

# Feeding strategies for freshly calved cows to increase milk yield and profitability

## First 100 days - Factsheet 1

### Key points

Using a maize grain instead of a wheat grain-based concentrate mix in the fresh cow period increased milk yield overall in the first 72 days in milk, but **ONLY** when high quality, palatable lucerne hay was fed in the fresh cow period.

When moderate to poor quality ryegrass pasture silage was fed, there was no milk production benefit from supplementing freshly calved cows with maize grain instead of wheat grain.

When a high-quality forage (lucerne hay) was fed with a maize grain-based concentrate mix to freshly calved cows, including a commercial protected fat supplement was not beneficial in terms of feed intake or milk yield.

### Introduction

The first three weeks post-calving is often referred to as the fresh cow period and is an important time that can impact milk production for the whole lactation. As dry matter intake is one of the main factors affecting milk yield, especially in the fresh cow period, best-practice nutrition recommendations for feeding cows during this time involve maximising dry matter intake, to help counteract the negative energy balance that cows experience in early lactation. However, peak dry matter intake for a dairy cow typically does not occur until 10–12 weeks post calving, but peak milk yield occurs around 5–6 weeks post calving.

Several factors have been shown to promote increased dry matter intake post-calving, including:

- Feeding higher quality, digestible forages that have a low neutral detergent fibre (NDF) concentration and a high metabolisable energy content
- Avoiding metabolic disorders that limit intake such as acidosis and milk fever (this is mainly achieved by having a good pre-calving transition diet and feeding nutritionally well-balanced diets)
- Having cows calve down in the optimum body condition score range, which is **4.5 to 5.5** on the 8-point scale used in Australia.

In Australian pasture-based dairy systems, despite the desirable nutritional profile of high-quality grazed pasture, there is still effectively an intake barrier for cows grazing pasture immediately post calving that limits their overall nutrient intake. This contrasts with housed systems where cows can be offered a nutritionally optimal diet immediately post-calving to achieve higher intakes.

**However, it is still possible to increase the dry matter intake of grazing cows via the type and amount of grain supplements provided in the first few weeks post-calving.**

Most concentrate supplements used in this period are starch-based, with wheat and barley the most commonly used ingredients in Australia.

Maize grain is an alternative starch-based grain that ferments more slowly in the rumen than wheat or barley grain. In theory, this should lead to a more stable rumen environment, allowing the cow to consume more feed in the fresh period. Consequently, dry matter intake and milk production should increase with potential benefits for the rest of the lactation.

## Fresh cow experiments

Two fresh cow experiments were conducted at the Ellinbank SmartFarm as part of the DairyFeedbase – First 100 Days project, to compare the effects of feeding wheat grain and maize grain. One of the initial aims was to see if dry matter intake could be increased in the first three weeks post-calving compared with conventional feeding strategies. To accurately measure dry matter intake, cows were fed in individual stalls (no grazing involved) rather than grazing pasture in a paddock.

### 1 Ryegrass silage fresh cow experiment

Cows were offered an unrestricted amount of average quality ryegrass pasture silage twice a day in an indoor feeding facility during the fresh cow period and fed one of two treatments – 8kg DM/cow of a maize grain-based concentrate or 8kg DM/cow of a wheat grain-based concentrate. After 23 days, all cows received grazed pasture and the same concentrate type, fed at a daily rate of 7kg DM/cow and were monitored up until 72 days post-calving.

Total dry matter intake in the first 23 days did not differ in this experiment, averaging 15.8kg DM/cow across all cows. Milk yield (kilograms) and milk solids yield (kilograms of milk fat and protein) were also the same for both treatments. In addition, in the carryover period from day 24–72 post-calving, where all cows were fed a common diet, there were no differences in milk yield nor milk solids yield between the cows fed the wheat or maize grain-based concentrate.

