

Feeding canola meal improves milk yield and profitability in early lactation



First 100 days - Factsheet 3

Key points

In early lactation, inclusion of canola meal in a wheat and barley grain mix resulted in greater dry matter intake, milk yield and milk solids yield.

Cows fed the grain mix that included canola meal consumed approximately 2 kg DM/day more fresh pasture.

Cows that received a grain mix where the canola meal was exchanged for maize grain did not consume more pasture. In addition, milk yield differences were minimal compared with cows that only received the wheat and barley grain mix.

Replacing some wheat with canola meal in the grain mix during early lactation was projected to be worth \$136 per cow from 1–100 days in milk. In addition, there was a carryover benefit of \$56 per cow from 101–300 days in milk.

Introduction

The first two factsheets in this series focused on the fresh cow period (defined as approximately the first three weeks post-calving). Results showed how dry matter intake (DMI) can be increased during this period by strategically using maize grain and canola meal in the supplementary grain mix. Additionally, there were positive carryover effects on milk yield up to 72 days in milk. Cows that consume the maize grain and canola meal mix are more profitable than cows fed wheat grain and canola meal concentrates during the fresh cow period.

However, for some farmers it may not be practical to feed a specific grain mix to cows in the fresh period before switching to a different grain mix three weeks post calving.

A longer-term experiment was undertaken at the Ellinbank SmartFarm as part of the *Dairy Feedbase First 100 Days project* where four different grain mixes from day 15 post calving to day 100 in milk were offered to cows.

On most grazing dairy farms in Australia, a starch-based concentrate containing wheat or barley is fed as a supplement to grazed pasture, most commonly in the dairy at milking. Some earlier, shorter term experimental work at the Ellinbank SmartFarm has shown that cows fed canola meal as part of the grain mix ate more pasture and produced more milk.

Also, as shown in factsheets one and two of this series, maize grain can improve DMI and milk yield under certain conditions.

Early lactation experiment

Four different grain mixes were tested in this design, fed at a daily rate of 9 kg DM/cow (Figure 1).

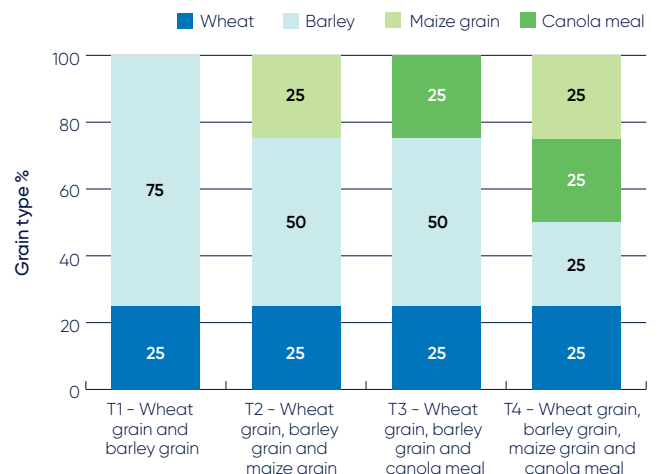


Figure 1 Portion of each grain type by percentage dry matter in the experiment for treatments 1–4

The experiment involved spring calving cows grazing perennial ryegrass pasture at a daily allocation of 35 kg DM/cow so that pasture intake was not limiting.

After 100 days on one of the 4 treatment diets, all cows were switched to a common diet of 6 kg DM of grain (50:50 wheat and barley mix) and continued to graze pasture. Milk yield was measured for the remainder of the lactation to see if any carryover effect of the treatments was evident.

Results

Daily milk production per cow (Figure 2) and milk solids per cow (Figure 3) was greatest from cows that received the grain mixes containing canola meal (T3 & T4).

However, once the treatments ended at 100 days in milk and cows were placed on a common diet, milk yield was not statistically different between the treatments (Figure 2).

Dry matter intake was higher in cows that received canola meal. Cows that were fed the grain mixes containing canola meal ate all grain allocated, but cows not fed canola meal had grain refusals of 0.6 kg DM/day on average. In addition, pasture intake was 2.1 kg DM/day greater in cows that received canola meal compared to those that didn't (Figure 4).

Body condition score (BCS) was measured continuously throughout the experiment and the rate of change in BCS from 15–100 days in milk did not differ between treatments.

