

DAIRY TECH-LINE



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Improving Transition Cow Health Through Monitoring Negative Energy Balance

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When dairy producers monitor and control ketosis in their herd, they can reduce retained placentas, metritis, mastitis and DA's all while increasing the odds of pregnancy at first AI.

Negative energy balance (NEB) occurs in all mammals when the energy derived from intake of food does not meet the energy demand for survival and production. In this situation a "fat to fuel" mechanism kicks in whereby animals pull fat reserves from tissue and turn it into fuel for survival. Ketones, Non-esterified Fatty-acids (NEFA) and Beta-hydroxybutyric acid (BHBA) are all byproducts of this process and are part of a normal metabolism. However, when cows undergo severe NEB, these byproducts elevate to a level that can have detrimental effects to the cow. This is called hyperketonemia or "Ketosis".

Because ketosis is present at some level in all herds, and the cause can vary, it can be difficult to diagnose and manage. However with the right tools and understanding of factors at play, we can reduce the duration and severity of ketosis in dairy herds.

So why is testing for NEB important?

Numerous studies have shown that when cattle experience excessive NEB there is increased risk of disease development and decreases in both milk production and reproductive performance. This is because high NEFA levels suppress the immune system, which leads to an increase in retained placentas, metritis, mastitis, and other negative cow health events. Elevated NEFA and BHBA have also been linked to increased risk of developing a displaced abomasum and decreased odds of pregnancy at first AI. Recent research out of Cornell University found that there was an average total cost of \$289 per case of ketosis. So a dairy herd with 1,000 calvings a year and a 30% incidence of ketosis will potentially lose \$86,700 of revenue. Monitoring the incidence of ketosis in your herd is the first step in determining where management focus should lie in order to decrease the economic impact of this disease.



"You can't manage what you don't measure."

Monitoring for ketosis:

- Provides real-time information on an individual cow's metabolic status and allows for a more rapid treatment.
- Provides a herd level tool to allow producers, vets, nutritionist to monitor management changes that impact transition cow health.

There are tests available to check for ketones in urine and milk but these are less accurate than blood tests. Two blood ketone tests that can easily be initiated on farm are:

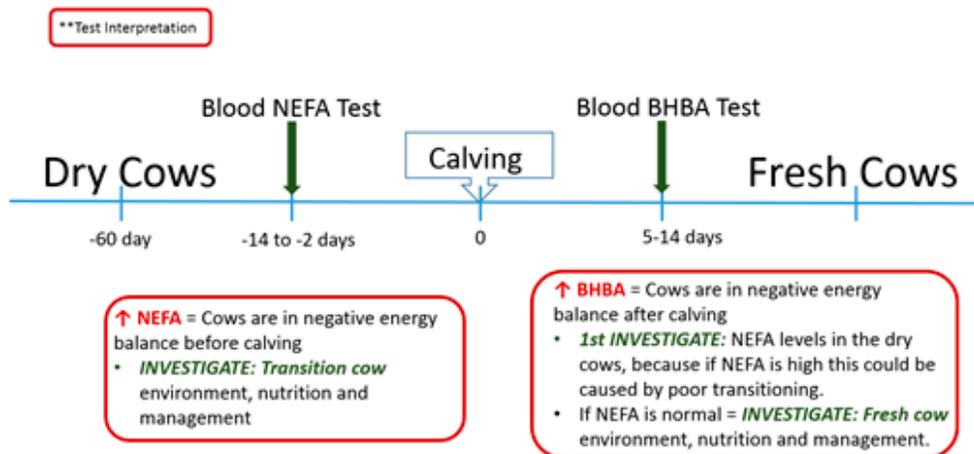
- NEFA- (Non-esterified Fatty-acids): test used to evaluate blood fatty acid level in pre-fresh cows. Cows that are high on this test would be much more susceptible to metabolic problems post fresh as they are losing too much body condition pre-calving.
- BHBA- (Beta-hydroxybutyric acid) test used to quickly check post fresh cows to help evaluate blood ketones, an indicator of rapid post fresh body weight loss. This test is more economical and easier to use on farm.

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Each of these tests can be drawn by on farm staff via tail head vein, but the handling of NEFA's to the lab is very important and working with local veterinary clinics may yield better results. The details of each of these tests are described below:

Blood Test	NEFA (non-esterified fatty acid)	BHBA (beta-hydroxybutyric acid)
Handling	Blood must be in a tube and spun down in a centrifuge quickly, no more than 24 hours from time of draw. Tubes need to be kept refrigerated and shipped on ice. 	Cow side, hand held monitor that uses a few drops of blood. Much like a human diabetic monitor. 
Recommended stages of lactation for use	<ul style="list-style-type: none"> • 2-14 days before calving • Can be used for fresh cows (3-14 DIM), but BHBA is more cost effective 	<ul style="list-style-type: none"> • 5-14 days after calving
Recommended number of animals to sample	12 animals every 2-4 weeks. **(Smaller groups can still be tested, but the interpretation of the results should be based on at least 12 animals)	12 animals every 2-4 weeks. **(Smaller groups can still be tested, but the interpretation of the results should be based on at least 12 animals)
Goal	2-14 days before calving = < 0.30mEq/L Fresh cows = < 0.65mEq/L	< 1.2 mmol/L is normal
Interpretation if elevated	If more than 25% of the tested pre-fresh population tests above 0.30 mEq/L = cows are mobilizing too much fat Possible causes: Poor pre-fresh management (nutritional, bunk, pen) accompanied by obesity in dry cows. Cow comfort and bunk management are key*	If more than 15% of the cows sampled are elevated this points to a transition cow problem, not getting enough energy through ration and/or poor bunk management post fresh
Cost	~\$16 per test	~ \$3 per test and \$45 for meter



By using the above tests, dairy producers can diagnosis if NEB is beginning pre or post fresh. Recognizing this allows producers to make proper management changes to the identified group(s). Continued testing is key to measuring the impact those changes have on the reduction of ketosis in the herd.

