SmartLine™

Why feed methionine pre-partum?

by Daniel Luchini, Ph.D.
Global Ruminant STS Manager, Adisseo

Methionine, as with other required and functional amino acids, is necessary for the normal growth and development of mammals. It plays many roles in the body, including participation in protein synthesis and is the initiating amino acid in the synthesis of virtually all proteins.

Methionine deficiency in the diet can impair the immune function. An increased methionine content, above the level required for optimal growth, improves the immune response through direct effects (protein synthesis and breakdown) and indirect effects involving methionine derivatives that have antioxidant properties.

Until recently, only a limited number of trials evaluated the impact of feeding methionine as a functional amino acid to cows. This article shares findings from trials conducted in the past few years, to evaluate the impact of feeding methionine-enriched diets on factors other than milk production and composition. The trials were conducted by researchers at the University of Illinois between 2014 and 2017. They evaluated the impact of feeding rumen-protected methionine sources during the transition period.

Methodology

At dry off, all cows in the trials were fed the same far-off diet to 22 days before the expected calving date. From 21 days of the expected calving date to calving, the cows were fed a close-up diet and from calving to 30 days in milk, cows were fed a fresh-cow diet. Cows were randomly assigned to the treatments from 21 days of the expected calving date to 30 days in milk.

Treatments

Control: fed the close-up and fresh-cow basal diets

Methionine-enriched diets: fed the Control diet plus rumen-protected-methionine sources.

The underlying hypothesis was that during the transition phase, methionine may be needed at a higher concentration relative to lysine than the current 3.0:1 Lys:Met ratio. This is the ratio recommended by the National Research Council in its 2001 *Nutrient Requirements of Dairy Cattle* for optimal milk production and composition. Therefore, the Lys:Met ratio of the methionine-enriched diets was fixed at 2.8:1 rather than 3.0:1.

Results

No difference was found in dry matter intake between the treatments of the pre-fresh cows. Cows fed the rumen protected methionine sources pre-partum in the other trials had an average increase in dry matter intake of more than 1.3 lbs/day.

Post-fresh cows fed the commercial methionine sources in all trials increased dry matter intake by more than 3 lbs/day.

As expected, the increase in dry matter intake resulted in more milk, more than 4 kg of energy corrected milk, more milk protein, and more milkfat.

The cows fed the rumen protected methionine source had higher antioxidant status (glutathione), and showed a better immune function (oxidative burst) before calving.

Conclusion

The authors concluded that the livers of cows fed diets enriched with rumen protected methionine during the last three-to-four weeks pre-partum were better prepared to withstand the transition period. Feeding rumen protected methionine sources led to faster recovery post-partum due to healthier liver function and decreased inflammation, resulting in higher dry matter intake for healthier cows with increased milk production and composition.