

NiaShure[™]

Precision Release Niacin

Harness the Power of Niacin



balchem[®]

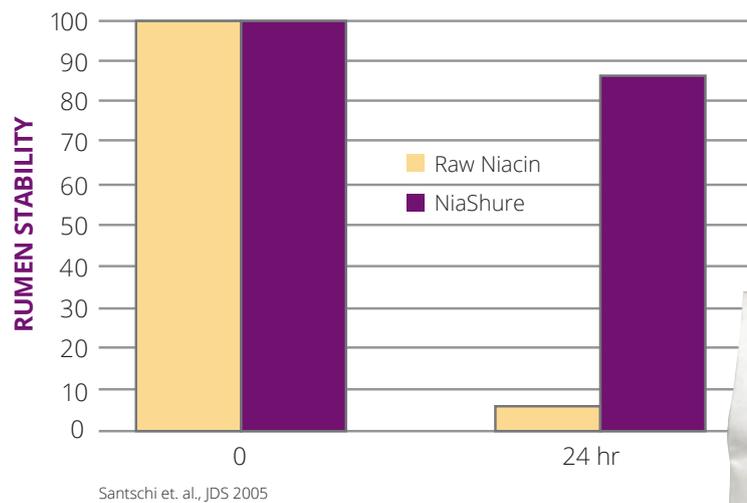
NiaShure™

Precision Release Niacin

NiaShure is rumen-protected to shield the niacin from microbial degradation in the rumen while allowing release further down the digestive tract.

Research shows that as much as 95% of raw niacin is broken down in the rumen. Balchem's proprietary encapsulation process ensures that NiaShure reliably delivers significantly more niacin to the intestinal tract than raw niacin.

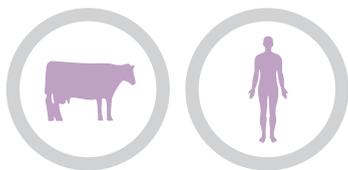
Figure 1
Time of Rumen Incubation



EMPLOYEE SAFETY

Encapsulation also protects employees from the irritating effects associated with handling unprotected niacin.

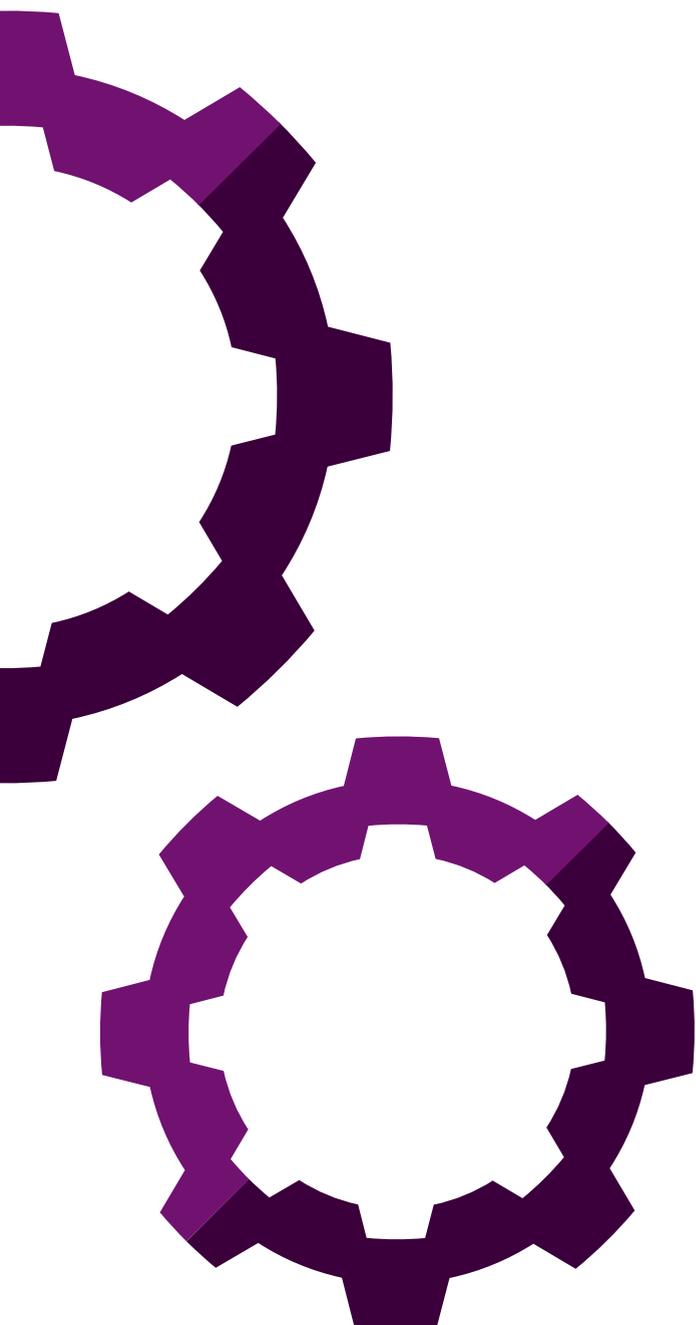




Niacin – Powerful Nutrition

Niacin is a highly bio-active compound and often referred to as vitamin B3. It is primarily involved in energy metabolism, helping convert feed into energy.

