Nutrition Plus

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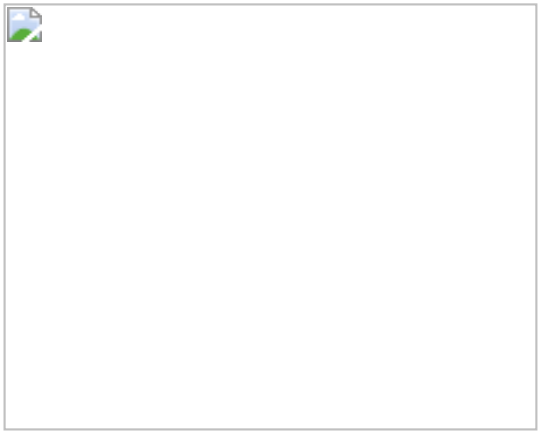
UTILIZING MUN DATA PROMOTES EFFICIENCY, ENVIRONMENTAL RESPONSIBILITY

When researchers started measuring blood urea nitrogen (BUN) to evaluate the nutritional status of cows, they soon knew they were onto something.



“As protein is digested by the cow, it creates ammonia, which is toxic to animal tissues, as a byproduct in the rumen,” explains Floyd Hoisington, dairy management consultant with Cargill Animal Nutrition, Ferndale, Wash. “The ammonia is converted to urea in the liver, since urea is a less toxic form of nitrogen for the animal to store. The urea is released into the bloodstream, where it is recycled, excreted via the kidneys or excreted in the milk.”

Early work on BUN showed that cows fed excessively high levels of protein, or whose protein-to-carbohydrate ratios were out of synch, showed higher levels of BUN. Thus, researchers concluded that the level of urea nitrogen processed and released by cows could serve as a bellwether for the suitability of the rations they were consuming.

University of Maryland Professor of Animal Science Dr. Rick Kohn says the practical application of this knowledge came when it was proven that urea nitrogen levels in milk are highly correlated with those in blood. “In fact, they’re actually more reliable, because milk urea nitrogen (MUN) levels fluctuate less through the course of the day, and are more telling of the cow’s ongoing nutritional utilization,” he notes. Milk samples are easier to collect than blood.

While the suggested boundaries for acceptable MUN levels vary slightly among nutritionists,

the acceptable range for BUN levels generally is between 8 and 18 mg/dl. The preferred level is ~10-14 mg/dl. Corn-silage-based diets and those utilizing limited amounts of high-quality legume forages tend to keep MUN levels at the lower end of the range, while diets based on legume forages and intensive pasture feeding tend to drive levels toward the upper limits. Levels also can vary significantly depending on season, especially in herds that are turned out on pasture in the spring and summer.

MUN is rapidly becoming an ongoing monitoring tool for dairies and their nutritionists, thanks in part to increased sampling of bulk-tank MUN levels by milk processors. Kohn says nearly all herds in Maryland and Virginia now receive an MUN value for every load of milk they ship, thanks in part to a USDA Natural Resources Conservation Service (NRCS) grant that helped processors upgrade their equipment and improve their testing methods.

Individual-cow sampling is not yet a routine practice for the majority of dairies, but this practice can be valuable in differentiating protein utilization within more precise parameters, such as feeding or production groups, stage of lactation, parity and BST use.

High levels of MUN likely indicate that cows are consuming too much protein, or not utilizing protein efficiently, possibly because energy levels or rumen fermentable non-fibrous carbohydrate (NFC) levels are too low. Keeping urea nitrogen excretion reasonably low also helps limit unnecessary environmental waste.

Both nutritionists caution that the role of MUN is not that of a ration-balancing goal, but rather as a quality control tool. “It has been said that balancing a ration to achieve a specific MUN is like driving while looking in the rear-view mirror,” says Kohn. “It should be a nutritional benchmark, not a goal.”

The beauty of the tool is that it reveals nutritional variations and inefficiencies shortly after they surface, making potential overfeeding, imbalances or other problems easier to identify and rectify.

SOYPLUS SUPPORTS EFFICIENT PROTEIN UTILIZATION

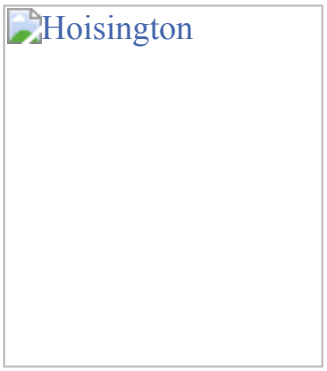
Using SoyPLUS as a primary TMR protein source helps stabilize MUN levels and improve digestibility of the entire ration. SoyPLUS consistently supplies 60 percent bypass protein via a patented production process that avoids damaging the proteins.

