

Increased Feeding Frequency Reduces Slug Feeding and Decreases the Severity of SARA in Higher Risk Dairy Cows

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Why is it Important?

Sub-acute ruminal acidosis (SARA) is a metabolic disease mainly found in high producing cows fed a high-grain diet. SARA occurs when the rumen pH drops below 5.8, where high grain diets increase the production of fermentation acids in the rumen and contribute to the pH drop. This condition can lead to issues in animal health, liver abscess and laminitis, as well as in production, decreased dry matter intake (DMI) and milk fat. Previous research has established that there is a lot of individual variation in rumen pH response to a high grain diet, which makes it difficult to develop a strategy to manage SARA in the herd. Recent studies have begun to categorize cows as higher or lower risk for developing SARA using an acidosis index, which is the severity of SARA (area below a pH of 5.8) normalized for DMI. A study completed last year showed that higher risk cows did not distribute eating time evenly throughout the day and spent more time eating after feeding. Large intake over a short period of time, or slug feeding, increases the risk for SARA. The objective of this study was to determine if increasing feeding frequency is a possible management approach to reduce the severity of SARA in higher risk cows.

What did we do?

In this study we used 8 ruminally cannulated lactating Holstein cows and fed them a high grain diet (35% forage and 65% concentrate) to induce SARA. Half the cows were fed once per day (0800) and the other half was fed 3 times per day (0800, 1500, 2200). After 16 days of treatment adaptation we measured rumen pH, using a data logger placed in the rumen, to assess the severity of SARA (area below a pH of 5.8) and the acidosis index (area below 5.8 normalized for kg of DMI). Cows with an index below 1.0 were categorized as lower risk and those above as higher risk. We measured feeding behaviour (eating and ruminating) and analyzed the data in 3 separate time periods (0800-1500, 1500-2200, and 2200-0800) to determine when cows spent most of their time eating in the day. We also measured milk yield and milk composition.

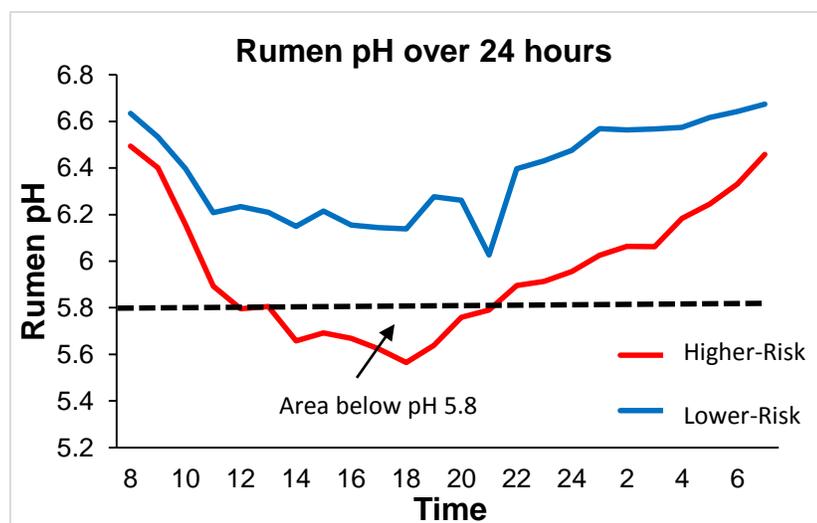


Figure 1. Rumen pH curve for a higher and lower risk cow measured over 24 hours.

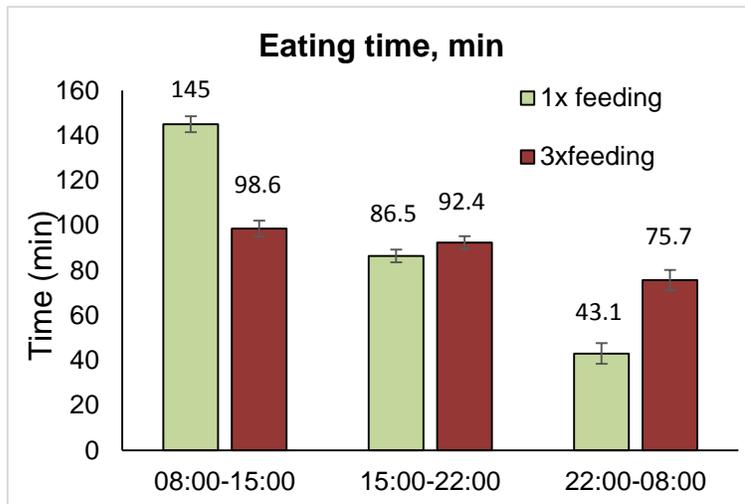


Figure 2. The time spent eating when cows are fed 1x or 3x.

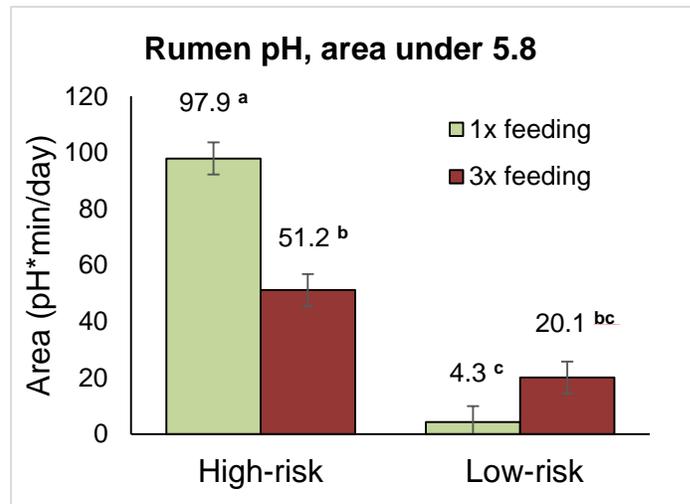


Figure 3. The severity of SARA between cows at a higher or lower risk for SARA when fed 1x or 3x.

What did we find?

When the cows were fed 3 times per day it decreased the time spent eating from 0800-1500 and increased the time spent eating from 2200-0800 (Figure 2). From the rumen pH results we categorized 4 cows as higher risk and 4 cows as lower risk. When the higher risk cows were fed more often it reduced the severity of SARA (area below a pH of 5.8), while there was no significant effect on lower risk cows (Figure 3). We also found that when all cows were fed more often, regardless of risk category, that milk fat yield increased (1.22 vs. 1.08 kg/d) and milk fat percent tended to increase (3.45 vs. 3.14%) with no change in milk yield.

What does this mean?

We found that increasing feeding frequency reduces slug feeding after the first feeding and increases the distribution of eating throughout the day. This change in feeding behaviour resulted in a decrease in the severity of SARA for higher risk cows. There was no effect on lower risk cows, which means this approach targets higher risk cows without negatively affecting lower risk cows. Therefore this may be a management strategy to use for the herd, where you cannot identify higher and lower risk cows. Finally, the increase in milk fat yield may indicate that feeding more often can lead to production benefits in addition to rumen health.

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Summary Points

Increased feeding frequency led to:

- Reduced slug feeding
- Increased distribution of eating time throughout the day
- Reduced severity of SARA for higher-risk cows
- Increased milk fat yield



This research summary is based on a soon to be published paper by K. Mamillan, X. Gao and M. Oba. For further information please contact Kira Macmillan at kamacmil@ualberta.ca

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