Farm amino acid trial success

A farm trial to look at the effects of feeding two rumen protected amino acids—methionine and lysine—has shown substantial benefits in one commercial herd in Wales.

Increased dry matter intakes and milk yields, plus better health and fertility, have been seen by milk producer Howell Richards at Cwrt Malle farm near Carmarthen following a feeding trial with protected methionine and lysine on his 2,000-cow herd.

The trial was performed from October to December 2020 on 1,700 lactating dairy cows,with an average milk production of 11,000kg, at 4.26% fat and 3.27% protein.

The main findings were:

- a 1.8kg increase in daily milk yields in the first 60 days in milk
- a 0.6kg increase in daily milk yields in the first 120 days in milk
- a 360kg increase in lactation yield per cow
- reduced embryonic losses and 3.3 fewer open days
- positive effects on health, including mastitis and metritis
- an economic return on investment (ROI) of over 5:1.

The experiment was performed using an OFF/ON design with a duration of 56-day periods for each. The rumen protected methionine and lysine were mixed into a premix and given as part of the TMR, which was fed once a day.

Robert Hamilton from Kemin explains: "Rations were formulated using the latest metabolisable protein rationing system devised by Cornell University (CNCPS v6.55). The aim was to achieve 100% of the requirement for metabolisable lysine and methionine.

"The calculated daily feed rate for methionine was 14g Kessent M and for lysine 21g of LysiGEM for lactating cows with an average daily dry matter intake (DMI) of 24kg. For close-up dry cows with a DMI of 14kg the requirement was 10g of methionine and with no additional lysine needed.

Howell Richards says milk yields have been up and feed costs reduced.

"These amino acids are encapsulated. This means that they are rumen protected and digested in the lower intestine," he says.

"There were no feed changes for the duration of the trial except for the addition of methionine and lysine in the ON period. Milk production figures (kg/day) were recorded daily from the parlour (1,700 individual recordings x3/day for 112 days) and evaluated for the first 120 days in milk," explains Mr Hamilton.

"First lactation cows were excluded from the results as they are still growing and, therefore, amino acid (AA) requirements differ from those of multiparous lactating cows."

The productive performance is shown in Table 1. Compared with the control group, the cows fed additional AAs had 3.3 fewer open days and decreased embryonic losses (seven compared with one).

"The same picture was seen for health parameters, indicating better health with the use of rumen protected amino acids. Mastitis was reduced from 6.5% to 2.1% and metritis from 10.5% to 4.7%." (See table 2)," he comments.

Economic evaluation

The positive responses of protected amino acids on production, health and fertility lead to an improved economic return. The ROI was 5.2:1, taken into account the 21 days pre-calving and 120 days post-calving feeding period of AAs.

Mr Hamilton calculates that feeding methionine and lysine over a 12-month period to cows in the first 120 days of lactation and methionine for the last 20 days of the dry period would cost Howell a total of £20,800.

However, Mr Hamilton claims that increased milk yields of 360kg (at 29p/litre), improved fertility (at £4.17 per day open) and reductions in metritis and mastitis would all combine to boost herd income by about £109,000 per year.

"The benefits of feeding amino acids in the first 120 days of lactation raise peak yields and will

Table 1: Milk production of cows comparing OFF and ON periods and days in milk

Days in milk	Up to 60 DIM	Up to 100 DIM	Up to 120 DIM
OFF period	32.40 kg	33.10 kg	32.88 kg
ON period	34.18 kg	33.74 kg	33.43 kg
Difference	**+1.78 kg**	**+0.64 kg**	**+0.55 kg**

increase milk production for the rest of the lactation after supplementation has stopped," he says.

"Positive effects on calves can also be expected, as maternal methionine intake appears to stimulate the immune system and liver metabolism, promoting in utero calf development and postnatal growth," adds Mr Hamilton.

Farm experience

Howell was so pleased with the results he was seeing in his herd that the trial was finished early. The intention was to stop feeding the additional methionine and lysine for a second 56-day OFF period after the ON period to see what affect this has on performance. But Howell decided to continue feeding the protected methionine and it still part of the ration today.

"The cows have never looked so healthy," he says. "I can't put this all down to the amino acids but this is the biggest change we have made. Feeding methionine for the first 120 days does seem to increase peak yields and then maintain a higher lactation curve.

"Yields over the past year have increased from 11,000 to 12,100kg of milk sold per cow per year. Cows normally average 32 to 33 litres per day but this increased to 37 to 38 litres per day in summer.

"They have dropped back since to 36 litres per day but are now starting to rise again with fat at 3.83% and protein 3.38% which ensures a bonus for constituents." Milk is sold to Meadow Foods and processed by Cadbury.

"Initially I was not keen on going ahead with the trial, partly due to the cost and the feeling it was just another 'magic powder'" admits Howell. "However, amino acids are not an additive. They are a nutrient that can replace fishmeal and soya," he says. "I was also worried that we would not get enough energy into the cows.

"Overall I have been impressed. We have definitely seen benefits ,with yields up and health and fertility improvements.

"Every day we are looking to be more efficient and for options to take out costs. We are now seeing feed costs coming down as we strip soya out of the rations. This has been helped by buying feeds on forward contracts, although we are facing a 2 pence per litre increase next year."

Table 2: Disease incidence related to calving

	Calvings	Metritis	Mastitis	Sick
OFF period	353 cows	10.5%	6.5%	3.1%
ON period	191 cows	4.7%	2.1%	2.6%

Howell formulates cow rations himself but checks them with independent nutritionists. Kemin monitors the amino acid balance of the diet.

Early lactation ration

The current milkers ration for first 120 days of lactation is:

Brewers' grains	5.0kg
Bread	3.0kg
Blend	12.0kg
Fat supplement	0.25kg
Maize silage	24.5kg
Grass silage	8.0kg
Methionine	14g
Lysine	20g.

The blend is made to Howell's specifications by Wynnstay and includes 33% wheat, 25% soya hulls and 38% rape meal plus minerals.

"The ration has a crude protein of 17% but I think we can get that lower," says Howell. "The diet was starting to show a deficiency of lysine so we have introduced a lysine supplement to the ration since November. I think lysine has place in the diet but we will keep this under review.

"Agri-King monitors the herd and sieves the cows' faeces every three weeks. We have noted better digestion of nutrients over the last year," notes Howell.

Cows are dried off at 50 days and fed 30kg of grass silage, 1kg of dry cow blend with minerals and vitamins. From 20 days the close up dry cow diet includes 14kg Hybrid rye silage, 5kg maize silage, 2.5kg bespoke blend and 10-12g of encapsulated methionine.