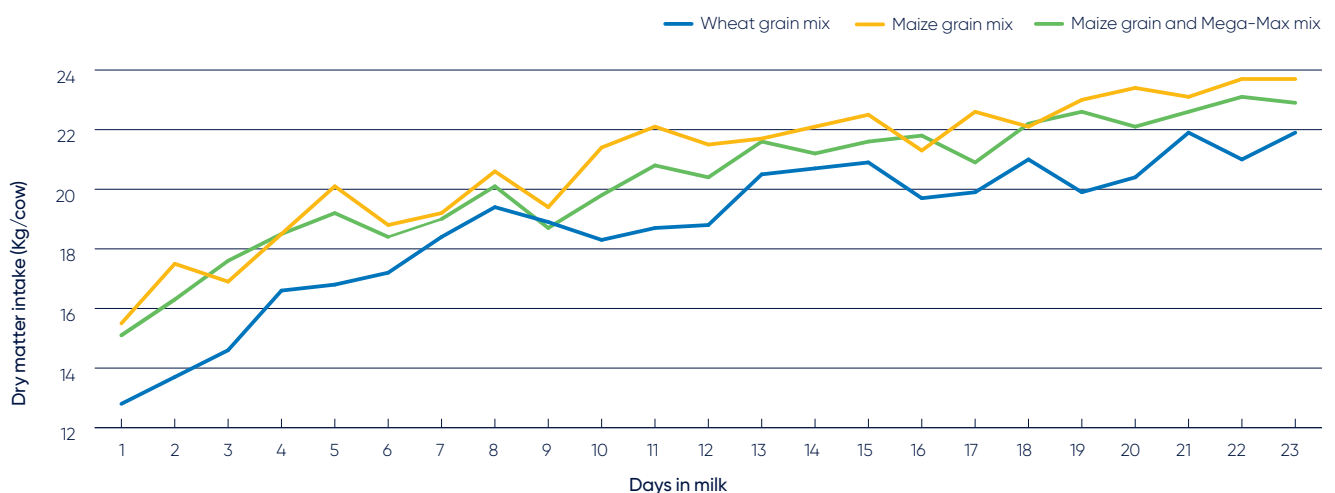
### 2 Lucerne hay fresh cow experiment

This experiment had a similar method and treatments to the ryegrass silage experiment but the forage component in the first 23 days was changed to a higher quality, palatable lucerne hay instead of the ryegrass silage. A third treatment was added in addition to the wheat and maize grain-based treatments for the first 23 days in milk – maize grain-based concentrate plus Mega-Max (a commercial protected fat supplement fed at 350g/cow per day). Grazed pasture and a common grain mix was fed to all cows from day 24 to 72 post-calving.

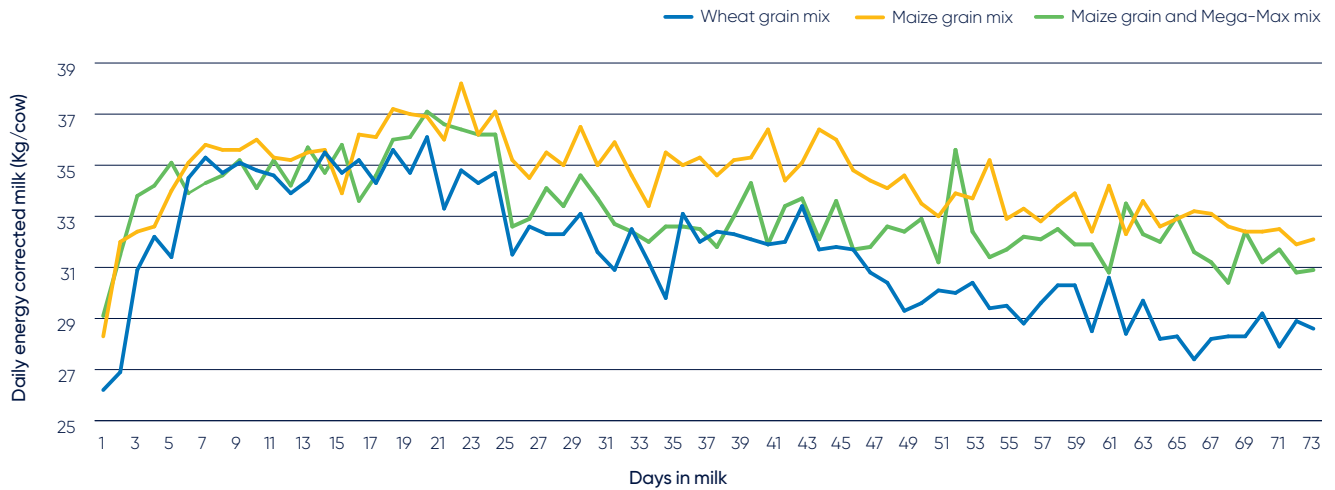
When higher quality palatable lucerne hay was used for the first 23 days in milk, rather than perennial ryegrass silage used in experiment one, daily dry matter intake was 18.8kg DM for cows on the wheat-based concentrate and 20.9kg DM for cows on the maize grain-based concentrate. Average dry matter intake of cows on the treatment where Mega-Max was added to the maize grain-based concentrate was 20.3kg DM/cow. Dry matter intake over the 23-day period is shown in Figure 1.

