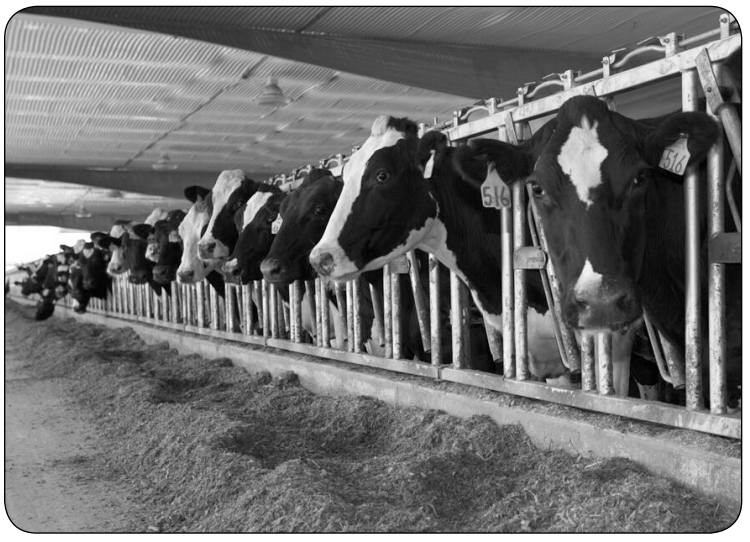
Taking another look at Milk Urea Nitrogen

There is no better time to seek opportunity, especially when it directly impacts one of the largest costs on your farm.

Milk Urea Nitrogen (MUN), the concentration of urea nitrogen in milk, provides information regarding how cows utilize the crude protein (CP) they consume. A well-balanced diet results in MUN in the range of 8 to 12, but values become elevated when excess protein is fed, or is not balanced with dietary carbohydrates. In these cases, the unutilized portion of dietary CP is converted to urea (by the liver), which ends up in the blood, urine, and milk. The diagram below shows a simple pathway by which MUN levels show up in milk.

MUN can be measured on individual cows (DHI testing), on a group of cows (milk line drip sampler), or by bulk tank samples taken when the milk is picked up on the farm. Most farms get MUN results from their milk handler on each tank of milk they ship from their farm.

Individual cow samples can be summarized to give producers and their consultants the opportunity to monitor MUN averages and ranges by and within pens or groups of cows that exist within the herd associated with parity, stage of lactation, and particularly diet. Bulk tank samples have their best application in single group TMR herds, while a drip sampler could be used to evaluate multiple groups within a herd. Bulk tank or drip sampler MUN test results provide information about herd or group average MUN, but do not provide information about cow variation that exists within a herd or group. Knowing cow-to-cow variation might be useful because a "normal" average MUN with high variability could suggest problems with feed mixing or delivery by the feeder and/or sorting in the feed bunk by the cows. Using a herd of 2 cows as an example, if 1 cow tests 6 MUN and the other tests 16 MUN, the result is an average of 11 MUN. Both cows are outside the optimum 8-to-12 MUN range we typically seek, but the herd average looks good.



