

HEAT STRESS

Heat stress can compromise a lactating cow's performance in many different ways — decreased feed intake, altered metabolism, reduced milk production, impaired reproductive performance and increased disease incidence.^{1,2,3} In the U.S., approximately \$1 billion is lost annually as a result of poor performance during periods of heat stress.⁴ The inability of a cow to dissipate heat effectively compromises their ability to function normally all the way down to the molecular level.⁵

Impact of heat stress

Heat stress is one of the costliest issues facing dairy producers and has consistently been associated with:

- ▶ Reduced dry matter intake (DMI)^{5,6}
- ▶ Altered metabolism^{5,6}
- ▶ Reduced milk production^{5,6}
- ▶ Reduced reproductive performance^{5,6}
- ▶ Increased disease incidence^{5,6}

Impact of chromium on heat stress

Evidence suggests insulin action is a key component of heat stress response.⁷ Chromium improves insulin function and results in efficient clearance of glucose from the bloodstream.⁸ Increased glucose availability and utilization may have significant benefits. Chromium supplementation minimizes the negative effects of the stress response by consistently decreasing serum cortisol during stressful periods for cattle.^{9,10,11}

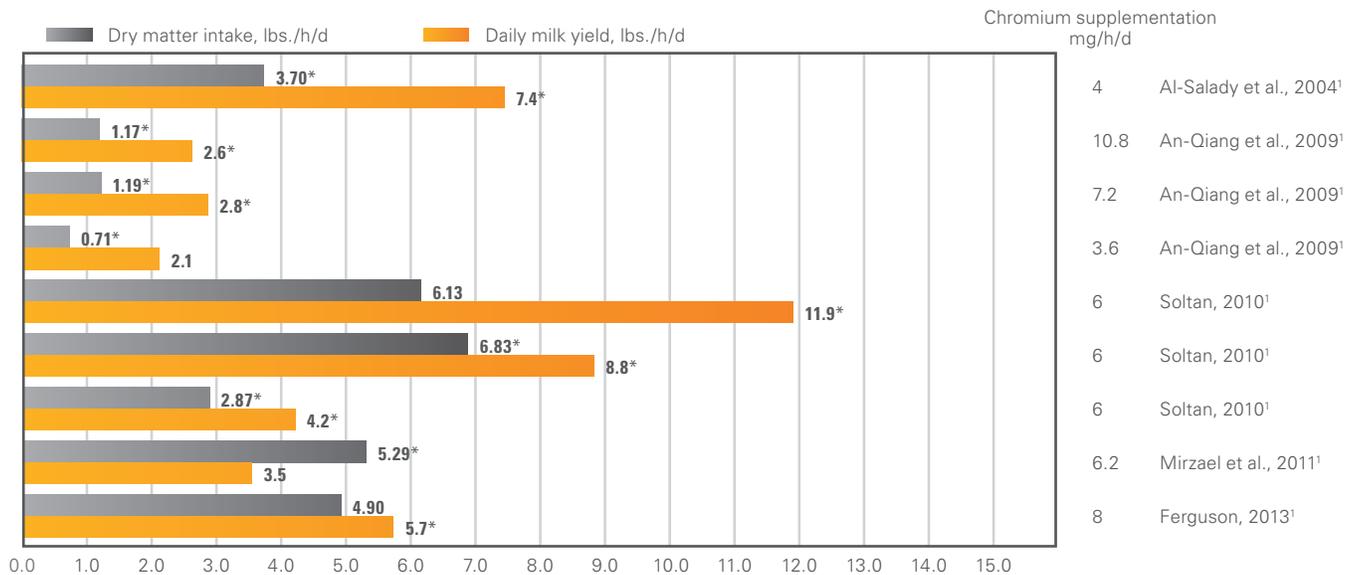
Chromium supplementation has been shown to:

- Increase insulin sensitivity and glucose utilization⁸
- Improve dry matter intake (DMI) in heat stressed cows¹²
- Improve DMI during heat stress to help maintain milk production¹²

Impact on milk yield

Research studies, designed to test the effect of chromium on milk yield under heat stress conditions, have shown cows supplemented with chromium have increased dry matter intake and yield more milk than control cows.¹²

Supplemental chromium impacts milk yield during heat stress



Response in daily milk yield, lbs./h/d and dry matter intake, lbs./h/d compared to the control within the study.

*Denotes significant difference from control.

Figure 1: Effect of chromium supplementation in lactating dairy cow diets on response in daily milk yield and dry matter intake, lbs./h/d under heat stress conditions.

Supplemental chromium helps improve performance during heat stress

Feeding supplemental chromium to dairy cows in prepartum and postpartum diets has consistently increased milk yield of cows during early lactation. The influence of chromium on milk production has been attributed to its effects on energy

metabolism reflected through decreased mobilization of NEFA from adipose tissue and increased insulin sensitivity. Increased glucose availability and utilization may have significant benefits to milk production during extended periods of heat stress

at different stages of lactation. Research studies, designed to test the effect of chromium on milk yield under heat stress conditions, have all shown cows supplemented with chromium yielded more milk than control cows.¹³

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