TECH TALK

Optimising the cost-efficacy of TMRs

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CopRice Model Farm Manager

Background

CopRice operates a 'model farm' in northern Victoria to examine the effectiveness of integrated nutritional strategies and new formulations under 'real world' conditions. Each year, our nutritional team implements dozens of projects that aim to optimise animal health, fertility, productivity, environmental sustainability and profitability.

Our model farm partners, Fred, Sonyia, Daniel and Ben DeCicco, milk a herd of a high production registered Holstein cows at Undera. Historically, the family has provided a partial mixed ration (PMR) to their cows over summer to complement lucerne pastures and fodder crops.

The DeCiccos conserve as much home-grown feed as possible, purchasing cereal hay as required. Traditionally, their PMR does not contain by-products and concentrates as a means of reducing costs, avoiding potential variations in quality or supply and keeping their nutrition program as simple as possible.

Faced with complexity of an exceptionally dry summer, escalating water costs and no pastures and forage crops, the DeCiccos opted to transition their herd to a total mixed ration (TMR) during the 2019/20 summer. The initial ration comprised farm-grown pasture silage, farm-grown maize silage and purchased vetch and cereal hay. The TMR was complemented by 6.2 kg/day of CopRice Lac Cycle Pellets in the dairy.

CopRice DairyBlends

With little stocks of maize silage remaining, the CopRice nutrition team began to investigate way of refining the TMR to:

- Maximise the utilisation of available farm-grown feed resources
- Reduce the level of purchased feed resources
- Boost production whilst supportive of rumen health
- Improve margin over feed cost

The CopRice team recommended replacing the entire maize silage component and part of the vetch and cereal hay levels in the TMR with a 'loose' blend of non-forage fibre sources, processed cereal grain and protein meals. (CopRice now markets a range of commercially-available loose mixes under the DairyBlends brand name).

The blend contained high levels of rumen degradable protein and by-pass protein to support microbial yield, high levels of starch to provide energy density and essential amino acids necessary for high levels of milk production. In effect, it provided an even delivery of high quality, digestible ingredients to promote rumen health and milk production.

Impact on milk solids production

Following a rumen adaptation period, the levels of vetch and cereal hay in the TMR were reduced by about 20% and the amount of pellets fed in the dairy was reduced to 4 kg/day. Total feed offered remained the same (24.7 kg/day).

The reformulated TMR had a marked impact on production and margin. At the start of the trial (29 January 2020), the Benevento herd comprised approximately two-thirds late lactation spring-calving cows and one-third fresh autumn-calving cows. Milk production averaged 27.5 L/day. Milk composition averaged 4.2% butterfat and 3.2% milk protein, giving a total milk solids production figure of 2.04 kg/day.

Within six weeks (8 April 2020), milk production had increased to 30 L/day, while composition had increased to 4.59% butterfat and 3.45% milk protein. Butterfat production was 20% higher than the previous year. Total milk solids production had increased by 17.6% to 2.4 kg/day. Importantly, these increases improved margin over feed cost by 0.63 c/cow/day. These results were sustained until the completion of the project at eight weeks (21 April 2020), when cows were transitioned to pasture and maize silage.

These significant production increases can be attributed to improved rumen health and increased microbial function caused by a reduction in the large, twice-daily fluctuations in ruminal pH that can occur with high levels of 'slug feeding' inside the shed, the provision of non-forage fibre sources and an increase in NDF digestibility.

Easy to use

Model farm partner, Fred DeCicco, says the ration was easy to store, handle and mix. "DairyBlends allowed us to stretch our vetch hay supply and make sure the cows still received some maize starch at a time when we had run out of maize silage and pastures," he says.

"In effect, the blend allowed us to fill the gap between last year's maize silage running out and this year's pit opening up. The ration was very palatable for the cows with no sorting."

Daniel DeCicco also noticed a marked improvement in the general health of the herd. "Our fresh cows appear to be bulling earlier, their coats are looking excellent, they're relaxed and very content," he says.

The family is looking forward to seeing the effect of the nutritional program on the results of the autumn mating program. Previous changes to the nutrition program in the Benevento herd have helped boost the six week in-calf rate to 73% last spring.

Summary

This trial shows feeding a customised CopRice DairyBlends ration in conjunction with low-cost home-grown feed sources can improve milk production and cow health by reducing fluctuations in rumen pH, increasing the digestibility and type of forages offered, optimising microbial activity in the rumen and increasing feed conversion efficiency. Importantly, these benefits resulted in an increased margin over feed costs. CopRice DairyBlends are an ideal way to produce a nutritionally-balanced TMR or PMR during times of limited feed supply, such as those experienced during the summer of 2019/20.

CopRice DairyBlends

CopRice DairyBlends are formulated to complement your available feed resources in order to provide a nutritionally-balanced ration throughout the lactation. Compared to conventional feed commodities, CopRice DairyBlends provides the assurance of known quality and consistent supply, with the added convenience of minimum order quantities. CopRice DairyBlends are ideal for feeding in combination with CopRice Lac Cycle concentrate pellets, which help to optimise health and performance outcomes at different stages of the lactation cycle. CopRice DairyBlends are produced at CopRice Coleambally, Australia's largest ruminant nutrition facility. Coleambally is located in the heart of Australia's largest irrigation area, ensuring a consistent supply of quality agricultural produce and cost-effective delivery.

Table 1. Feed intake during the trial period.

	Original ration (kg/DM/cow/day)	Trial ration (kg/DM/cow/day)	Final ration (kg/DM/cow/day)
Maize silage	2.36	–	8
Pasture silage	12.5	12.5	–
Vetch hay	1.85	1.3	–
Wheat hay	1.8	1.7	1.5
CopRice Lac Cycle Mid Lactation Pellet	6.2	4.4	6
CopRice DairyBlends	–	4.8	–
Grazing	–	–	9.2
Total kg offered	**24.7**	**24.7**	**24.7**

Table 2. Nutritional specifications of the three rations throughout the trial period.

Specification	Original ration	Trial ration	Current ration
Metabolisable protein %	2528 (20%)	2608 (20%)	2521 (19%)
MJ ME/kg DM	268 MJ	271 MJ	264 MJ
Starch %	15%	16%	20%
NDF %	30%	28%	39%

CopRice Model Farm Manager, Ellen Fitzgibbon, is an accredited advisor for the Dairy Australia InCalf Program and a committee member of the Australian Association of Ruminant Nutrition. Originally from north-east Victoria, she graduated from La Trobe University with a Bachelor of Veterinary Bioscience (Hons), majoring in ruminant nutrition and reproduction. Ellen's research on markers of fertility in colostrum was awarded Ag Institute Australia's Richardson Memorial Award in 2015 for outstanding contribution to agricultural research.