Improving feed conversion efficiency
Here, in the final article of our series looking at feed conversion efficiency, we explain why the parameter is set to become increasingly important for UK dairy businesses and how it can be improved.

There's more to ration formulation than simply balancing the chemical content

Let's get physical

The right feed in the right form is vital if feed conversion efficiency is to be maximised. In this, the final article in our series on improving FCE, we take a closer look at the importance of feeding a good ration, both in terms of its chemical content and physical make up, to produce more milk.

text **Rachael Porter**

Feed out: a lot can go wrong between the laptop and the rumen

Nutrition can be divided into two parts – chemical and physical. Chemical nutrition looks at the contribution of nutrients, which are energy, protein, oil, fibre, vitamins, minerals and trace elements, and matching them to the cow's requirements.

"Getting nutrition wrong will have a huge impact on profitability," says BOCM PAULS' Nick Berni. "To offset rising feed costs and milk price volatility, herds need to produce high levels of milk efficiently without compromising cow health and fertility."

Rumen fermentation

"Nutrition should focus on the rumen not the cow, as it is the end products of rumen fermentation that actually feed the cow and are responsible for driving milk production and milk quality while at the same time being closely linked to cow health and fertility."

The aim is to supply adequate levels of energy and protein within a realistic dry matter intake while correctly balancing the sources of energy and protein. Feeds are broken down at different rates in the rumen so a chemically balanced ration will take into consideration different fermentation and degradation rates of energy and protein sources. "Sometimes it is also important to supply nutrients that by-pass the rumen and are utilised in the intestines, particularly with higher yielding cows," he adds.

Ration formulation systems, such as BOCM's Dietplan DairyPro, accompanied by accurate forage and feed analysis allow nutritionists to develop diets that provide the correct supply and balance of nutrients.

"By taking account of how different nutrients interact in the rumen we can maximise rumen output, health and overall feed efficiency."

Correctly implemented

Mr Berni stresses that good chemical nutrition does not begin and end at the laptop. Once a diet has been formulated it needs to be correctly implemented and monitored as there is a risk that any one of four different diets could be fed – not just the one on paper. The other three could be the ration that the mixer wagon operator is told to feed, the ration that the operator actually puts in front of the cows, or the ration that the cow decides to eat.

"There's a great deal that can go 'wrong' between the laptop and the rumen and the real skill is in reducing the variation between the diet formulated and the diet actually utilised by the cow," he says.

According to Keenan nutritionist Mark Voss the way the diet is physically presented to the cow is as important as the chemical make-up of the diet. "Present the diet in the wrong way and all the benefits of a precise chemical formulation will be lost because the rumen will struggle to digest the ration, intakes will fall and FCE and margins will be reduced."

Physical nutrition considers the structure of the ration. The rumen requires a mix of different particle sizes to work effectively and if the diet contains too much long material then the rumen becomes congested and actually slows down. Cows have problems digesting the diet and nutrients pass through the rumen without being utilised. Conversely, too many small particles lead to an over-vigorous fermentation and problems with acidosis.

Mark Voss: "Nutrition should focus on optimising rumen function"

Craves consistency

The rumen also craves consistency and ideally each mouthful should be virtually the same in terms of the particle size and chemical breakdown. "Delivering the correct balance of particles to optimise rumen function will improve utilisation of the diet. Physical nutrition sets out to optimise the form of the ration so the maximum amounts of nutrients can be utilised in the rumen."

Mr Voss says that there is a misconception that a well-mixed diet is one that is heavily processed so all the ingredients become largely indeterminable. "This could not be further from the truth. Many systems of mixing diets actually work against rumen function by mixing too aggressively and producing an over-processed ration with a lack of adequate structure. This forms a diet that is too dense.

"An effective physically presented diet leaves a clearly distinguishable range of particle sizes in a low-density mix. Effective physical nutrition delivers the optimum distribution of particle size and fibre while ensuring the optimum bulk density."

He says that the Keenan Mech-Fiber approach employs a gentle paddle mixing action that thoroughly chops and mixes the ingredients using a non-destructive tumbling action. The result is a homogenous mix that allows the rumen microflora to work to their potential and release the maximum quantity of nutrients from the diet. And the unique Pace system helps reduce daily variations in mixing.

"Focussing on getting the chemical and physical nutrition right is the foundation of improving feed efficiency and is something all producers can benefit from this winter," Mr Voss adds. |

Feed efficiency is a useful benchmark

Diet consistency is high on the list of priorities for Yorkshire-based producer Ed Goodall, who runs a 240-strong herd of Holsteins, with all milk processed on farm and distributed around Leeds.

"We want to avoid making too many changes to the ration and base our feeding on buying consistent feeds, formulating the diet carefully and then making sure it is delivered to the cows in a consistent way," he explains.

High yielders are housed all year round while mid-lactation cows are turned out for a few hours in the summer. Low yielders graze full time in the summer, but will get some mixed ration.

All feed is fed in the trough and the rations are formulated by BOCM's Keith Colley. The diet comprises grass silage, two protein blends, rolled wheat, Lintec, Megalac, Levucell and straw. The high yielders' ration is formulated to give maintenance plus 45 litres, while the mid-lactation diet supplies maintenance plus 35 litres.

Ed has used Keenan feeders for the past 16 years and has been impressed with the control that the new Pace system has given him.

"With Pace we know exactly what has been fed and it's also easy to increase the total fed while keeping the proportions the same, rather than just adding more silage. The latter changes the chemical and physical ration and disrupts the cows.

"We are feeding a well presented diet and I can quickly check the accuracy of inclusion and mixing times to make sure we are feeding what we expect. Being able to download the feed data enables me to discuss any discrepancies that have arisen with the rest of the team."

The system also allows Ed to monitor feed efficiency, which has to average around 1.3kg of milk per kilogramme of dry matter fed, but this has increased to closer to 1.4 since the cows moved onto this year's first-cut silage.

"Feed efficiency is a useful benchmark, particularly when we change the silage. It allows us to monitor how cows are reacting."

Ed Goodall: "A consistent ration is vital"