

Study shows that additional methionine improves efficiency in heifers

July 9 2012, By Evelyn Boswell

An extra dose of certain amino acids can help cows better use dietary protein or the nutrients they consume, according to a new study published by Agricultural Research Service scientists at the Fort Keogh Livestock and Range Research Laboratory (LARRL) in Miles City.

Amino acids -- the building blocks of proteins -- are essential, especially those that are "limiting," to cattle that graze on poor-quality forage, the scientists said in the article they published in the online edition of the international journal [Amino Acids](#). Methionine is considered a limiting amino acid because if a diet is deficient in it, the usefulness of other limiting amino acids is restricted, thus preventing the formation of body protein.

In cows, [microbes](#) in the rumen -- the first of their four stomach chambers -- are the first to use [dietary protein](#), which is then incorporated into microbial protein and provides [essential amino acids](#) to the animal.

Lead author Richard Waterman and his coauthors at LARRL - Mark Petersen and former intern Valerie Ujazdowski -- conducted their research from Jan. 13 through Feb. 26, 2010. They added methionine to the diets of 24 pregnant heifers, mostly Angus, that had been artificially inseminated. A large percentage of the methionine bypassed the rumen and went directly to the animal, resulting in an increase and more [efficient use](#) of amino acids, the researchers said. Results suggested that animals retained more of the nitrogen provided in the protein from

dietary and microbial origin and excreted less back into the environment.

In the current study, heifers were given supplements 56 days before they had their calves. One group was given a wheat middling-based [protein supplement](#) that contained urea, which provided adequate nitrogen to the [microbial population](#) of the rumen. Another group of heifers was fed the same amount of nitrogen, but a portion was replaced with a form of methionine with a protective coating to limit the ability of microbes in the rumen to use the methionine.

After 44 days, blood plasma amino acid concentrations were evaluated in response to dietary supplements. Methionine levels were higher in cows that received the extra amino acid, indicating that methionine bypassed the rumen and entered the animals' bodies. Even though the methionine had a protective coating, the small amount released in the rumen benefited both the rumen microbes and the animal itself.

The scientists said they also saw a decrease in other plasma amino acids, which suggested that providing additional methionine enhanced the ability of animals to more efficiently use other [amino acids](#) for growth and reproduction.

The [methionine](#) research was conducted under a cooperative agreement between the USDA Agricultural Research Service and the Montana State University Montana Agricultural Experiment Station.

Provided by Montana State University

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