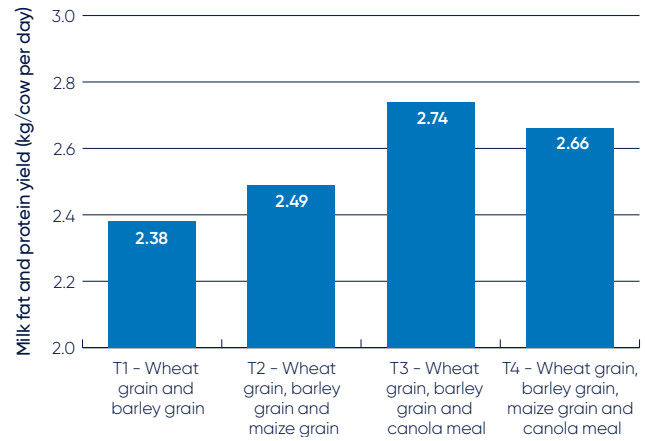


Figure 3 Average daily milk solids yield per cow for each treatment from 15–100 days in milk

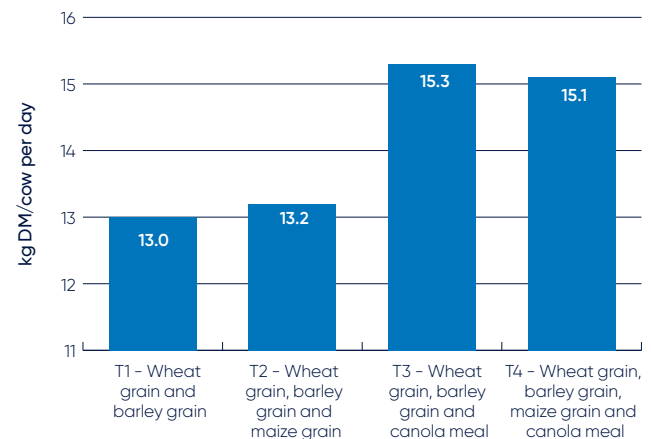


Figure 4 Average pasture dry matter intake over a 6-day measurement period (taken at 58 days in milk)

Economics of each treatment

Differences in the profitability of each treatment diet were calculated using average feed ingredient costs from 2013–18 and the average milk price from 2000–18, adjusted for inflation. Profit was estimated as milk income minus the cost of the grain mix on a per cow basis and results are shown in Figure 5.

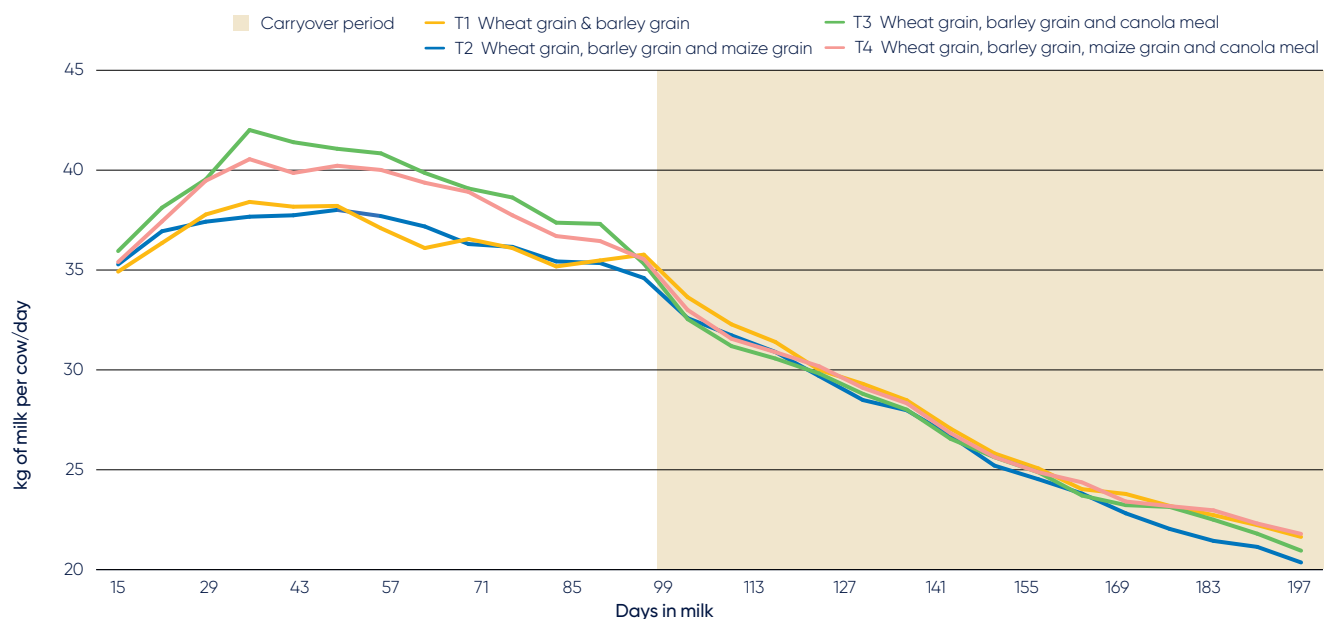


Figure 2 Milk yield per cow in each treatment over both the experimental period (15–100 days in milk) and the carryover period (101–200 days in milk)

