

How do producers take more control over nutrient partitioning?

# A tough trade off

When diet partitioning dictates that milk will be produced at the cost of even basic physiological demands, such as growth and strong immunity, how can producers ensure that they are providing a diet that satisfies all of cows' requirements?

text Allison Matthews

**W**hen fed an adequate diet, dairy cows will partition a significant portion of this to provide the resources required for milk production. Cows have become masters at this, sacrificing the

nutrients needed to grow, reproduce and defend themselves from infection, to allow for maximum milk output. But, as Zinpro's Arturo Gomez and Dana Tomlinson explain, producers

have an expectation of efficiency within their system while maximising output. "Efficiency is expected across the board from high-yielding TMR units to lower yielding grass-based systems. However, nutritional deficiencies clearly have a negative effect on growth, re-establishment of pregnancy, production and survival," says Dr Gomez.

"Similarly, overfeeding or malnutrition may also have a negative impact on animal performance. Producers are in control of this situation and must avoid expensive nutrient losses that detract from producing milk."

Thompsons' dairy specialist Richard

*Balanced diet: dairy cows will divert a significant portion of their ration into milk production*





Dana Tomlinson: "The immune system needs to be respected by producers"



Richard Moore: "Many herds have struggled this winter, due to low silage ME"



Arturo Gomez: "A balanced diet will only solve part of the problem"

Moore points out that so much of a cow's health and performance is dictated by the producer's ability to minimise the negative energy balance (NEB) in early lactation.

"The grass silage analysis average for the winter so far has a dry matter of 23% and an ME of 10.2 MJ/kg DM. Many herds have had to cope with a foundation diet sitting below 10ME, and they have struggled.



"Today's high yielding cow is designed to encounter negative energy balance – it is an unavoidable reality of her first weeks of lactation. But there are many benefits to be gained from promoting high dry matter and energy intakes in early lactation. At a practical level, four weeks before calving, the diet should consist of up to 4kg of a bulky, energy dense and mineralised, ration that will promote rumen fill and avoid metabolic disease at calving. The feed level should build up gradually to the maximum feed weight during a 21-day period," he explains.

Maintaining body condition score at three, monitoring intakes and managing diet composition are the starting points to ensuring things are as they should be on the surface, but Dr Tomlinson warns that there are also unseen implications of a diet that doesn't provide the energy required for every eventuality.

"A healthy cow has a basal maintenance requirement of energy and metabolisable protein in order to maintain her defensive white blood cells," he says. "However energy expenditure increases several fold when the immune system is called into action to fight infection, protect against intestinal entry of toxic components naturally present in the gut, or respond to vaccinations.

### First response

"Producers must recognise the immune system as one of the most expensive and complex mechanisms in nature," says Dr Tomlinson. "If formulated properly, dietary energy and protein will be in sufficient quantities to meet the additional needs of immune activation. Unfortunately research is limited when it comes to deciding which diets would achieve optimal immune function, and the majority of information will only help avoid general deficiencies."

Using the information that we do know dictates that the sources of energy contained in the diet, such as starch and protein and digestible fibre, are crucial

to the optimal performance of any diet with the availability of glucose from rations high in cereal proving vital in reducing NEB.

Dr Gomez explains that although a balanced and tailored diet will ensure that the clinical signs of deficiency are not present, there is a large gap between that and being confident that the immune system is ready to respond if put under pressure.

"There are a set of key vitamins and minerals that need to be included in the immunity equation such as vitamins A, C, E and B-complex, magnesium and the trace minerals zinc, manganese, iron, iodine, copper and selenium," says Dr Gomez.

### Small quantities

"Although these trace minerals are only present in small quantities in the body, their presence determines the adequate use of protein and energy resources and each has its own purpose.

"For example, zinc is responsible for maintaining a healthy status of the gut lining, the reproductive tracts and all other epithelial tissues and also for the production of the somatic cells; lymphocytes. "Manganese is responsible for, among other things, producing pro-inflammatory hormones which ensure an immune response is activated when it is needed," he adds.

Some of the elements that make up a balanced diet are more obvious than others, but they are all vital if a complete picture of cow health is to be achieved. Using the typical signs of cow health, alongside a deeper understanding of the importance of a healthy immune system, will ensure that the pathway to efficient milk production becomes clearer.

"Producers will be rewarded with profitable production outcomes when maintaining a cow's ability to partition nutrients in favour of milk production by keeping them healthy, stress free and in an infection-controlled environment," concludes Dr Gomez. |