

## Research Shows that Niashure™ Helps the Dairy Cow Cope with a Heat Stress Challenge

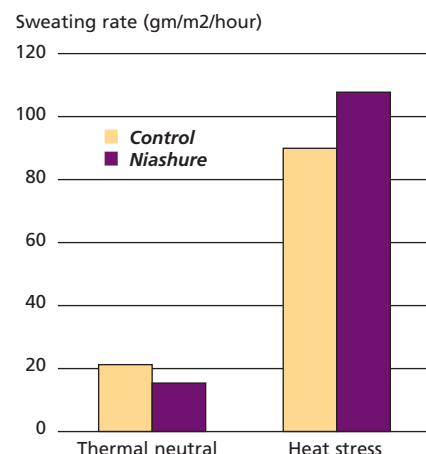
Niacin causes vasodilation in many animal species. Vasodilation means that the blood vessels expand and thus carry more blood to the skin surface. Vasodilation is one means that an animal can use to lose body heat and maintain normal body temperature. It helps the animal lose more heat because the increased blood flow to the body surface helps transfer the body core heat to the skin surface. In some animals (cow) this 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 via this mechanism. There is also evidence that niacin can increase the synthesis of heat shock proteins, intra-cellular components that protect cells within the body from heat damage.

**Trial 1:** Cows were housed in a facility at the University of Arizona which allowed precise control of the ambient temperature and humidity. The lactating dairy cows were assigned to either a control (CON – no niacin) or treatment group (Niashure – 12 gm/d). The cows were challenged by two different heating patterns. The first pattern was a thermal neutral (TN – Temperature Humidity Index < 72 for 24 hr/d) pattern for 7 d followed by the second 7 d pattern of heat stress (HS) challenge (Temperature Humidity Index > 72 for 12 hr/d and < 72 for 12 hr). This latter pattern of 12 hr of heat stress/12 hr of no heat stress was established to mimic the day–night cooling pattern observed in the desert Southwest.

Two of the key parameters monitored during this study were sweating rate and body core temperature. *Figure 1* depicts the change in sweating rate during the thermal neutral and heat stress phases of the trial. During the TN phase, when cows were not heat stressed, the sweating rate is low in both groups. During the heat stress phase, the sweating rate increases in both groups of cows, but to a greater rate in cows fed the 12 gm/d of Niashure. *Figure 2* depicts the core body temperature of these cows during the last 3 d of the heat stress phase. Cows fed Niashure were able to maintain their core body temperature approximately 1°F lower ( $p < 0.001$ ) than the control cows. Niashure helped these cows better handle the heat stress challenge.

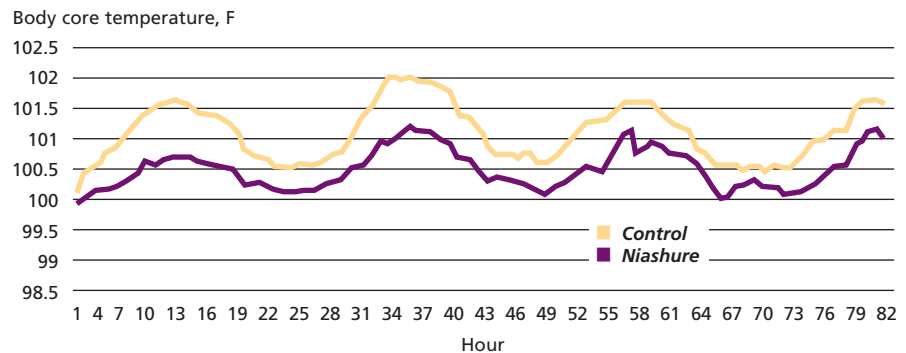
**Trial 2:** Lactating cows housed at a commercial dairy in Arizona were fed either a Control (200 cows – no supplemental niacin) or a Niashure (200 cows –

**Figure 1:** Supplementing with Niashure increases the sweating rate of lactating dairy cows experiencing heat stress.



12 gm/d) ration. The experiment ran from August 15 – Sept 15, 2007, and was designed as a switchback with two 30 d periods. The cows were 166 DIM and were housed in a Saudi style barn with a Korral Kool system.

**Figure 2:** Niashure significantly ( $p < .001$ ) lowers core body temperature cows challenged with a heat stress event.



Key parameters monitored during the trial

were milk yield and composition, as well as body core temperature. Cows consuming the Niashure maintained their body core temperature about .5°F lower. Cows in both groups produced similar levels of milk (87 lb/d); but the cows fed Niashure had significantly higher milk fat and protein concentrations and yield vs. control cows (Table 1). Consequently, the cows fed Niashure had significantly higher fat corrected milk and energy corrected milk yields. These two parameters are used to standardize the output of milk based on variable milk composition. Niashure helped these cows maintain a lower core temperature and achieve higher milk component output during this trial.

**Why Niashure Rumen-Protected Niacin?** Raw niacin is extensively degraded in the rumen (> 95%). Niashure is encapsulated to protect it from microbial degradation and allow it to consistently deliver niacin to the small intestine to be absorbed intact. Consequently, the use of Niashure in ruminant rations allows you to adjust your formulated level of niacin to deliver the expected benefits.

**Feeding Recommendations:**

- Heat Stress – 12 gm/cow/d
- Transition period (no heat stress): 3 – 6 grams/cow /day

**Table 1:** Body temperature and milk yield and components for control vs. Niashure supplemented cows during summer field trial in Arizona.

Item	Control	Niashure
Milk, lb/d	87	87
Milk fat %	3.38a	3.65b
Milk protein %	3.05 a	3.09 b
Fat corrected milk, lb/d	84.2 a	87.5
Energy corrected milk, lb/d	84.7 a	87.3
Body Temperature, °F	101.7 a	101.3

a, b significant difference  $p < 0.01$