



Monitoring Subclinical Ketosis

All dairy cows in early lactation are at risk for developing ketosis¹ — a metabolic condition that primarily occurs in post-calving dairy cows as a consequence of negative energy balance due to the stresses of calving and milk production.² Ketosis causes economic losses resulting from decreased milk production, impaired fertility, and increased risk of displaced abomasum.³

Subclinical ketosis is more common than clinical ketosis and causes dairy producers greater economic losses in the long term. One study³ estimates that one case of subclinical ketosis in one cow can result in an economic loss totaling US \$78. In most literature reviewed, it is reported that subclinical ketosis has an incidence rate of 40% or more in many herds. Screening for subclinical ketosis along with an established prevention program should reduce risks of economic loss and improve animal health and well being.

What are ketones?

- Ketones are produced during the metabolic process and provide energy to body tissues when carbohydrates are limited⁴ and fat becomes the body's main energy source.²
- Beta-hydroxybutyrate (BHB), acetone, and acetoacetate are the ketones produced in cows when fat is metabolized.

What is subclinical ketosis?

- Subclinical ketosis is a condition in dairy cows that is marked by increased levels of circulating ketones in the absence of clinical signs of ketosis such as reduced dry matter intake and decreased milk production.
- Subclinical ketosis is generally detected during the first and second weeks after calving when energy intake may not be adequate to sustain production levels.

Why monitor cows for subclinical ketosis?

- Monitoring cows or herds for subclinical ketosis can help prevent economic losses.
- Regular screening can help determine which cows have the highest risk of becoming clinically ketotic.
- Research has indicated that subclinical ketosis is associated with an increased incidence of inflammatory (e.g. mastitis, metritis), and metabolic (e.g. displaced abomasum, clinical ketosis) diseases postcalving,² decreased milk production, reduced fertility (extended interval from calving to conception), and impaired immune function.^{5,7,8}

When should you test for subclinical ketosis?

- Cows should be sampled for BHB at 2 to 14 days in milk;⁴ possibly up to 21 days in milk^{9,10} — when the incidence of subclinical ketosis peaks.⁴

When should you test? (cont'd)

- Exercise caution in the use of cow-side tests for the detection of ketones within the first 48 hours after calving. A positive test for ketones is very common during this period due to a large surge in plasma concentrations at calving.¹

How can you test for subclinical ketosis?

- Ketones can be monitored in blood, milk or urine.
- Urine and milk tests use a dipstick or powder that changes color in the presence of ketones.
- Blood tests, as well as some milk tests, detect BHB; the predominant ketone in disease states.²
- Milk tests offer the advantage of immediate results, low-cost, and ease of sample collection.
- Commonly used threshold values for subclinical ketosis are:^{3,5,6}
 - Blood BHB = 1400 µmol/L
 - Milk BHB = 100 µmol/L to 200 µmol/L

Testing for subclinical ketosis at the herd level

- Evaluating herds requires a different approach than evaluating an individual cow.¹¹
- Prevalence of subclinical ketosis in a herd should be determined by evaluating a minimum sample size of 12 cows per herd, as a representative sample of cows at risk for ketosis.¹¹
- Ten percent positive cows in the herd is commonly accepted as the "alarm level" for ketosis prevalence.¹¹
- Samples sizes above 12 can increase confidence that the herd is above or below the level of concern.¹¹

Prevention

- Feed cows according to their nutritional needs.
- Good nutrition and excellent cow management can achieve the largest gains in ketosis risk prevention.
- Establish a subclinical ketosis monitoring program for your herd.

*By: David L. Lee; Professor,
Rutgers University New Jersey Agricultural Experiment Station*

Monitoring Subclinical Ketosis – Cont'd

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