

Heat Stress and Probiotics

Dr. Jim Sullivan – Lallemand Animal Nutrition

Summer is here and it is a time many of us look forward to with warmer temperatures and longer days after a long cold winter. However, the dairy cows we work with don't look at summer in the same light as we do.

Summer temperatures and humidity can play havoc on dairy cows, affecting production, milk components, reproduction and health. Temperatures as low as 75 degrees combined with a relative humidity of 65% can cause mild heat stress in dairy cows. The level of stress increases as the temperature and humidity increase. Heat stress costs the U.S. dairy industry billions of dollars every year.

Heat stress affects cows in many ways. Cows will do whatever they can to stay cool, including: spending more time in the shade and under fans and misters, reducing feed intake (and changing intake patterns), spending less time exhibiting estrus and trying to conserve energy needed to expel heat. Cows will tend to consume more feed at night when it is cooler, slug feed, sort feed and tend to choose feeds that don't produce as much heat during digestion (grains and proteins). All of these behaviors lend themselves to *rumen acidosis* problems. Slug feeding, lower levels of forage intake and higher levels of fermentable carbohydrates cause an increase in rumen fermentation acids (lowering rumen pH) and a decrease in microbial protein production. Bacteria in the rumen responsible for fiber digestion are the most affected at lower rumen pH (< 6.0). All of these factors can contribute to the reduction in dry matter intake, milk yield (as much as 30%) and often milk components (particularly milk fat).

There are tools we can use to help us manage cows during heat stress periods. Keeping cows comfortable and as cool as possible are key components. Provide plentiful, clean water at all times. Shade, fans, misters (in lower humidity areas) and coolers are very effective tools to use to try and lower cow body temperatures. The use of cooling is particularly effective in the holding pen and milking areas. Cooling and shades used along feed bunks can encourage cows to consume more feed more frequently throughout the day. Feeding more frequently, feeding in the cooler times of the day and pushing up feed more often can also encourage more feed intake. Rations can be adjusted to try and cope with heat stress. Feeding high quality, highly palatable forages is probably the single best ration strategy to incorporate. High quality forages will allow for more of the diet energy coming from forages and decrease the need to increase fermentable carbohydrates.

Another strategy is the use of probiotics in the ration. One such product is *Levucell® SC Rumen Specific Yeast*. Levucell SC is an active dry (live) yeast that has been shown to improve rumen function and stability. Many of the problems associated with heat stress discussed above, affect rumen function. Published research studies have shown that Levucell SC can be an effective tool in minimizing these challenges.

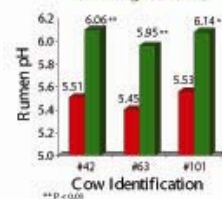
One such study (conducted in Spain) demonstrated that
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Levucell SC was effective in stabilizing rumen pH (both higher average rumen pH and less severe drops in rumen pH) as well as tending to stabilize feed intake patterns (smaller more frequent meals throughout the day). Both of which are positive attributes during periods of heat stress. This stabilization in rumen pH was verified in a trial conducted at the University of Minnesota in 2006. Similar to the first study, cows fed Levucell SC had higher average, minimum and maximum rumen pH (less acidosis) compared to the same cows when fed a diet without the Levucell SC.

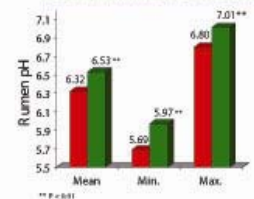
Other studies looking at Levucell SC have demonstrated increases in feed intake, ration digestibility and improvements in milk yield and fat yield in cows fed Levucell SC during the summer months in different parts of the world.

- Rumen pH Studies: IRTA – Barcelona, Spain; Effect of Levucell SC supplementation on rumen pH (average/cow) – Bach
- Rumen pH Studies: U of MN; Effect of Levucell SC supplementation on rumen pH – Mean, Minimum, Maximum – Bach & Stern

Effect of Levucell® SC supplementation on Rumen pH (average / cow)

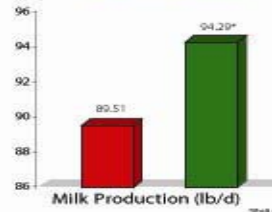


Effect of Levucell® SC on Rumen pH Mean, Minimum & Maximum

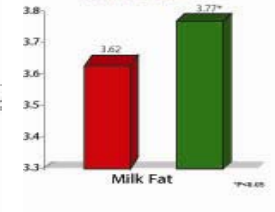


- Milk Production Studies: The results below were from a recent 200 cow dairy trial at FARME Institute in New York. The trial was conducted from mid-June to mid-August and Levucell SC significantly increased milk yield and milk fat %.

Milk Production



Milk Fat %



Summary ~

Keeping cows cool and comfortable, through the use of cooling, maximizing dry matter intake, utilizing high quality high digestibility forages and using high energy-low-heat - producing feeds (i.e. fats), are all good tools in managing heat stressed dairy cows. Stabilizing rumen function is also an important goal, particularly during heat stress periods. Products like Levucell SC can be effective tools in helping to alleviate the impact of heat stress. And it's not too early to look at ways to minimize the negative effects of heat stress. Summer is here and now is the time to incorporate some of these tools to combat heat stress in our cows.

(edited from an article by Dr. Jim Sullivan, Lallemand Animal Nutrition)

For additional information on dealing with heat stress contact the Renaissance Help Desk! Give your producers the information they need to make informed decisions. Keep the cows cool ~ and make MILK!