considered as that where the infrastructure and equipment needed to mix and feed out a formulated ration were already available and the decision is about whether to feed supplements as grain in the dairy at milking and forage in the paddock or as a mixed ration on a feed pad.

Key points

- This study analysed the economics of short-term partial mixed ration (PMR) feeding decisions where the infrastructure and equipment to feed out a mixed ration was available and the only decision was whether to feed supplements as a mixed ration or grain in the dairy and forage in the paddock.
- The results indicated that feeding PMR plus Canola meal in early lactation results in higher milk production and higher profit (total milk income minus feed costs) than feeding grain in the dairy and forage in the paddock or PMR feeding without Canola meal. For a farmer who has already invested in a feed pad and mixed wagon, the benefits of feeding a mixed ration exceed the costs in early lactation.
- In late lactation, there was little difference in milk production and profit between feeding grain in the dairy and forage in the paddock and the PMR and PMR + Canola meal diets.

Approach

Six grazing experiments from the Flexible Feeding Systems project, which were carried out under restricted pasture allowance to replicate drought conditions, were used.

The data from experiments conducted early or late lactation were combined to determine if some general conclusions could be made about the milk responses to different diets at these times. A summary of the diets used is given in Table 1. In early lactation, a Formulated grain mix (FGM) treatment was also tested where the components of the mixed ration in the PMR + Canola meal diet, except lucerne hay, were combined and fed in the dairy.

Table 1. Summary of diet treatments the Flexible Feeding Systems project. Cows in all treatments also grazed perennial pasture.

Diet treatment	Supplements fed (% dry matter basis) and location of feeding
Control	Cereal grain (75%) fed in the dairy and pasture silage (25%) fed in the paddock
Partial mixed ration (PMR)	Cereal grain (38%), maize grain (20%), maize silage (30%) and lucerne hay (12%) combined in a mixer wagon and fed on a feed pad
PMR + Canola meal	Cereal grain (38%), maize grain (18%), canola meal (22%) and lucerne hay (22%) combined in a mixer wagon and fed on a feed pad
Formulated grain mix	Grain component of the PMR + Canola meal diet fed in the dairy and the lucerne hay fed in the paddock

The profitability of the diets was compared by estimating the total income from milk produced minus the cost of the supplement, for different amounts of supplement intake.

The milk and supplement prices used to estimate milk income and feed costs are given in Table 2 and are based on historical data from Dairy Australia, ABARES and AusPork, and the expertise of the project advisory committee. The impact of different milk prices and feed prices on the profitability of the diets was also tested.

Table 2. Milk prices and feed prices used in the analysis.

Item	Price received or paid
Milk protein and fat	\$8.75/kg protein, \$3.50/kg fat
Grain	\$285/t DM barley, \$309/t DM wheat, \$400/t DM maize
Protein supplement	\$428/t DM canola meal
Silage	\$186/t DM pasture, \$250/t DM maize
Hay	\$342/t DM lucerne

Results

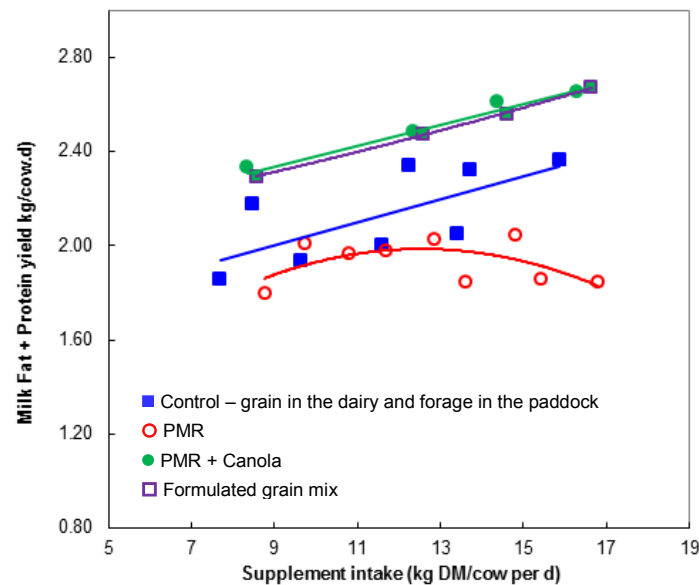
Early lactation

The data from the three experiments conducted in early lactation were collated so that a single response curve for milk production to each of the Control, PMR or PMR + Canola meal diets could be formed (Figure 1a).

