

# PURINA<sup>®</sup> HERDSMART<sup>®</sup> TECHNICAL BULLETIN

## Milk production benefits of Purina<sup>®</sup> Rally<sup>®</sup> Dairy Feed

Research conducted at the University of Missouri and Purina Animal Nutrition showed feeding Purina<sup>®</sup> Rally<sup>®</sup> Dairy Feed during times of heat stress:

- Improved milk production potential
- Increased dry matter intake and feed efficiency
- Lowered postpartum non-esterified fatty acid levels
- Reduced beta-hydroxybutyrate levels

Heat stress is a multi-million dollar challenge that dairy producers face each year. Heat stress is associated with a 10% to 35%<sup>1</sup> milk production loss that may cost a dairy \$1.60 to \$5.60 per cow per day.<sup>2</sup>

Nutritional strategies are available to help lessen the effects of heat stress on cows. Research from the University of Missouri and Purina Animal Nutrition presented at the American Dairy Science Association annual meeting in 2013 continue to show the potential milk production benefits of feeding Purina<sup>®</sup> Rally<sup>®</sup> Dairy Feed during heat stress. This research supports results of several other field demonstrations and transition cow studies conducted by Purina Animal Nutrition.

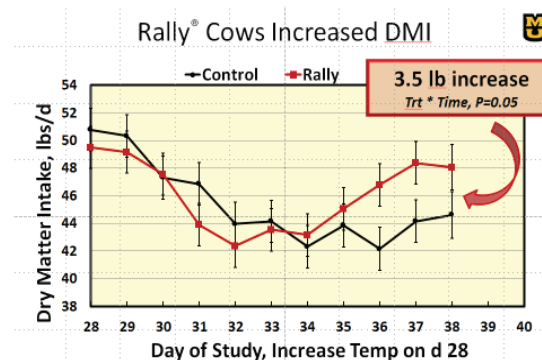
### Mitigate milk production losses<sup>3</sup>

The research conducted at the University of Missouri looked at the effects of feeding Purina<sup>®</sup> Rally<sup>®</sup> Dairy Feed on: dry matter intake (DMI), milk yield, milk composition and plasma metabolites during an acute period of heat stress. To elicit heat stress, cows were housed in environmentally controlled chambers.

Forty-eight mid-lactation Holstein dairy cows were blocked according to milk yield, days in milk, and parity and then randomly assigned to one of two dietary treatments. Treatments were calculated to provide 100g (as fed) daily of either sucrose or Purina<sup>®</sup> Rally<sup>®</sup> Dairy

Feed, administered as part of the total mixed ration (TMR). Cows were individually fed the TMR in two daily allotments for a total of 28 days during thermoneutral conditions, followed by 12 days of heat stress conditions.

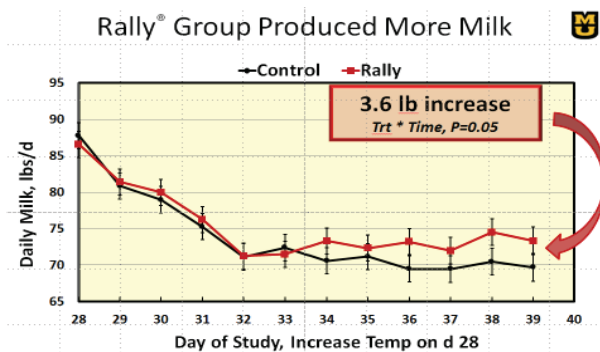
Daily cyclical temperatures ranged from 75 degrees F to 86 degrees F and a temperature-humidity index of 69 to 75. During heat stress cows fed Purina<sup>®</sup> Rally<sup>®</sup> Dairy Feed displayed increased DMI (3.5 lbs) and milk yield (3.6 lbs) relative to cows fed sucrose. Milk fat yield was not different between treatments. Plasma NEFA concentrations of cows fed Purina<sup>®</sup> Rally<sup>®</sup> Dairy Feed were lower than cows fed sucrose during heat stress



<sup>1</sup>Rhodes et al, 2009 JDS Collier et al, 2012 Ruminant Nutrition Symposium

<sup>2</sup>Assumed a 100 lbs/cow at stated lost milk production, assuming \$16/cwt. milk price

<sup>3</sup>K. A. Davison, R. O. Rodrigues, J. A. Davidson, N. M. Barkley, A. L. Kenny, E. C. Adkins, and M. R. Waldron, University of Missouri, Columbia, Purina Animal Nutrition Center, Gray Summit, MO. Effects of a commercial feed additive on production losses during acute heat stress conditions in Holstein dairy cows, 2013 American Dairy Science Association Annual Meeting, Indianapolis, Ind.



