

**Just Veterinary**

*The Magazine*

**Volume - 1**

**Issue - 2**

**July-August, 2025**

**[www.justveterinary.co.in](http://www.justveterinary.co.in)**

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**ARTICLE ID: 03**

## **Bovine Ketosis: Unmasking the Hidden Threat of Dairy Health**

### **Introduction:**

Dairy farming isn't just about feeding cows and milking them—it's a delicate balance between nutrition, genetics, and metabolic health. Among the many challenges faced by dairy herds, bovine ketosis stands out as an invisible adversary, robbing cows of their vitality and farmers of their profits. While it operates silently, its consequences are anything but mild. Left unchecked, ketosis cripples milk production, reproductive efficiency, and overall herd health.

But here's the good news: ketosis is manageable and, in many cases, preventable—if identified early and treated strategically. In this article, we dive deep into ketosis, exploring what makes it tick, how to detect it before it wreaks havoc, and the most effective ways to combat it.

### **The Science Behind Ketosis:**

Ketosis occurs when cows fail to meet their energy demands during early lactation. With milk production at its peak, dairy cows require immense amounts of glucose. When feed intake falls short, their bodies mobilize fat reserves for energy, leading to an excessive buildup of ketone bodies, including  $\beta$ -hydroxybutyrate (BHB), acetoacetate and acetone.

### **Key Risk Factors:**

- **High milk production:** The greater the yield, the higher the risk.
- **Poor diet formulation:** Low carbohydrate intake weakens glucose production, fueling ketone buildup.
- **Improper dry-period nutrition:** Feeding missteps before calving disrupt metabolic adaptation.
- **Genetic predisposition:** High-yielding breeds like Holstein and Jersey face greater susceptibility.

### **Spotting the Signs:**

Ketosis isn't always obvious—some cows soldier on while their bodies slowly deteriorate. Understanding its specific clinical signs is vital for timely intervention.

## 1. Clinical Ketosis: The Alarming Red Flags

This visible form of ketosis manifests with clear symptoms:

- Dramatic appetite loss, especially rejection of grains.
- Rapid weight loss despite continued roughage intake.
- Marked drop in milk yield, affecting farm economics.
- Dry, firm feces, signaling ruminal dysfunction.
- Dull demeanor, reduced activity, and lack of grooming.
- Acetone-like odor in breath, milk, and urine.
- Neurological signs (nervous ketosis): circling, abnormal licking, head pressing, and apparent blindness.

## 2. Subclinical Ketosis: The Hidden Threat

Subclinical ketosis is trickier, causing economic damage without dramatic symptoms. It's associated with:

- Gradual milk yield decline without obvious illness.
- Increased risk of secondary infections, including mastitis and displaced abomasum.
- Delayed fertility and prolonged calving intervals.
- Elevated blood ketone levels, detectable through routine tests.

### Diagnostics:

Effective ketosis management begins with precise diagnosis. Veterinarians and farmers can leverage advanced testing methods to detect ketosis before it inflicts serious damage.

#### 1. Rapid Field Tests (*Quick, On-Farm Detection*)

- Urine Ketone Strips: Detect ketones in urine (acetoacetate, BHB).
- Milk Ketone Tests: Identify ketone presence in milk, often mirroring blood ketone levels.

- Handheld Blood Ketone Meters: Offer instant readings of  $\beta$ -hydroxybutyrate levels.

#### 2. Advanced Laboratory Tests (*Definitive Confirmation*)

- Serum Biochemistry: Measures blood glucose, NEFAs (non-esterified fatty acids), and ketone bodies.
- ELISA (Enzyme-Linked Immunosorbent Assay): Quantifies  $\beta$ -hydroxybutyrate, offering precise ketosis detection.
- PCR (Polymerase Chain Reaction): Used for genetic studies on metabolic dysfunction in ketosis-prone cows.

#### 3. Differential Diagnosis:

- Pregnancy Toxemia: Similar metabolic issues but occurs in late gestation, not early lactation.
- Displaced Abomasum: Mimics ketosis symptoms but requires ultrasound confirmation.
- Fatty Liver Syndrome: Often coexists with ketosis but is identified via liver biopsy or serum triglyceride analysis.

### Winning the Battle Against Ketosis:

Early detection and precision nutrition are game-changers in ketosis prevention. Here's how farmers can turn the tide against this metabolic disorder:

#### 1. Strategic Feeding:

- Balance energy-dense diets with glucogenic precursors like propionate and propylene glycol.
- Optimize dry matter intake pre- and postpartum to minimize body condition fluctuations.
- Ensure proper fiber balance to support rumen health and digestion efficiency.

#### 2. Aggressive Monitoring & Early Intervention:

- Routine ketone screenings in fresh cows (milk or blood testing).

- Immediate administration of oral glucose precursors at early warning signs.
- Severe cases may require IV glucose therapy and corticosteroids for nervous ketosis.

### **3. Precision Herd Management:**

- Reduce stressors that interfere with feed intake, such as overcrowding and abrupt diet changes.
- Optimize breeding to ensure cows calve at an appropriate body condition score.

- Implement precision feeding technologies to detect metabolic imbalances before symptoms appear.

### **Conclusion:**

Bovine ketosis is no longer an inevitable cost of dairy farming—modern diagnostics, precision nutrition, and metabolic tracking offer scientific solutions to reduce prevalence, minimize economic losses, and maximize herd health. As dairy production evolves, farms embracing proactive ketosis management will pave the way for sustainable, high-performance dairying.