

How Can MUN Testing Help My Farm?

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MMMPA recently began testing for milk urea nitrogen (MUN) from bulk tank samples. DHI testing organizations also provide MUN testing for samples from individual cows. This article discusses what MUN testing is and how you can use it to help improve feed efficiencies on your farm.

What is MUN?

Urea is a normal constituent of blood and body fluids, such as milk. It is formed from ammonia, which is produced in a cow's rumen from the breakdown of feed proteins and from normal daily metabolism of absorbed amino acids and body proteins. Ammonia is transported in blood to the liver and kidneys where it is converted to urea. Excess ammonia circulating in blood is very toxic, whereas urea is much less so. The conversion of blood ammonia to urea is the body's way of preventing ammonia toxicity. This conversion of ammonia to urea occurs in mammals including humans and is part of normal body metabolism. The body excretes excess blood urea in urine and milk. Urea is a normal constituent of milk and is part of the non-protein nitrogen fraction of milk. Urea circulating in a dairy cow's blood and in milk is closely related.

Obtaining a bulk tank milk sample to determine MUN is a much easier, non-invasive way of evaluating nitrogen (protein) status of all the milking cows in a herd as compared to obtaining a blood sample from a number of individual cows. Therefore, monitoring bulk tank MUN concentrations has potential as a management tool to evaluate protein feeding of individual herds.

Why test MUN?

Urea concentrations in blood are affected by two factors: 1) the breakdown of dietary protein to ammonia by rumen microorganisms; and, 2) the normal body metabolism of tissue protein. Much of the dietary protein that enters the rumen is degraded to ammonia by the microorganisms and then utilized to synthesize ruminal microbial protein. Because of this process, the dairy cow is uniquely capable of converting lower quality protein sources into high quality microbial protein that the cow can use to produce protein in milk.

Changes in blood urea concentrations can be affected by the amount of dietary protein fed and by the efficiency with which rumen microbes synthesize rumen ammonia to microbial protein. Thus, monitoring bulk tank MUN concentrations offers the potential for dairy farmers, nutritionists and veterinarians to evaluate ration protein nutrition. Feeding excess protein levels especially of rumen degradable protein (RDP) may result in MUN concentrations above a normal concentration range. Other factors that can influence MUN concentrations include breed, stage of lactation, level of milk production, cow health, season of year, ration energy density concentration, and feed intake.

How are MUN concentrations reported?

Urea concentration in milk is very small as compared with milk fat and protein. MUN values are reported as milligrams urea / deciliter milk (mg/dl) and can range from 0.5-40 mg/dl.

What are normal MUN concentrations and ranges?

Summarization of several published reports, suggest MUN concentration should be between 12 and 16 mg/dl.

How might bulk tank MUN concentrations be used?

If MUN concentrations are greater than 16 mg/dl, this may indicate that dietary protein is being inefficiently used. Concentrations of MUN lower than 12 mg/dl may indicate that ration protein levels may be too low to maximize ruminal fermentation and lactational performance.

As previously discussed, MUN is influenced by many factors. Tracking and graphing bulk tank MUN data for an individual herd as it becomes available from MMPA would be an effective approach to establish a MUN baseline over time. Attempting to use a single test result or only a few MUN reported results to make ration changes could result in making incorrect ration formulation decisions.

MUN values are recorded as "UREA" on MMPA component reports and can also be found in the producer section of MMPA's Web site. The graphing function available for other components is also available for MUN, allowing producers to graph their herd's MUN results over time. After monitoring bulk tank MUN over a period of time, if MUN concentrations are not within the suggested normal ranges of 12 to 16 mg/dl, the possible factors that may be

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influencing MUN concentrations should be evaluated. Collecting MUN data on individual cows or cow groups can help pinpoint potential problems to make more informed ration formulation decisions.

Bulk tank MUN data can be a useful tool to assist in monitoring the feeding program and perhaps to relate to excessive nitrogen excretion in manure. Remember bulk tank MUN concentration represents the milk from all of the lactating cows and thus is only a gross evaluation. Individual cow or management group MUN concentrations are required to pinpoint where high or low MUN concentrations are occurring and if protein nutrition adjustments are warranted in one or more cow groups in the herd.

Updated Spreadsheet Shows Hauling Manure Farther Can Pay

High fertilizer prices got you down? A newly reformatted worksheet from Michigan State University Extension (MSUE) may help.

The Manure Haul Spreadsheet, introduced in the early 1990s, has been updated to help producers figure the cost of hauling manure to fields farther down the road, a practice that may take the sting out of high nitrogen prices.

"When nitrogen fertilizers were less expensive, 3 miles was about as far as you could afford to haul manure before the cost of transportation began to outweigh the value of the fertilizer," says Bob Battel, farm management educator for Michigan State Uni-

versity (MSU). "But the high cost of commercial nitrogen may mean that you can go farther down the road and still save money, even after you factor in the increased cost of fuel."

Battel recently updated the MSU Extension Manure Haul Spreadsheet to aid producers who want to determine the feasibility of fertilizing more fields with manure. Farmers with access to Microsoft Excel can download the information from the MSUE Web site. From there, they can enter information that will personalize the data output and make it pertinent to their farms.

"Farmers who take the time to enter personalized information will get the most benefit from the program," Battel explains. He says a number of data points are requested, including current price of fertilizers, labor costs, distance to the field and type of crop to be fertilized.

"Two variables that really extend the distance you can haul are the size of the tank you're hauling with and the speed of travel," Battel says. "Farmers may find that it pays to hire a custom hauler with a large tank who can move faster rather than do all the hauling themselves."

Though standard manure nutrient values are already programmed into the software, Battel says a recent manure analysis will make the figures more accurate.

A link to the Manure Haul Spreadsheet appears in the upper right corner of www.rootzone.msu.edu. Farmers who want to learn more or don't have access to Microsoft Excel can call their county MSU Extension office for more information.

New Study Gives Insight into Dairy and Weight Loss Link

A new clinical trial published in the December 2005 issue of *Obesity Research* provides more insight into how dairy product consumption is linked to weight and body fat loss.

The study found that when adults on a reduced-calorie diet exercised and consumed the recommended three to four servings of dairy foods each day, their metabolism changed so that their bodies burned more fat than those in the study who only consumed one serving of dairy under the same conditions.

"Our data suggests that when you restrict calories slightly and increase calcium intake by increasing the number of low-fat dairy servings, the amount of fat burned over 24 hours is increased," said Edward Melanson, Ph.D., lead investigator and assistant professor of medicine at the University of Colorado.

"This is the third study in the last six months that adds more support to the body of research on dairy's role in weight management," said Paul Rovey, Arizona dairy producer and chairman of Dairy Management Inc., which manages the national dairy checkoff. "These studies, funded in part by dairy producers through their checkoff investment in nutrition research, help form lifelong consumers by reinforcing dairy's role as part of a healthy diet."

For more information about the study, visit www.nationaldairy-council.org.