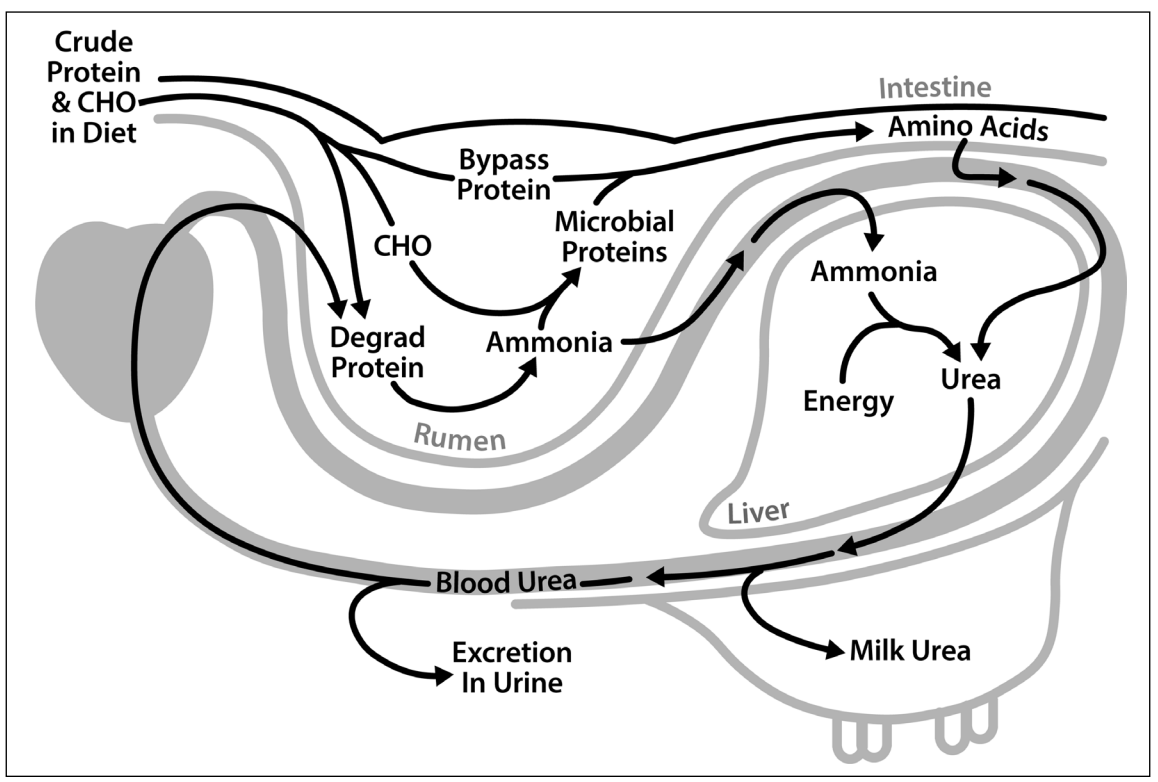
Most current guidelines recommend about 17% CP diets for lactating dairy cows. Besides being costly, excess protein is excreted as urinary nitrogen that is highly unstable, thus creating an environmental concern. Energy is used by cows for this waste excretion, making feeding excess protein both wasteful and costly to cow performance. Using MUN results in combination with TMR analysis can help fine-tune rations by looking for changes in the MUN levels before we notice changes in silage or other feedstuffs.

Many nutritionists have become more sophisticated with their formulations for protein and carbohydrate balance. Yet measuring and using milk urea nitrogen is a way to let the cow tell you how you are doing with diet formulation and the feeding program.

Estimating the economic impact of changes in a ration is necessary to generate the greatest possible return when feeding cows. Work from Wisconsin has given us a tool to estimate the urinary excretion of nitrogen by using MUN and body weight.

Urinary Nitrogen =
Body Weight x 0.0129 x MUN (mg/dl)

A Holstein cow weighing 1400 lbs. and testing 16 MUN would be excreting about 290 g (grams) of urinary nitrogen. Making dietary changes that would improve the protein utilization and reduce MUN to 12 would reduce this urinary nitrogen to about 220 g. Nitrogen multiplied by 6.25 will convert this 70 g reduction to 440 g or 1 lb. of protein. This is equivalent to about 2 lbs. of soybean meal equivalent. What does that add up to if your MUN average is 16 or greater?



The strategy for using MUN testing should include bulk tank MUN analysis to allow you to notice changes in ration or feed management that are not always caught otherwise. Test whole herd MUN for individual cows and follow these guidelines:

1. Establish the average for the herd. Target should be 10-14 MUN. For fine-tuning may push levels lower if you have good controls in feeding.
2. Look at the range for the herd. Within a herd or group fed the same diet, the difference should be +/- 6 from the average. Look for sorting and other feed management compromises if greater.
3. Look at differences between groups. Do the differences reflect diet differences? Are we feeding all groups correctly?
4. Look at the differences between lactation groups. Lactation 1 animals tend to be slightly lower in MUN.
5. Look at the differences between stages of lactation. MUN may increase slightly for cows fed the same diet as DIM increases.

If you have questions or would like to learn more about Milk Urea Nitrogen, please contact your DHiA Field Service Technician, or call 800-344-2697.