

Manipulating amino acid balance

Balancing amino acids has helped one Cumbrian dairy farming family achieve a significant increase in milk protein and milk price.

Achieving fat and protein targets can have a big impact on milk price and margins for producers on a manufacturing contract.

Recent analysis by AHDB indicates that 40% of milk sold into the liquid market and 55% of manufacturing milk fell below butterfat targets—costing farmers £38 million in lost potential income. In addition, 64% of farmers on manufacturing contracts fell short on protein—which lost another £17 million.

“Together this means that farmers were losing £55 million per year by not hitting targets,” comments Sam Wellock, feed specialist with Massey Feeds. “But this is not the full picture, as most contracts continue to pay a bonus for higher compositional quality above the targets.

“Identifying ways to ensure

that bonuses are achieved should be high on every dairy farmer’s list of priorities, especially in the light of increasing production costs. In the case of milk protein, this largely comes down to paying close attention to the diet.”

Boosting milk proteins

Mr Wellock says the typical approach to attempting to improve milk proteins is to increase either starch or total protein content in the diet. But he suggests that this is often not the most cost-effective approach, advising farmers to look at more precise supplementation.

When feeding protein in the diet, farmers are in fact supplying amino acids which are the building blocks of protein. So cows need a carefully balanced supply of amino acids.

“There are 20 amino acids, of which half are essential. This means they have to be supplied in the diet as they cannot be synthesised by the cow,” he explains.

“As soon as an amino acid becomes limiting—in other words there is not enough to meet the cow’s requirements—the performance of the cow is affected.

“In most UK dairy diets, methionine is the first limiting amino acid—with an estimated 85% of diets being deficient. Once this happens, cows will draw it away firstly from milk protein production to maintain yield and, secondly, from fertility, leading to a fall in milk protein.”

Andrew Grimston from Adiseo comments that to improve milk protein content or protein yield then cows need to be rationed for the supply of amino acids, starting

with methionine and lysine which are predominantly the most limiting in dairy diets. This has the additional benefit of potentially reducing the need for total protein supply, which can lead to lower feed costs while improving the sustainability of production.

Precision rationing

While 100% of UK pigs and poultry are rationed for amino acids, less than 2% of the UK dairy herds are. The USA leads the way, with a significant proportion of dairy herds rationed for amino acids.

“The usual response to try and increase amino acid supply is to feed more protein,” comments Mr Grimston. “In essence you put more in with the hope that more

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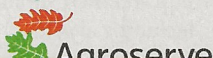
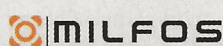
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of the limiting amino acids get through unscathed to be absorbed.

"The result is that cows are fed too much protein. At current protein costs, this is a huge burden as well as having an environmental impact.

"A typical UK dairy diet is 17% to 18% crude protein. This oversupplies metabolisable protein (MP) by 8% to 10%, while often still failing to supply sufficient essential amino acids. A typical diet formulated to balance amino acids will be 14% to 16% crude protein with a MP oversupply of less than 5% while delivering more closely what the cow requires.

"Reducing crude protein content could have a significant impact on cost per litre. But, more importantly, ensuring adequate amino acids will increase milk protein and milk price to boost margins."

To help ensure diets are sufficient in methionine, Mr Grimston advises feeding the amino acid in a protected form. Providing the amino acid in this form encourages it to be used effectively by the cow as a greater proportion will be



The Barrows' herd's winter diet is based on grass silage and a blend supplemented with additional methionine.

absorbed across the rumen wall, bypassing the rumen and going on to stimulate liver function—resulting in a milk protein response. This in turn prevents the cows having to prioritise methionine

use, which is a principal cause of low milk proteins.

"Methionine can be added to compounds and blends and has two specific modes of action in the cow. You can address methionine

deficiency and increase milk protein, milk yield and help support health and fertility. Additionally, MetaSmart contains some rumen active methionine which plays a role in increasing milk fat."

Positive response from added methionine

Milk protein content is economically important to James and Robert Barrow, Robert's wife Hazel and their son Paul, who supply milk to First Milk Nestlé from their 200-cow pedigree Langhurst Holsteins near Appleby-in-Westmorland in Cumbria.

The all-year-round calving cows typically graze on a paddock system from late April until the end of September, before being housed in cubicles on a grass silage-based diet. In the summer, the cows are buffer fed with grass silage and 4.5kg to 6.0kg of a Massey Feeds blend comprising maize, wheat, sugar beet, soya and rape depending on grass availability. In the winter, the diet is grass silage, fat and blend.

Throughout the year the Barrow family is looking for M+28 litres from the base diet. An 18% high starch 13ME wheat-based dairy compound is fed to yield in the parlour.

Cows are averaging 10,427 litres with a calving interval of 383 days. Heifers calve in at two years old. The herd is bred by DIY AI, using a combination of sexed



James, Paul and Robert Barrow with Adisseo's Andrew Grimston and Sam Wellock from Massey Feeds.

and conventional dairy semen and some beef.

"Maintaining milk quality is vital to maximise milk price under our contract," comments Paul Barrow. "Milk protein is valued at 4.798 per litre per percent above a base of 3.1%. Failure to achieve 3.1% leads to a deduction.

"We have always worked to keep proteins up and tried various approaches, including altering the balance of energy in the blend and increasing total protein in the diet.

But we never achieved the increase we wanted."

Proteins were a particular problem in June 2021 and throughout the summer, with the lowest test of 3.12%. Following discussion with Sam Wellock of Massey Feeds, the diet was reviewed with Adisseo for total amino acid balance and was found to be approximately 7.5 grams/cow/day short of digestible methionine.

Addressing this required a reformulation of the ration. The

inclusion of MetaSmart was trialled as a bypass digestible methionine source in the blend.

"Adding the MetaSmart increased the price of the blend. So we agreed to try it for two loads to see what sort of return we would get. No one likes paying more for feed but hopefully we would see an effect quickly," Paul explains.

The new blend was first used in mid August this year and at the end of August milk protein had increased to 3.25% and has never fallen below this level since. In October, protein was running at 3.39% and butterfats have increased too, now running at 4.4%. There has been no real impact on milk yield.

"Milk protein has certainly improved since we added the MetaSmart, and we are now receiving the bonus with each 0.1% extra protein which is worth nearly 0.5ppl. This is really important," Paul adds. "We will continue to add it to the blend and the next stage will be to look at reducing the total protein in the diet as this will help with our carbon footprint and the environmental impact."