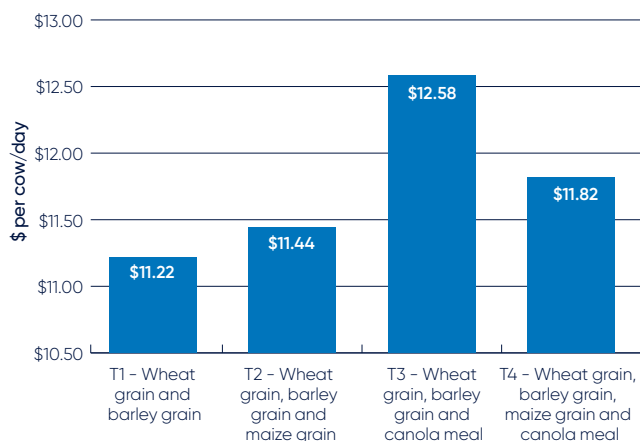


Figure 5 Milk income minus cost of the grain mix over the treatment period (15–100 days in milk)

The analysis showed that the most profitable diet was the wheat grain, barley grain and canola meal mix (T3), which was \$1.36 per cow per day more profitable than the wheat and barley only treatment (T1).

Overall, treatments where canola meal was fed were more profitable than treatments that did not include canola meal. When the cost of grazed pasture intake was accounted for, the rankings of each treatment diet in terms of profitability did not change. Milk income minus feed costs from 15–100 days in milk when the cost of grazed pasture was included was \$9.16, \$9.32, \$10.30 and \$9.67 for treatments 1–4 respectively.

In the carryover period when all cows were fed the same diet, profit was similar for all treatments. However, cows that had consumed the wheat, barley and canola meal grain mix (T3) were still estimated to be \$0.28/cow per day more profitable than cows that had been fed the wheat and barley grain (T1).

Implications and recommendations

The experiment demonstrated the value of using a high-quality protein source (canola meal) in early lactation to supplement grazing dairy cows.

This experiment supports previous research showing DMI of pasture increases when canola meal is offered to grazing dairy cows in early lactation. Other experiments where cows have been fed canola meal in early lactation have shown it has beneficial impacts on body condition score, and increased retention of body condition in early lactation has been associated with improved fertility and in-calf rates.

It is worth noting that the rates of grain fed in this experiment were quite high at 9 kg DM/cow, an amount which is higher than what the average pasture-based dairy farmer would feed in spring. However previous research from the Ellinbank SmartFarm has also shown milk production benefits of including canola meal in a supplementary grain mix fed at lower rates than used here.

Use of maize grain in this experiment did not provide any significant benefit over a wheat and barley grain mix, though it was still slightly more profitable over the first 100 days in milk. Maize grain was previously shown to be more profitable than wheat when used in the fresh cow period in the first 23 days post-calving (see factsheets 1 and 2 in this series).

If using maize grain, it is important to ensure it is well processed so that the benefits of its slower fermentation in the rumen compared to wheat or barley can be fully realised.



Figure 6 Example of correctly ground maize grain to optimise digestibility

This experiment showed cows will eat up to 2 kg DM more pasture per day compared to a wheat, barley or maize grain mix, and this may need to be accounted for when allocating fresh pasture on a herd level basis. This is an important practical consideration for farmers feeding canola meal as an early lactation supplement.

It is important to ensure the correct amount of pasture is allocated to manage post-grazing residuals to approximately 1,500 kg DM/ha and not overgraze, which in turn will affect subsequent regrowth.

Further reading

Wright, M. M., M. L. Douglas, C. K. M. Ho, L. C. Marett, M. J. Auld, G. L. Morris, M. C. Hannah, K. Giri, W. J. Wales, and V. M. Russo. "Milk production of cows grazing pasture supplemented with grain mixes containing canola meal or corn grain or both over the first 100 days of lactation." *Journal of Dairy Science* (2024). In-press. **Milk production of cows grazing pasture supplemented with grain mixes containing canola meal or corn grain or both over the first 100 days of lactation - ScienceDirect**

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