

Transition cow nutrition and management

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All newly calved cows will initially be in a state of negative energy balance because milk production demands will exceed their ability to compensate with dry matter intakes.

The cow responds in the short term by mobilising body fat reserves to supply the energy required for milk production and maintenance. In well-managed herds with appropriate transition cow management, this energy deficit resolves after about 10 weeks (see figure 1).

However, in some herds, and for some cows, the rate of fat mobilisation is too fast for the liver to oxidise it. This results in a build-up of ketones in the blood, milk and urine.

When ketone levels become extreme, cows develop clinical ketosis. Clinical signs include poor appetite, depression, and nervousness. This results in loss of milk production and

leads to metabolic and fertility-related diseases and poorer health (see table 1).

Cases of ketosis have significant cost. Even at subclinical levels, in which there are no outward signs of the disease, ketosis is estimated to be costing up to £690/cow (Esslemont, WBC 2012)

Ketosis - a common problem

When a clinical case of ketosis occurs on a farm, this is just the 'tip of the iceberg'. According to a survey of over 1200 UK herds (Macrae, 2012), although clinical cases are





relatively rare with less than a 3% incidence, by contrast, subclinical ketosis is much more common with nearly 30% of cows experiencing the condition in the first 50 days of lactation. And even at this 'hidden' level of ketosis, there is still a depression in milk production and fertility, a compromise of the animal's immune system and health, and an increased likelihood of involuntary culling.

Ketosis – a risk in early lactation

There are two types of ketosis: Type 1 ketosis occurs in early lactation when the animal becomes energy-deficient. The most obvious at-risk group are high yielding cows. Their energy demands are greater than their peers, and so they are more likely to have a greater negative energy status. Heifers are another at-risk

group as their 'social status' in the herd is low. Older, more dominant, cows may refuse them access to the feed trough. So heifers eat less and suffer more stress. This is less of a problem in new buildings with wide passageways. However, older housing is frequently not so heifer-friendly. A high LDA incidence in heifers may be a reflection of this environment.

Poor quality rations are another risk factor: the digestibility and energy content of grazed grass and forages varies through the year. Cases of subclinical and clinical ketosis can occur when rations are changed to include poorer quality forages or when there is an over-reliance in late summer on grazed grass. Butyric acid silage or wet silage can cause a dietary overdose of butyric acid, inducing severe ketosis and cause a reduction in dry matter intake.

"To regain their fitness in time for calving, cows can be put into a 'starvation' group or 'fat club' at drying off"

Fat cows – candidates for ketosis

In the run-up to calving, some cows become over-conditioned or 'fat'. If their body condition score (BCS) is greater than 3.0 at drying off, they are prime candidates for Type 2 ketosis. Again this is more frequently found at subclinical 'hidden' levels than at clinical levels.

These 'fat' cows will be less efficient at utilising energy and also have lower dry matter intakes, both before and after their next calving, further exacerbating the energy deficit. Fat cows are also more prone to milk fever and difficult calvings, which will further disrupt feed intakes.

To prevent pregnant cows becoming fat, they should be split into groups and fed according to their stage of lactation and yield. In practice, overfeeding can still occur

when, for example, a cow is fed as one of a group expected to be giving 30 litres of milk/day but is only giving 25 litres/day.

To regain their fitness in time for calving, cows can be put into a 'starvation' group or 'fat club' at drying off. However, it's not healthy or economic for dry cows to be losing BCS.

Over-conditioning of cows can also occur when it has taken longer to get them back-in-calf than their herdmates e.g. due to poor oestrus expression. The extended time without pregnancy allows the cow to put on condition.

Another ketosis risk is extended dry periods - cows become less fit and less able to cope with the change from dry cow rations to the milking cow ration.

Monitoring for ketosis – on-farm investigations

Ideally regular monitoring of body condition across the herd should be carried out at key stages of production (see table 2). Scoring cows at 100 days before calving can ensure diets are adjusted to better match yields and prevent 'fat' cows and Type 2 ketosis occurring.

In calved cows, if BCS at 60 days post-calving is one whole point lower than that of the dry cows, this indicates a 1kg per day weight loss from negative energy balance, and ketosis and poor fertility is likely.

An increased incidence of LDAs, metritis, RFM (retained foetal membranes) or milk fever are also warning signals that cows could be in a state of subclinical ketosis.

Take a look at the herd's milk records. If more than 40% of cows have a fat:protein ratio of more than 1.5:1 at the first test after calving, this may also

Figure 1
The energy gap in early lactation

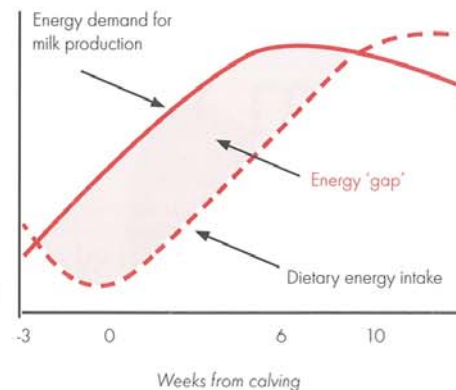


Table 1
The impact of ketosis on cow health and performance

Increases in:	Reductions in:
<ul style="list-style-type: none"> • LDAs • Cystic ovaries • Metritis • Severity of mastitis • Retained Foetal Membranes (RFM) • Calving interval • Culling rate 	<ul style="list-style-type: none"> • Feed intakes • Milk yield • Fertility (conception rate)

Table 2
When to condition score

Stage of lactation	Target Body Condition Score
At calving	2.5-3.0
60 days post-calving	2.0-2.5
100 days before drying off	2.5-3.0
At drying off	2.5-3.0

indicate that the herd is at risk of ketosis.

Testing for ketosis – metabolic blood profiling

Routine ongoing herd monitoring for ketosis is important. Monitoring helps assess if

changes to nutrition and/or management need to be made over time to help optimise herd performance.

For an objective measurement of a herd's energy status, blood samples can be taken and metabolic profiling carried out.

In newly calved cows, vets

will typically sample 12 cows which have calved between 2 and 21 days previously. The levels of ketones in the blood – measured as beta-hydroxybutyrate, or BHBA – indicate the degree of energy deficit, with levels of over 1000 µmol/l indicative of subclinical ketosis.

Where more than 10% of the group have subclinical ketosis then the situation needs careful monitoring and further testing is recommended. Where more than 25% of cows tested have high ketone levels, changes to management and/or nutrition are needed.

For dry cows, energy status is typically assessed using NEFA (non-esterified fatty acids) levels in the blood, with samples taken in the two weeks before calving.

Take care of transition cows

Both Type 1 and Type 2 ketosis – even at subclinical levels – are detrimental to a cow/heifer's performance, health and productivity. This metabolic disease reduces herd profitability in the short term due to the costs of treatment and drop in milk yield. In the long term, subclinical ketosis can be a gateway disease, as affected animals are more prone to other metabolic diseases, health challenges and also at a higher risk of being culled.

So it's essential to pay attention to their nutrition and management during the transition period – the three weeks before and after calving.

Farmers concerned that ketosis may be depressing herd performance should talk to their vet, together with their nutritionist, to investigate the energy status across the herd so that an appropriate strategy can be put in place.