Fatty acid profiles start to tell a positive story

Win-win for cow he

A UK-based project that monitors fatty acid profiles in milk is showing benefits for cow management and is providing lower saturated fat milk on the shelves. Useful data is emerging and developing a tool to predict energy balance is a key priority.

text **Karen Wright**

NML director Ben Bartlett admits it's early days in the project, co-funded by the Technology Strategy Board, but results so far make him optimistic that the outcome will be very beneficial for the industry as a whole.

The project involves monitoring and improving the efficiency of the dairy supply chain and the healthiness of dairy products. Milk testing company NML uses mIR analysis to provide fatty acid profiles on both bulk milk and individual cow samples and is working with project participants Scottish Rural Colleges (formerly SAC) and Marks and Spencer. This data, supported by existing research, will be used to establish links with genetic and management factors.

"Results so far suggest that this could be a win-win situation for the dairy industry," Mr Bartlett told delegates at this year's British Cattle Breeders Conference. "We are seeing a significant drop in the saturated fat content of milk where, through cow feeding, the fatty acid profile of the milk has been altered.

"Our data supports overseas trial work too, which has shown that mIR test data can be used to predict negative energy balance in the cow more accurately than by traditional milk testing methods. Research has shown that the fatty acid C18.1 increases significantly in periods of negative energy balance, which indicates mobilisation of adipose tissue.

"An analysis of fatty acids early in lactation could therefore provide useful indicators of energy balance status and highlight cases where action needs to be taken before cow health becomes a real concern."

So far, 210 herds are being 'monthly' profiled using NMR recording samples with more than half a million profiles completed during the past four months. More than 400 fatty acids are produced in cows' milk and the key fatty acids will be logged within the project's database. A core group of herds are also recording condition score and live weight data to allow correlations between negative energy balance and fatty acid profiles to be analysed.

