

Managing Heat Stress in Dairy Cows – A new Approach with nu.biom BOS

Technical bulletin

UNDERSTANDING HEAT STRESS

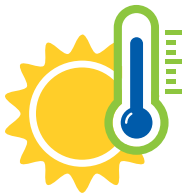
Heat stress occurs when a cow's ability to dissipate body heat is overwhelmed by environmental conditions, resulting in a disruption of its thermal balance. Unlike humans, cattle begin to suffer from heat stress at relatively moderate temperatures due to their higher metabolic heat production and limited thermoregulatory mechanisms—they do not sweat and primarily rely on increased respiration to release heat.

The severity of heat stress is most effectively assessed using the Temperature-Humidity Index (THI), which combines ambient temperature and relative humidity into a single value. As THI increases, the risk of heat stress and its impact on health and productivity becomes more significant.



HEAT STRESS RISK LEVELS AND RUMEN HEALTH IMPLICATIONS

While the Temperature-Humidity Index (THI) provides the most accurate assessment of heat stress risk, ambient temperature alone can offer a practical approximation:



Ambient Temp (°C)	Approx. THI	Stress Level
< 21°C	< 68	No Stress
21–25°C	68–72	Mild Stress
26–30°C	73–78	Moderate Stress
31–35°C	> 79	Severe/High Stress
> 35°C	> 84	Emergency/Critical

MANIFESTATIONS OF HEAT STRESS IN DAIRY COWS

Heat stress triggers a range of behavioral and physiological responses in dairy cows. These signs can be early indicators of thermal discomfort and declining performance:

Behavioral Signs:



- Increased respiratory rate and panting
- Reduced feed intake
- Higher water consumption
- Standing more frequently to improve heat dissipation
- Actively seeking shade or air movement

Physiological Signs:



- Elevated core body temperature (above 39.5°C)
- Open-mouth breathing and drooling
- Reduced rumination and altered rumen motility
- Increased heart rate

Recognizing these symptoms promptly is essential for implementing timely mitigation strategies and preventing long-term impacts on animal welfare and productivity.

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EFFECTS ON PRODUCTION AND HEALTH

Heat stress has significant consequences on dairy cow performance and overall health. The impact is both immediate and long-term, affecting productivity, reproduction, and metabolic stability.

Production:

- Reduced milk yield: losses of up to 10–25% during moderate to severe heat stress
- Altered milk composition: decreased fat and protein content, increased somatic cell count
- Lower feed efficiency: more energy diverted to cooling rather than production

General Health:

- Increased incidence of mastitis, laminitis, and metabolic disorders
- Suppressed immune function, increasing vulnerability to disease
- Body weight loss and decline in body condition score

Reproductive Health:

- Weakened expression of estrus
- Reduced conception and embryo survival rates
- Hormonal imbalances affecting reproductive cycles

Proactively addressing heat stress is essential to maintaining herd performance, animal welfare, and economic sustainability.

OPTIMIZING INTESTINAL BALANCE AND RUMINANT PERFORMANCE nu.biom BOS:

What is nu.biom BOS?

nu.biom BOS is a postbiotic, a preparation of non-living microbial cells, their components, or metabolites that exert beneficial effects on the host. It is rich in unique bioactive compounds derived from bacterial fermentation processes that provides immunomodulatory, anti-inflammatory, antioxidant, and antibacterial benefits, rumen and intestinal health in general.

Unlike traditional postbiotics based on yeast, nu.biom BOS offers key advantages:

- **Broader Metabolic Profile** - Bacterial strains produce a wider range of bioactive metabolites.
- **Optimized Bioavailability** - The metabolites are naturally suited for uptake by the gut microbiota.
- **Precision** - Designed for precision microbial modulation in ruminants.
- **Synergistic Strain Combination** - Multiple proprietary strains work together to deliver diverse and complementary bioactivities.



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How nu.biom BOS helps cows cope with heat stress?



Supports gut barrier integrity

- Heat stress compromises the intestinal lining, leading to increased permeability ("leaky gut").
- **nu.biom BOS** delivers bioactive metabolites that strengthen tight junctions and support gut lining regeneration.
- Result: Reduced endotoxin (LPS) and bacterial leakage, preserving immune efficiency and milk production.



Modulates rumen microbial balance

- Heat stress disrupts rumen microbial populations, favoring lactic acid-producing bacteria and increasing rumen acidosis risk.
- **nu.biom BOS** helps restore balance by promoting beneficial microbial populations.
- Result: Lower ruminal acid load, stable pH, increased the digestive efficiency and improved volatile fatty acid (VFA) profile.



Delivers anti-inflammatory metabolites

- **nu.biom BOS** contains bioactive compounds such as short-chain fatty acids (SCFAs), peptides, and cell wall components that naturally modulate immune responses.
- Result: Reduced systemic inflammation, better energy partitioning, and improved metabolic focus on milk production.



Boosts antioxidant capacity

- Oxidative stress is a major consequence of heat stress due to excessive reactive oxygen species (ROS) and disruption of antioxidant systems.
- **nu.biom BOS** enhances antioxidant defense mechanisms, including upregulation of super-oxide dismutase (SOD) and glutathione pathways.
- Result: Reduced cellular damage and improved resilience of metabolic systems.



Stabilizes feed intake & energy utilization

- Heat stress significantly decreases feed intake (DMI), affecting energy availability for milk production, reproduction and overall health.
- **nu.biom BOS** improves rumen function and feed palatability, helping maintain nutrient intake during hot periods.
- Result: Stabilized milk yield and better efficiency in nutrient conversion.

