

# Treatments for Dairy Cows with Ketosis

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In the United States, 20 to 60% of fresh dairy cows have elevated concentration of ketones in their blood and are classified as hyperketotic or having the common metabolic disorder known as ketosis. Dairy cows with elevated blood ketones have an increased risk for metritis, mastitis, and displaced abomasum in addition to lower milk production, increased chance of culling from herds at less than 60 days in milk, and possibly reduced conception at first service. Studies indicate that 80 to 90% of fresh dairy cows with ketosis do not show clinical signs and incidence of hyperketonemia must be detected using cow-side tests. All fresh cows have elevated ketone concentrations within their blood compared to when they were dry. However, the negative effects on performance and health have been seen when  $\beta$ -hydroxybutyrate (BHBA- one of the ketones) concentrations are greater than 1.2 mmol/L from 3 to 14 days after calving.

Previously, a [KY Dairy Notes article](#) reviewed a [DAIReXNET webinar](#) presented by Dr. Gary Oetzel where he explained the cow-side tests available to diagnosis fresh cows with ketosis. In the companion [DAIReXNET webinar](#) entitled “Hyperketonemia Treatment at the Individual Cow and Herd Level”, Dr. Jessica McArt from Cornell University Veterinary School discussed treatment options for these cows and ways to detect the prevalence of ketosis in a dairy herd. A summary of her discussion follows in this article.

- Ketosis, or elevated ketones in the blood, can occur during two distinct time periods for early lactation cows. (1) When energy intake is limiting, ketosis can occur from 3 to 6 weeks after calving. This time frame has classically been associated with this metabolic disorder. (2) In addition, elevated blood ketones (greater than 1.2 mmol/L) can occur from days 3 to 21 after calving which relate to a fresh dairy cow’s inability to adapt to negative energy balance shortly after calving.
- Dr. McArt shared that the incidence rate of fresh cow ketosis varies between herds and will vary over time within a herd. Thus, herds need to test cows on a routine, if not monthly, basis. Blood samples should be taken from the tail or jugular vein and tested using the Abbott Precision Xtra™ meter, the same recommendation as Dr. Oetzel in the companion webinar. Test strips for this meter currently are only available through human medicine not animal medicine suppliers, thus the high cost and lower availability. Hopefully, this will be resolved within the next year and additional cow-side blood tests will come on the market that have been validated for use in dairy cows. Time of sampling relative to feeding does not matter in ad lib fed TMR herds, but concentration peaks 4 to 5 hours after feeding in component or non-free choice, fed herds. Sick cows should not be tested as they will be positive since they are already known to be off feed and mobilizing fat stores. In larger herd sizes, 20 fresh cows can be sub-sampled between 3 and 14 DIM to determine the prevalence rate and a protocol for determining cows needing treatment (test and treat or treat all fresh cows). Although not discussed by Dr. McArt, smaller herds may need to test all fresh cows.

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## Monthly Webinar Review: Treatments for Dairy Cows with Ketosis

- All fresh cows experience increases in the concentration of ketones in blood with the concentration of ketones peaking between 5 to 10 days in milk (DIM). Fresh cows (3-14 DIM) with a concentration of BHBA above the threshold of 1.2 mmol/L have been shown to have decreased performance and increased health issues. On average, half of the US dairy cows have elevated ketone concentrations after calving. Changes in management and feeding programs can alter the incidence of ketosis. For example, overcrowding in the close-up pen can increase the incidence of fresh cow ketosis.
- Dr. McArt discussed treatment options for these fresh cows with elevated ketone concentrations (greater than 1.2 mmol/L).
  - For moderately ketotic cows (tested BHBA concentration between 1.2 to 2.9 mmol/L), cows should receive an oral drench of 300 ml (10 oz.) of propylene glycol once daily for 3 to 5 days and an injection of Vitamin B<sub>12</sub>. She did not recommend injections with glucocorticoids (Azium or Predef) for any fresh cow with an elevated ketone concentration. Dr. McArt rated the prognosis for these cows when treated as excellent.
  - For more severely ketotic cows, Dr. McArt recommended the same treatment of 300 ml of propylene glycol orally drenched for 3 to 5 days and an injection of Vitamin B<sub>12</sub>. In addition, she recommended giving 250 to 500 ml of dextrose IV when blood concentrations of BHBA were above 3.0 mmol/L as tested. Fresh cows which tested between 3 to 6 mmol/L BHBA, were assigned a fair to good prognosis. Fresh cows greater than 6.0 mmol/L BHBA are also likely to have fatty liver and have a poor prognosis.