The results indicate that PMR + Canola meal feeding in early lactation results in higher milk production than Control or PMR feeding without Canola meal, and also higher profit (Figure 1b). For a farmer who has already invested in the infrastructure and equipment to feed a mixed ration, the benefits of increased milk production from feeding a mixed ration exceed the costs in early lactation.

The milk production of cows fed the FGM diet was similar to PMR + Canola meal suggesting that most of the benefits of feeding a mixed ration can be obtained by feeding the concentrate components of the ration in the dairy and the forage components in the paddock. This presents a potential option for farmers wanting to expand or intensify their systems without the need for a feed pad and mixer wagon and an increase in labour or other costs.

(a) Early lactation – milk production (kg protein + fat)



(b) Early lactation – profit (total milk income minus feed cost)

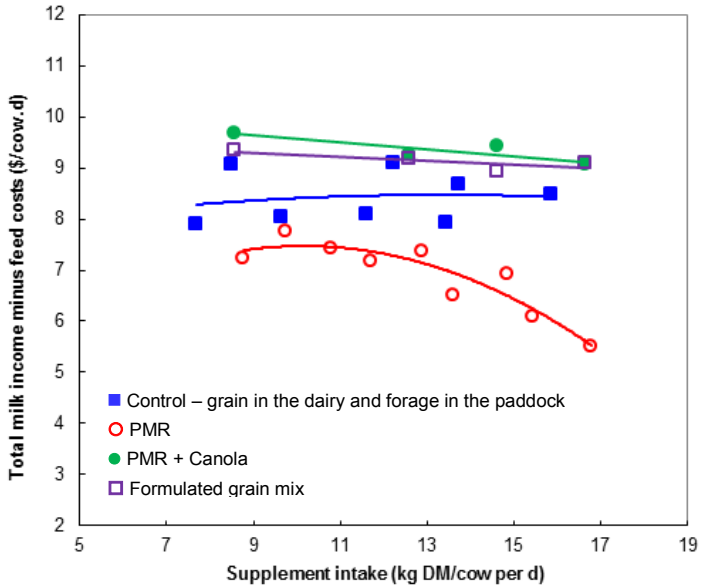


Figure 1. Changing supplement intake with (a) Milk protein plus fat production (b) Profit (total milk income minus feed cost) in early lactation.



Late lactation

In late lactation, there was no difference in milk production between Control, PMR and PMR + Canola meal feeding until supplement intake reached 13 kg DM/cow.d, and therefore the PMR and PMR + Canola meal diets were less profitable than the Control (Figure 2). Up to 15 kg DM/cow.d, the Control diet was more profitable than PMR or PMR + Canola meal. A farmer with the option of feeding grain in the dairy and forage in the paddock would be better off using this system in late lactation rather than feeding supplements as a mixed ration.

