Introduction
Balancing dairy cow diets for amino acids is a nutritional strategy that can improve the production efficiency of dairy cows and reduce the environmental impact of overfeeding crude protein. Methionine is frequently the first limiting amino acid in the diet of dairy cows. To meet the methionine requirement of cows, a supplemental source of protected methionine is often required.

Previous research on 2-hydroxy-4-methylthio butanoic acid (HMTBa) has determined that absorbed HMTBa can serve as a source of methionine in poultry and swine. Research shows that HMTBa fed to ruminants acts as a source of methionine in two ways – as bypass methionine and through its effect in the rumen.

Absorbed HMTBa is converted to methionine in cells and then either utilized to meet the animals’ requirements or incorporated into protein in the mammary gland. For a methionine product to provide methionine for protein synthesis, it must be absorbed directly through the rumen wall or escape the rumen undigested by passing through the omasal canal. Previous studies have approximated the escape of HMTBa from the rumen; however, additional research was needed for confirmation. Therefore, an experiment evaluating the absorption of HMTBa provided ruminally or post-ruminally was conducted.¹

Methods
Four ruminally cannulated Holstein dairy steers (718 kg BW, 12.5 kg DMI) were dosed with 80 mg HMTBa (as DL-methionine hydroxy analogue calcium feed supplement, containing 84 percent HMTBa)/kg body weight immediately prior to the morning feeding. The entire dose was delivered to the rumen in half of the steers and through the omasal canal in the other half. Each steer received a dose in the other site of administration in a second period, where period length was seven days. Plasma samples were taken over time for 48 hours of collection and analyzed for free methionine and HMTBa.

Rumen escape of HMTBa.

Results and Discussion
Dosing through the omasal canal represents 100 percent escape from the rumen and would be comparable to the extent of post-ruminal delivery if HMTBa is completely indigestible in the rumen. With the applied methodology, research indicated that 48.54 percent of HMTBa delivered to the rumen escaped the rumen and was available for absorption (Figure 1).

As was shown in this trial and previous experiments across species, HMTBa serves as a source of methionine.

The change in methionine concentration in plasma from baseline levels is proportional to the HMTBa concentration in plasma (Figures 2 and 3).

The higher value observed in this experiment compared to previous trials could be due to differences in animals, diets.
or experimental methodology. For instance, in previous trials HMTBa disappearance was evaluated only through passage out of the rumen. In this experiment, the measured response would not differentiate between rumen escape or rumen absorption.

Summary

ALIMET and MFP are Novus’s solutions to these findings because of their two benefits. HMTBa, as ALIMET and MFP, has an average rumen bypass value of at least 40 percent. This increases the amount of methionine available for protein and milk fat production.

References