The rumen degradable protein fraction in SoyPLUS provides nitrogen sources needed for microbial growth. SoyPLUS also contains 23 percent NFC with an excellent profile of sugars, starches and highly digestible soluble fiber, which also support enhanced rumen microbial growth and digestion.

The result is more efficient utilization of rapidly available nitrogen, reducing nitrogen wasting that could otherwise drive up MUN levels. The RUP and high lysine content help meet the metabolizable protein requirements. You can feed SoyPLUS with confidence that it will routinely maximize protein utilization and enhance the availability of rumen fermentable energy.

CONSULTANT'S CORNER

MUN VALUES CAN TIP OFF SUBTLE CHANGES



By Floyd Hoisington, PAS, Dairy Management Consultant, Cargill Animal Nutrition

Dairy nutrition certainly has changed in the 30-plus years I've been in the business. I used to balance rations on a yellow tablet in the cab of my pick-up and have them done before I even left the dairy.

Today we know much more about the subtleties of nutrition and how trace minerals, protein fractions and other fine details impact rumen function, cow health, and milk and component production.

Monitoring milk urea nitrogen (MUN) is a good example of an aid that has evolved as a valuable enhancement to the dairy nutritionist's toolbox. It signals the potential need for ration adjustments much more quickly than more traditional means of ration evaluation such as milk production and herd health.

I recently had a situation with a herd that illustrates the value of ongoing MUN monitoring. The bulk-tank MUN level on the farm jumped from 12 to 17 mg/dl in a very short period of time. In the same time frame, the manure in the herd started to loosen up. Supposedly nothing had changed in the ration.

Upon investigating, we found that the ratio of corn silage to grass silage had shifted (they were in the same pit, with the corn silage stacked on top of the grass silage), and that the grass may have been from a different field or cutting. We took all new forage samples and then re-evaluated the current ration based on the new information. The ration protein on a dry-matter basis had increased from 17.25 percent to over 20 percent. The ration was adjusted to bring everything back in line, as it had been originally formulated. Monitoring MUN was one of the tools that helped us to efficiently catch and resolve the ration inconsistency.

What hasn't changed about nutrition is that the cow is always right. Despite what the computer says or what our research proves, she is the ultimate judge of the job we are doing as nutritionists. And she has no requirement for 10 pounds of alfalfa hay, 12 pounds of corn, 3 pounds of soybean meal or 35 pounds of corn silage. She does have requirements for nutrients such as carbohydrates, starches, sugars, protein and fiber. Let those standards be your guide in your quest to achieve optimum rumen function; healthy animals with strong immune systems; and excellent milk and component production—without dumping excess nutrients into the environment.

FROM THE MATERNITY PEN

INTRODUCING THE TRANSITION COW INDEX®

Over the last decade, the management focus on both calving and fresh-cow health has heightened tremendously. Calving protocols, fresh-cow exams and the advent of the "fresh pen" now are the norm rather than the exception on U.S. dairies.

The missing piece was a comprehensive evaluation tool to quantify the success of a dairy's transition-cow management program. That's changing, with the advent of the Transition Cow Index® (TCITM), developed by Dr. Ken Nordlund of the University of Wisconsin School of Veterinary Medicine, Madison, Wis.

TCI utilizes 14 factors from the historical DHIA record of each individual cow, to predict: (1)

milk yield at first test date; and (2) 305-day milk yield (without a herd production effect). The projections are based on the average first-test performance of cows with the same history in all 14 variables, which are drawn from a database of thousands of herds.

The model then compares the cow's actual performance to that predicted, and the difference is TCI. So, if a cow was projected to have 305-day milk production of 32,000, and her actual record was 31,500, her TCI would be -500.

Nordlund says TCI is a more objective, predictable and reliable measurement than previous means of evaluating transition-cow performance—disease incidence and milk production at early lactation test days.

TCI currently is licensed by the University of Wisconsin to AgSource, Wisconsin's DHIA service. To learn more about accessing TCI outside of Wisconsin, contact your regional DHIA service center.