Niacin is important for the development and function of cells throughout the body. As a water-soluble vitamin, niacin can not be stored in the body, so it must be provided on a daily basis. In humans, niacin is supplemented to help lower cholesterol, ease arthritis and boost brain function. In dairy cattle, niacin is included in rations to help reduce the impact of heat stress and to mitigate ketosis in severely overweight or problem cows.



NiaShure's Impact in Your Herd

Summer heat stress can cause decreased milk production and reduced reproductive performance in dairy cattle.

Heat stress is known to reduce dry matter intake and feed efficiency. It is associated with higher incidence of infectious diseases such as mastitis due to a lowered immune response. Heat stress affects every segment of the cow's

Reduce Heat Stress

Through Vasodilation

Niacin is proven to cause vasodilation in many animal species. Vasodilation means that the blood vessels expand and carry more blood to the skin surface. Vasodilation is a way for the animal to lose body heat and maintain normal body temperature. The animal can transfer heat from the body core to the skin surface. In cattle, vasodilation is accompanied by an increased sweating rate, which helps further cool the body. Two trials from the University of Arizona have demonstrated how supplemental NiaShure can help the dairy cow better cope with a heat stress challenge.

How NiaShure Works

- **Increases Peripheral Circulation** Feeding NiaShure increases blood flow to the skin, allowing the skin to dissipate heat.
- **Increases Sweating** Much like in humans, by increasing the ability for cows to sweat, body temperature is reduced (Figure 2).
- **Shown to Reduce Core Body Temperature** by 1°F compared to control cows during periods of peak thermal loads (Figure 3).

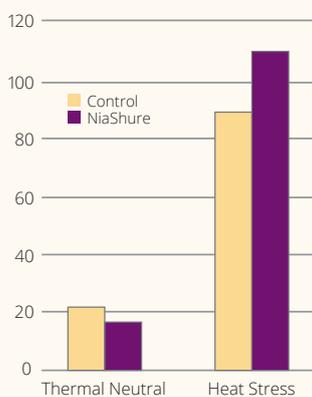
Through Cellular Stabilization

The University of Arizona investigated niacin's role in heat stress reduction at the cellular level. Dairy cows produce heat shock proteins (HSP) in response to a heat stress challenge. HSPs protect cells from damage by assisting in the refolding of proteins located in the cytoplasm that have been damaged by heat. Several types of HSP can be found in cells and their levels increase in response to prostaglandins.

Research shows that niacin increases the production of prostaglandin D (PGD) and also suggests that niacin could increase HSP production by increasing PGD production. Researchers at the University of Arizona (Collier et al., 2006) had earlier reported that PGD and prostaglandin A (PGA) increased the production of a specific HSP (HSP 70) in bovine mammary epithelial cells after eight hours at 42°C. This increase in HSP was associated with improved cell viability when temperatures were elevated during culturing (Figure 4).

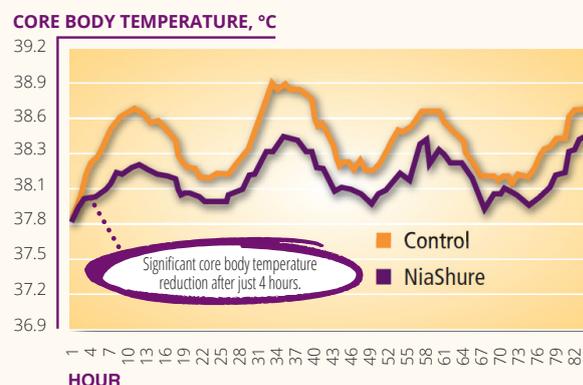
Though more work needs to be done to understand the importance of heat shock proteins, initial studies indicate that cows fed niacin had increased levels of heat shock proteins.

Figure 2
Sweating Rate
(gm/m²/hour)



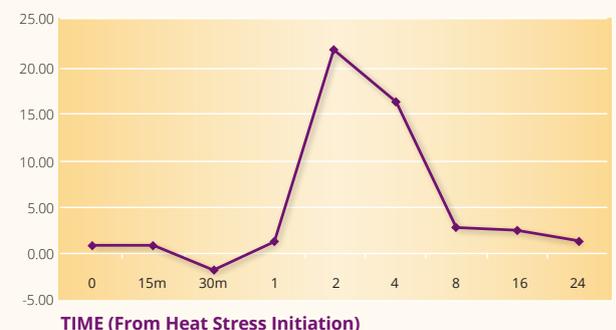
Zimbelman et al., 2010

Figure 3
Effect of NiaShure on
Core Body Temperature



Zimbelman et al., 2010

Figure 4
Relative Expression of Inducible
Heat Shock Protein 70



Relative expression of inducible HSP-70 gene RNA in response to acute thermal stress. From Collier et al (2006).

reproductive cycle and makes it harder to observe cows in estrus; plus, fewer cows conceive after insemination. Many herds seek to manage heat stress externally through mechanical cooling with fans, sprinklers and other ventilation alternatives. Now you can also cool your cows from the inside and manage NEFA levels with NiaShure™ Precision Release Niacin.