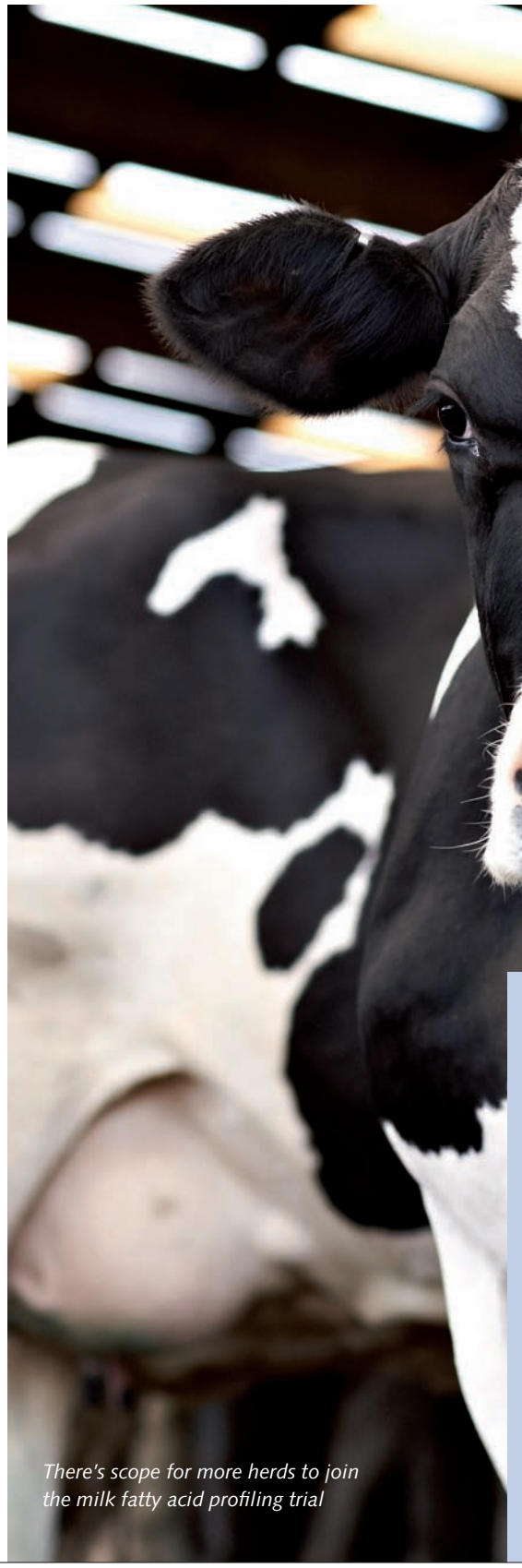
Energy-balance

"Over time we will see a correlation between management factors and fatty acid profiles, but our short-term priority is using the raw data to derive new measures for determining energy balance," adds Mr Bartlett.

"This can have immediate advantages as the energy balance of the cow early in lactation can have a significant impact on her immune status and fertility performance and, if a cow is in a negative energy balance, it can provide an early warning indicator of likely body condition loss. Producers can monitor and manage trends in energy balance in individual cows without the need for regular body condition scoring which is both complex and costly."

Recent research has also shown correlations between certain fatty acids and fertility. For example, higher concentrations of trans fatty acids were shown to have an adverse affect on fertility performance, with a larger number of inseminations, lower calving rates and lower non return rates in cows with high trans fatty acid content.

In addition to the M&S producer pool, the project involves 30 carefully selected industry partners – feed and breeding



There's scope for more herds to join the milk fatty acid profiling trial

for cow management and milk fat content

alth and milk quality

Mark Robins: "Using profiles to predict condition score will help avoid problems"

Ben Bartlett: "Fatty acid profiling will bring new management tools"

companies, vets, milk purchasers and consultants – who have nominated some of their NMR recorded dairy clients for monthly fatty acid profiling. The results will be added to the database but these companies will also have access to the data so they can monitor the effects of, for example, the herd's feed regime, on its fatty acid profile.

More herds

"Interpretation is key though, bearing in mind the number of fatty acids involved and their interactions – a drop in one can cause an increase in another and while some may be deemed as harmful to human health, others are beneficial.

"At this stage we need to monitor trends. We already know that seasonality, feeding and stage of lactation have an impact on fatty acid profiles. Each herd profile varies so the key is to recognise deviations from the norm. There's scope for more herds to join the project which, with more data, will improve accuracy," says Mr Bartlett.

"Longer term we hope that there will be new tools from fatty acid profiling that can benefit management and breeding decisions, given the heritability of certain traits. Ultimately, we are looking for the balance of fatty acids that best benefits cow and human health since this will both strengthen dairy herd sustainability and the role that dairy products have to play in improving human health." |

Ration adjustments reduced sat fat but not yield

Mark Robins, estate manager for Farley Farms Estate in Berkshire and chairman of the M&S national milk pool, recorded a reduction in the saturated fatty acid content of milk from the 200-cow Holstein herd when extruded linseed was added to the TMR ration in place of palm oil.

"The response was rapid and there was no milk yield drop during the trial, but a slight reduction in total fat," Mr Robins told the conference audience. "However, there are many factors that will cause variations in fatty acids and feeding is multifaceted, so it can be difficult to attribute changes in the fatty acid profile to the addition or removal of one component in the ration."

As one of 40 producer suppliers to the M&S liquid milk pool, the Farley Farm herd's ration is now geared to produce lower saturated fat milk. "We have reduced the saturated fat content of the M&S milk pool as part of the Healthier Milk Project introduced in the autumn of 2011," he added.

"We wanted to offer this as a point of difference and it meant that most of us producers had to implement some changes in feeding regimes. It was a steep learning curve for many but in most cases milk yields weren't affected, the saturated fat content fell and many reported that their cows were healthier."

The M&S producer pool, supported by the Royal Veterinary College, is involved in trials to derive body condition scores from mIR testing. "We try to make sure cows fall into the target condition score band, knowing that if they do they should be in the right condition to perform well," added Mr Robins. "The whole process of body condition scoring is costly, time consuming and subjective. If fatty acid profiles can predict energy balance and condition scores then we can act quickly before the cow encounters any real problems."