Researchers concluded that feeding Purina® Rally® Dairy Feed before and during a period of acute cyclical heat stress increased DMI and milk yield, and appeared to favor improved energy balance of mid-lactation dairy cows during heat stress, indicated by less body weight loss and less circulating NEFA for Purina® Rally® Dairy Feed-fed cows compared to those fed sucrose.

#### Support subsequent lactational performance<sup>4</sup>

Research conducted by Purina Animal Nutrition evaluated whether Purina® Rally® Dairy Feed improves milk and component yield of transition cows during the summer months.

Forty-four multiparous and 18 primiparous Holstein cows were blocked by calving date (June 22 to Sept 4, 2010 and June 20 to Aug 28, 2011) and randomly assigned to dietary treatments of control or Purina® Rally® Dairy Feed from 28 days prior to calving to 30 days post-calving, relative to parturition. Individual cows were fed with Calan doors once a day, ad libitum, and diets were formulated to be iso-nitrogenous and isocaloric. On day 30 postpartum, all cows were fed the same diet and lactation performance was tracked until cows were 60 days in milk (DIM).

Within the free-stall housing, cows were provided with thermostat-controlled fan cooling only. During the treatment period of day -28 to 30 days, cows experienced environmental temperature humidity index readings greater than 68 for 91.1% of the time. During the prepartum, dry matter intake (DMI) and body weight (BW) were not different.

From 0 to 30 DIM, milk yield was greater for cows fed Purina® Rally® Dairy Feed compared with the control group

(71.7 vs. 66.5 lbs/day). Cows fed Purina® Rally® Dairy Feed had greater DMI of 2.8 lbs relative to control. Cows fed Purina® Rally® Dairy Feed had lower milk fat percent during the first 30 days postpartum than control, with the greatest difference occurring during the first week postpartum. However, component yields were not significantly different. An increase in milk fat percentage in fresh cows is typically associated with body fat mobilization which causes an elevation in NEFA concentrations in the blood. Therefore elevated milk fat in fresh cows is not necessarily desirable.

Research results showed that multiparous cows had greater improvement in milk yield compared with primiparous cows. For 0 to 21 DIM, multiparous cows fed Purina® Rally® Dairy Feed had lower plasma nonesterified fatty acid (NEFA) concentrations than control (0.79 vs. 0.93 meq/L). Additionally, plasma beta-hydroxybutyrate (BHBA) concentrations were also lower (7.6 vs. 10.5 mg/dL).

From 0 to 60 days postpartum, multiparous cows fed Purina® Rally® Dairy Feed during transition phase produced an additional 6.4 lbs/day of milk and consumed an additional 3.5 lbs/day of DMI compared with control. Cows fed Purina® Rally® Dairy Feed had lower circulating NEFA and BHBA as well as lower milk fat (%) immediately postpartum, which may be indicative of a breakdown of peripheral (mainly body fat reserves) tissues. Elevated milk fat concentration in fresh cows is typically derived from body fat mobilization, as an elevated NEFA would indicate.

Researchers concluded that feeding Purina® Rally® Dairy Feed during warm seasons improved transition cow milk yield and DMI which may lead to better performance for the entire lactation because cows were able to achieve steeper milk curves in early lactation, thus driving total lactation performance through the summer heat and into the cooler season.

#### Drive milk peaks

In summary, both of these research results continue to highlight the benefits of feeding Purina® Rally® Dairy Feed during periods of heat stress. The addition of Purina® Rally® Dairy Feed to diets, especially during warm season can improve transition cow milk yield and dry matter intake. Driving additional peak milk yield may lead to better performance for the entire lactation as those cows enter the cooler seasons.

<sup>4</sup>J. A. Davidson, C. M. Klein, and B. L. Miller. 2013. Purina Animal Nutrition Center, Gray Summit, MO.

**To learn more about Purina Animal Nutrition dairy feed technologies, visit [purinamills.com/dairy-feed](http://purinamills.com/dairy-feed).**

Purina® dairy feed technologies – from our farm to yours.

Located in Gray Summit, MO, the Purina Animal Nutrition Center operates a 600-head herd of registered Holstein cows, heifers and calves. The research objective at the dairy research facility is to deliver innovative technology, products and programs that will enhance performance and income for dairy producers for all stages of life. To learn more about the Purina Animal Nutrition Center, visit [Purinamills.com](http://Purinamills.com).

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