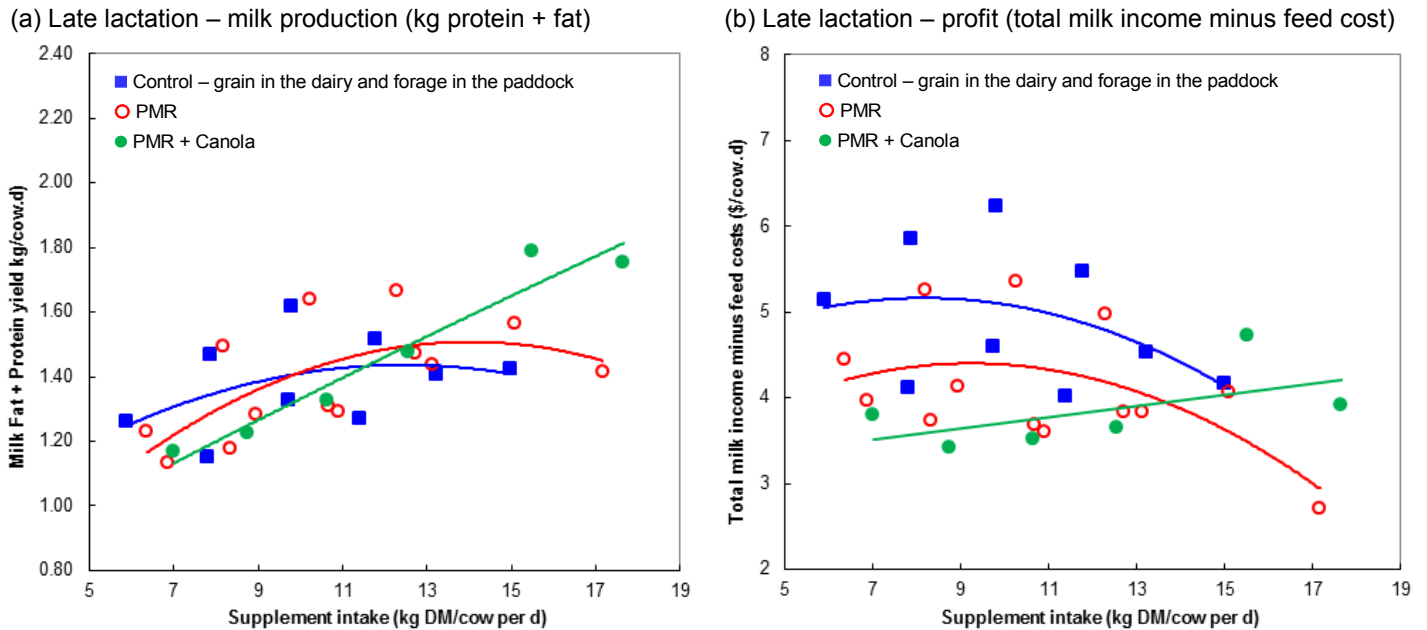


Figure 2. Changing supplement intake with (a) Milk protein plus fat production (b) Profit (total milk income minus feed cost) in late lactation.

Sensitivity to changing milk and feed prices

A sensitivity analysis of changes in milk and feed prices on the impact of profit, showed that overall profit increased (or decreased), but the overall order in profitability of the different diets did not change.

At higher feed prices and higher supplement intakes, profit declined more quickly compared with when feed prices were lower, particularly for the more expensive PMR diets.

Change in milk price had a larger impact on profit than changes in grain or forage price. In addition, a high grain price decreased profit to a greater extent than high forage price. This is not unexpected given the grain component of the mixed ration for both PMR diets comprised more than 50% of the total ration.



Summary

- This analysis investigated the economics of short-term PMR feeding decisions using data from the Flexible Feeding Systems project, which measured the milk response to different ways of feeding supplements to grazing cows.
- For this analysis, it was assumed the infrastructure and equipment needed to mix and feed out a formulated ration were already available and the decision was about whether to feed supplements as a mixed ration on a feed pad, or to feed grain in the dairy at milking and forage in the paddock.
- PMR + Canola meal feeding in early lactation gave higher milk production and higher profit than Control or PMR feeding.
- The milk production of cows fed the FGM diet was similar to PMR + Canola meal suggesting that most of the benefits of feeding a mixed ration can be obtained by feeding the concentrate components of the ration in the dairy and the forage components in the paddock.
- An analysis of PMR feeding systems as an investment decision, where a feed pad needed to be constructed and a mixer wagon and other equipment were purchased, is presented in another information sheet in this series ('A whole-farm investment analysis of a partial mixed ration feeding system for dairy cows').



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