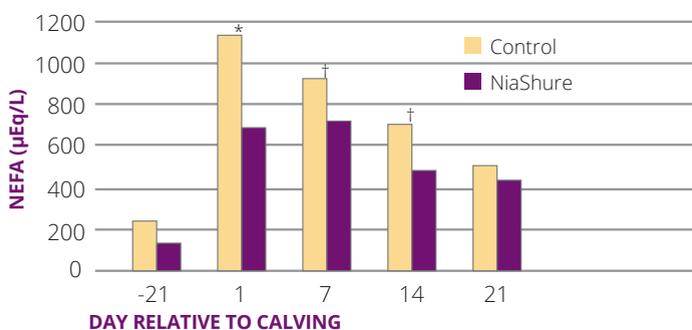
Mitigate Ketosis

For severely fat or problematic cows it may be necessary to reduce blood NEFA levels pre-partum by lowering the amount of fat mobilized from body stores to help mitigate fat accumulation in the liver and the incidence of ketosis. Niacin is widely recognized as a potent anti-lipolytic agent capable of reducing the surge in NEFA seen prior to parturition (Figure 5). Niacin acts on fat cells to reduce the amount of lipid being mobilized, leading to lower prepartum blood NEFA levels. Niacin is generally not recommended for use as an anti-lipolytic postpartum, because the cow requires NEFA and ketones as essential energy sources for lactation. Without NEFA mobilization during early lactation, cows would be even more dependent on glucose to meet their energy needs and milk yields will suffer.

How Niashure Works

•**Reduce NEFA Surge** Niacin acts on fat cells to reduce the amount of lipid being mobilized leading to lower prepartum blood NEFA levels.

Figure 5
Plasma NEFA Levels When Including NiaShure



Yuan et al., 2012

Harness the Power

Heat stress and metabolic disorders are some of the most costly issues your dairy can face. St-Pierre et al. found that, based on very conservative \$13/cwt milk prices, researchers estimated annual losses of \$897 million, or almost \$100 per cow, for the U.S. dairy industry due to heat stress when traditional heat abatement strategies were used. That number jumped to \$1.5 billion, or \$167 per dairy cow without heat abatement systems.

Recent research from Dr. Geoff Dahl's lab at the University of Florida also shows the multi-generational impact of heat stress on the *in utero* calf, leading to three generations of reduced milk production and overall animal productivity.

NiaShure is the most cost-effective way to deliver niacin to your cows.

•**Niacin is a biologically powerful compound** proven to help reduce the impact of heat stress by increasing peripheral blood circulation and sweating rates in cattle.

•**Niacin is also a potent anti-lipolytic agent** that is shown to reduce fat mobilization and NEFA generation to support health in over-conditioned cows as they transition to the milking string.

To learn more, visit BalchemANH.com/Cool.



THIS IS ANIMAL NUTRITION & HEALTH

RUMINANT

ReaShure®
Precision Release Choline

AminoShure®-XM
Precision Release Methionine

AminoShure®-L
Precision Release Lysine

NiaShure™
Precision Release Niacin

NitroShure™
Precision Release Nitrogen

VitaShure®-C
Precision Release Vitamin C

KeyShure®
Chelated Minerals

KeyShurePlus
Chelated Minerals

MONOGASTRIC

PuraChol
Choline Chloride

KeyShure®
Chelated Minerals

KeyShurePlus
Chelated Minerals

COMPANION ANIMALS

PetShure
TURNING IMAGINATION INTO REALITY

**POROSITY & TEXTURE
MANAGEMENT**

pH CONTROL SYSTEMS

**STRUCTURING & FORMING
TECHNOLOGIES**

CHOLINE

SENSORY SYSTEMS

KeyShure®
Chelated Minerals

KeyShurePlus
Chelated Minerals

Balchem Animal Nutrition and Health is the global leader in choline production, mineral chelation and encapsulation technology. With a growing portfolio of nutrition products and a dedication to innovation and industry sustainability, Balchem is leading the charge to meet the nutritional needs of ruminants, monogastrics and companion animals.

WE ARE:

Real People

With a passion for animal nutrition, we are intense advocates for our customers and the animals they feed. You can count on us to provide honest, candid advice to address your toughest challenges.

Real Science

Balchem delivers proven science backed by years of success. Our products are some of the most extensively researched in the industry, further supported by documented on-farm results.

Real Results

In the end, it all comes down to results. We deliver real results you can count on, results that exceed your expectations and deliver value to your customers and your bottom line.



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