Challenging conventional thinking on feeding cows is key to meeting increasing economic and environmental pressures. In the first in a series of three articles, we highlight ways to improve feeding precision.

Challenge your nutritionist to improve ration precision

Feed remains the biggest single cost of milk production and also accounts for up to 70% of the carbon footprint of every litre produced. So improving ration precision is key to profitability and sustainability.

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With pressure on margins and increasing environmental demands, producers urgently need to find ways to improve the precision of ration formulation to make better use of feed, to improve margins and cut waste.

So says ED&F Man's Georgina Chapman, adding that the key is to challenge how diets are formulated, as well as how effectively they are utilised by the cow to produce milk efficiently.

"The better the nutrients are utilised, the fewer will be wasted – reducing cost and emissions per litre. And the good news is that a great deal is known about how feeds are utilised and challenging standard approaches to drive improvements is possible."

Forage is the best place to start. "The rumen has evolved to digest fibre, making forage utilisation key to efficient ration formulation. It is vital that full use is made of forage analysis and that clamps are also analysed regularly to ensure diets are balanced effectively," says Ms Chapman.

"Early indications are that this year's grass silages will present some problems because they are typically higher in NDF and lignin, which will make them less digestible. Unless care is taken to supply the appropriate energy sources to stimulate the rumen microbes

Georgina Chapman:
"Make nitrogen use efficiency (NUE) a primary KPI"

effectively, there is a risk that intakes and rumen throughput will be reduced, impacting yields, and that feed refusals will increase."

She says that analyses show that grass sugar levels are also lower, which will impact both total and rapidly fermentable carbohydrate levels. So diets will need to be supplemented to fire up the rumen without increasing the acid load and the risk of sub-acute ruminal acidosis (SARA), which will reduce diet efficiency.

Fibre digestion

Adding sugars, in the form of a molasses blend, can help to improve fibre digestion. "This will help to release more of the nutrients from forage while, at the same time, also increasing diet palatability and homogeneity to stimulate intakes and reduce sorting."

She adds that sugars will also stimulate microbial activity and supply rumen-fermentable carbohydrates without increasing the SARA risk, and can increase dry matter intakes (DMI) without causing excess rumen fill.

"Most UK dairy diets typically contain around 3% sugars in the dry matter, which is significantly below requirements. For optimum performance, early-lactation cows require between 6% and 7% sugars. Cows at peak require 8%, and even late-lactation cows need 6% sugar in their diet.

"Filling this 'sugar gap' provides cows with valuable rumen-fermentable carbohydrates to fuel the rumen micro-organisms, which will encourage better fibre digestion," she says. "By stimulating the rumen micro-organisms, sugars accelerate fibre digestion and reduce the proportion of undigested fibres that are just excreted, wasting energy.

"Adding the optimal level of sugars in the diet also contributes to increased microbial protein production, which is the most important protein source for ruminants.

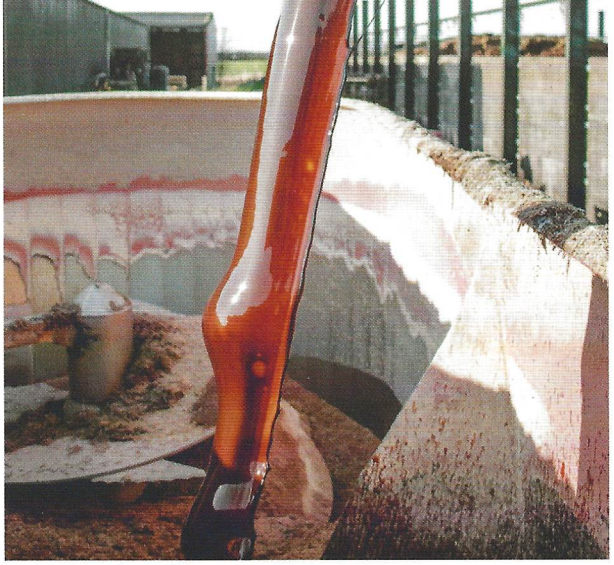
"Due to this year's volatile protein prices, optimising microbial protein production will be particularly important this winter and could allow a reduction in the amount of protein that needs to be fed."

There is a huge opportunity to reduce protein usage because cows are particularly good at utilising it. They typically require 4kg of crude protein to produce just 1kg of milk protein. Any unutilised protein is excreted, wasting money and contributing to total greenhouse gas (GHG) emissions through the production of nitrous oxide, the most polluting GHG associated with milk production.

"To increase precision, ration cows for metabolisable protein and amino-acid balance and make nitrogen use efficiency (NUE) a primary KPI when formulating and assessing diets," says Ms Chapman.

Pointers for precision feeding

- Analyse silage at least monthly and fine-tune rations
- Target between 6% and 8% sugars in the ration dry matter
- Make NUE a KPI, targeting more than 30%
- Challenge your nutritionist to reduce dietary crude protein
- Understand the importance of amino-acid supply
- Question the carbon footprint of all ingredients to reduce emissions in a transparent and economic way



Sugar boost: molasses helps to improve fibre digestibility

NUE is the proportion of nitrogen fed that the cow captures and uses for maintenance and milk-protein production. Currently, NUE averages about 25% in the UK, so 75% of nitrogen fed is just excreted – a nutrient and economic loss.

When protein is fed, a significant proportion is broken down into ammonia and amino acids. These are reconstituted into microbial protein, which passes into the hindgut. The microbial protein is joined by bypass protein, which avoids being broken down in the rumen. Together these are used to meet the cow's metabolisable protein (MP) and amino-acid requirements.

"UK dairy diets typically oversupply crude protein to try and ensure that the cow is supplied with all the MP and amino acids required," says Ms Chapman. "But this imprecise approach pushes up protein use and costs while also depressing NUE. And there is no guarantee that feeding more crude protein in total will meet the cow's amino-acid requirements. So challenge your nutritionist to formulate to amino-acid requirements and, if required, supplement the diet with rumen-protected amino acids."

A typical UK dairy diet is between 17% and 18% crude protein, and this oversupplies MP by between 8% and 10%, which results in low NUE. A diet formulated to balance amino acids can be closer to between 14% and 16% crude protein, with a much smaller MP oversupply, allowing cows to be more nitrogen efficient and reducing nitrogen pollution.

Challenge ingredients

Focusing on NUE has the potential to have a significant impact on total feed costs while reducing the environmental impact of feeding too much protein. Ms Chapman adds that it is also possible to reduce emissions by looking closely at the ingredients in the diet.

Soya is currently the focus of a lot of attention and, with the new deforestation regulations (EUDR) coming in, a number of milk processors are looking at options to replace it in diets without compromising performance. There is likely to be a drive to move to lower carbon ingredients. "Co-products, like molasses, have a low carbon footprint because the carbon is accounted against the primary product.

"Producers wanting to reduce emissions from feeding should focus on increasing feeding efficiencies, reducing waste and ingredient selection," adds Ms Chapman. "These will give a demonstrable and economic benefit, rather than looking for a 'magic bullet' solution." |