Energy corrected milk\* yield is shown in Figure 2 for both the fresh period when the treatment diets were fed (first 23 days post-calving), and the subsequent carryover period from days 24 to 72 post-calving, where all cows received the same diet of grazed pasture and a common concentrate.

\* Energy corrected milk is milk yield standardised for a uniform level of fat and protein.



**Figure 1** Daily dry matter intake of each treatment where lucerne hay was used as the forage base for the first 23 days in milk.



**Figure 2** Energy corrected milk yield of each treatment across the 72 days of the experiment where lucerne hay was used as the forage base for the first 23 days in milk.

As shown in Figure 2, milk yield was highest over both the treatment and carryover periods for cows consuming the maize grain-based concentrate for the first 23 days. There was no additional feed intake or milk yield benefit observed from adding Mega-Max as a protected fat supplement to the maize grain-based concentrate.

Over the first 72 days in milk, cows in the maize grain-based concentrate group produced a total of 2,546kg/cow of energy corrected milk, which was 217kg/cow more than cows fed the wheat grain-based concentrate (total of 2,329kg/cow).

### Implications and key takeaways

The experiments showed that dry matter intake can be increased in the fresh cow period, by using maize grain instead of wheat grain as the starch base in a concentrate mix. Importantly however, this only occurred when a high-quality, palatable lucerne hay was used as the forage source. When a moderate quality perennial ryegrass pasture silage was fed instead there was no difference in feed intake or milk production between cows fed maize grain or wheat grain-based concentrates.

In practice, many pasture-based dairy farmers will typically have cows grazing ryegrass pastures immediately post-calving when fresh grazed pasture is available in spring. These experiments clearly demonstrate the benefit of feeding high quality forage post-calving and would likely apply equally to the quality of the grazed pasture offered to cows in the 3-week fresh cow period, for spring calving herds.

The experiments also reflect common practice on dryland farms in many regions of Australia where late summer/early autumn calved cows are fed conserved forage immediately post-calving when there is minimal or no grazed pasture available. Farmers should strive to ensure this conserved forage is of the highest nutritional value possible to avoid any limitation on dry matter intake and impacts on milk yield in the fresh cow period as well as during the remainder of the lactation.

The addition of Mega-Max to the maize grain-based concentrate when the palatable lucerne hay was used, had no positive effect on dry matter intake or milk yield and there was also no benefit in the carryover period to 72 days post-calving.

### Economics of each treatment option

Based on milk income minus feed costs, cows offered the maize grain-based concentrate with or without Mega-Max were less profitable than cows on the wheat grain-based supplement during the fresh period from 1–23 days in milk. This was due to the substantially higher cost of maize grain than wheat grain.

However, during the subsequent carryover period, cows that had received either the maize grain-based concentrate or maize grain plus Mega-Max supplement, were more profitable than the wheat treatment. When the fresh cow and carryover periods were considered collectively (1–72 days post-calving), only cows on the maize grain-based concentrate (without Mega-Max) were estimated to provide a positive net benefit, that was \$51/cow more profitable than the cows on the wheat grain-based concentrate.

Carryover effects beyond 72 days in milk were not measured in either of these fresh cow experiments but residual benefits to the use of maize grain in the first 21 days were demonstrated in later experiments in First 100 Days (see Factsheets 5 and 6 in this series).

#### Disclaimer

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