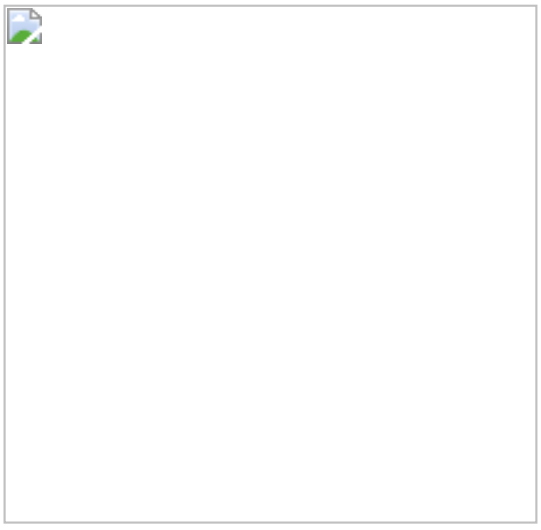
HAPPENINGS

NEARLY 500 ATTEND MEMBERSHIP MEETING

West Central hosted its 74th Annual Membership Meeting Thursday, June 28th, at Hilton Coliseum in Ames, Iowa. CEO Jeffrey Stroburg highlighted West Central's recent achievements, and detailed plans for future growth. The evening concluded with a dynamic presentation by New Mexico State University professor Dr. Lowell Catlett. Catlett's presentation touched on the need to deliver customers what they want, when they want it, and where they want in today's ever-changing business culture.

BEYOND BYPASS

FORAGE BYPASS PROTEIN CAN VARY GREATLY



Simply using constant rumen undegradable protein (RUP) or bypass protein values on forages when formulating rations isn't good practice. One reason, says Dr. Randy Shaver, professor of dairy nutrition at the University of Wisconsin-Madison, is the tremendous variability in the bypass protein content of forages, which can range from 15 to 45 percent of the total crude protein.

"It's something that we're all aware of as nutritionists," says Shaver, "but sometimes we fail to adjust for this variation. I think it's a factor that must be considered when we reformulate rations."

Shaver summarizes the major factors that affect the fraction of forage crude protein that is bypass protein as follows:

- Early maturity forages usually have a higher crude protein content, but also tend to have

a lower fraction of rumen bypass protein, than more mature forages.

- Alfalfa tends to have a lower fraction of rumen bypass protein than grasses.
- Hay-crop forages preserved as silage have a lower fraction of rumen bypass protein than when preserved as hay.
- High-moisture hay-crop silages have a lower fraction of rumen bypass protein than lower-moisture silages.
- Heat damage in hay that is put up too wet, or silage that is put up too dry, increases the fraction of rumen bypass protein, but unfortunately reduces the availability of the bypass protein and its component amino acids to the cow.
- Corn silage is lower in crude protein than hay-crop silage, which increases the need for supplemental protein in rations depending on its proportion in the forage mixture. But, the high content of rumen fermentable carbohydrates found in corn silage can increase rumen microbial protein output so that more of the supplemental protein can come in the form of rumen degradable protein rather than bypass protein.

Shaver suggests that nutritionists adjust dairy rations for rumen bypass protein variation in forages based on a combination of: (1) standard testing for crude protein, neutral detergent fiber, and dry matter concentrations, to assess stage of maturity, proportion of alfalfa versus grass, and silage fermentation effects on rumen bypass protein values; (2) accommodations for proportion of corn silage versus hay-crop silage in the ration; (3) use of nutrition models such as NRC 2001 or CPM; and (4) adopting new laboratory tests for determining rumen bypass protein as they become available (i.e. NIRS calibration from *in sit*u data).

“This is an area where nutritionists have an opportunity to add value and assist herds in achieving high production, reducing feed costs, and (or) minimizing nitrogen excretion” says Shaver. “Knowing how to consider these collective factors, and accordingly adjust supplements, is important to every dairy’s long-term success.”

QUALITY CORNER

In past issues, we’ve reported on the consistency of the chloride content of SoyChlor. This has always been based on in-house laboratory chloride determinations and a commercial analytical chemistry lab (Eurofins) determination.

We’d like to highlight the chloride content of 12 split SoyChlor samples as determined by three commercial labs, as well as our in-house determinations. Variations in chloride concentration probably were due to slight differences in how samples were prepared; each lab’s results were very consistent. The average across all three commercial forage analysis labs was 9.13%.

Laboratory Chloride concentration

(% as fed +/- Standard error)

In-House	9.21 +/- 0.07
Eurofins	8.95 +/- 0.15
Cumberland Valley Lab	10.29 +/- 0.10
Dairy One	9.00 +/- 0.04
Dairyland Lab	8.10 +/- 0.07

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