

# MUN

## Why Milk Urea Nitrogen

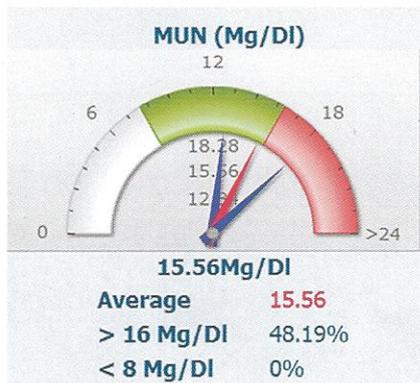
is important to dairy farmers and why a bulk tank sample is not giving adequate information for management decisions

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The variation in MUN in a herd is large. The standard deviation (SD) is estimated to be  $\pm 3$  to 4 MUN units. This means if the true value is 14, two thirds of the cows will vary from 10 to 18 (using  $\pm 4$  SD units). Remember, somatic cell counts (SCC) have a higher standard deviation than MUN values and we use SCC as a critical mastitis management tool (ON INDIVIDUAL COWS as well as specific groups, such as young *versus* old, etc.).<sup>6</sup>

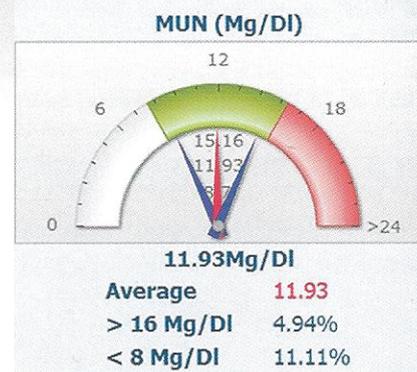
**Herd (bulk tank) MUN values** are therefore similar to herd somatic cell counts when interpreting results and is therefore **NOT reflecting any variation among feeding groups**, parity, breeds, days-in-milk or the relative contribution of each cow to the MUN values in the bulk tank. All these factors will contribute to **WRONG assumptions regarding management interventions** in the dairy herd.

Figure 1 and the values, obtained from *Logix<sub>Milk</sub>* Management Reports for a specific herd and test day, illustrate the importance of knowing the MUN values of each individual cow. Although the mean value in this herd (on the test day) is within the acceptable norms (15.56), more than 48% of the cows are in the higher DANGER ZONE for MUN.



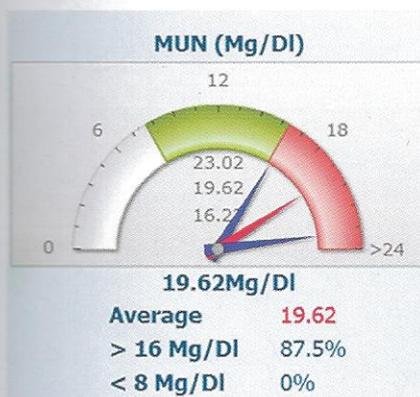
**Fig 1:** MUN values (average and spread) for a whole herd on a specific test day

*Logix<sub>Milk</sub>* Management Reports enable farmers to create reports for groups of cows, as illustrated in Figure 2, where the average and spread (variation) of MUN values in a specific feeding group are investigated for management and nutritional need purposes.



**Fig 2:** MUN values (average and spread) for a specific feeding group of cows in the herd

Figure 2 enables the farmer and his advisors to have a more precise indication of the situation in the herd. Only the feeding group containing the early lactation and top producing cows is shown (again, only possible to isolate the feeding groups if the MUN values of individual cows are known). The MUN values of this group is spot-on, the problem of high MUN values in the herd is therefore with the other feeding groups, as illustrated in Figure 3.



**Fig 3:** MUN values (average and spread) for the remainder (excluding cows included in Figure 2) of the cows in the herd

Figure 3 illustrates the real danger of general assumptions based on bulk tank average values for MUN. While the bulk tank average of this herd is within acceptable boundaries, the late lactation group shows unacceptable high MUN values and not only stand the risk of detrimental health effects, but also contributes towards unnecessary costs and erosion of profit.

Dairy farmers and nutritional consultants should use MUN concentrations to determine if:

- the ration is properly balanced,
- the ration on paper or mixed (for each individual cow) is the same as what the cows are eating,
- the values used by the computer are the same as the ingredients that went into the ration,
- there are undetected equipment problems that changed the ration<sup>8</sup> and
- each management group are fed optimally.

#### MUN TESTING AND PROFITABILITY

Milk Urea Nitrogen (MUN) levels that are too high or too low, can therefore rob you of profits. Over-feeding or under-feeding crude protein, or feeding rations with unbalanced protein to carbohydrate ratios, can decrease feed efficiency, increase feed costs and lower milk production. MUN analysis can therefore be used to identify potential problems in your feeding program.<sup>1</sup>

Cornell University research has indicated a **10 to 1 return on the cost of MUN testing**. This reflects potential savings in feed costs and reduced days open (reproduction rate) if MUN testing leads to a reduction in MUN as a result of feeding program changes.<sup>1</sup>

Higher levels of MUN concentration suggests there are opportunities to improve your protein feeding system. Just what needs to be done should be decided with assistance of your nutritionist. High MUN values indicate crude protein levels are too high, rumen fermentable non-fiber carbohydrates (NFC) are too low or the ratio of protein and NFC is not properly balanced.<sup>1</sup>

In a comprehensive study involving 53 large dairy herds, MUN herd levels had a positive relationship with feed costs per cow per day (higher MUN = higher feed costs).<sup>2</sup>

On the other side, herds with constantly low MUN values tended to have lower income over feed costs. The results of the study demonstrate that milk urea measurements offer a useful tool for monitoring the efficiency of nitrogen utilization in commercial dairy herds. The results also suggest that diets may be balanced to achieve greater efficiency of nitrogen utilization, lower milk urea concentrations, and lower feed

costs, while still achieving high milk production. This may lead to improved income over feed costs.<sup>2</sup>

There are many controlled studies that show a clear relationship between high levels of MUN and impaired reproduction.<sup>8</sup>

**Why should I pay for MUN values on individual cows when I get bulk tank result for much cheaper? "Milk urea testing has proved more effective in situations where cows are being individually sampled."**<sup>7</sup>

**MUN analyses on individual cows have the following advantages:**<sup>8</sup>

- You can troubleshoot each ration or age (parity) group with MUN Summaries.
- The distribution of MUN levels in a group is known. This is much more valuable than a simple weighted average from a bulk tank.
- MUN measuring instruments are rigorously tested for accuracy.
- These MUN values can be used to ensure the optimum levels based on: Breed, parity, seasonality, when sampled (after feeding), production level, frequency of milking, feeding group and days in milk of each cow.
- This provides you the most accurate information for determining if a ration is maximizing protein utilization in each herd.<sup>3</sup>
- "Bulk tank samples are interesting and useful for getting a general picture of how the herd, as a whole, is doing; however, it **does not supply adequate management information** such as which string(s) are high or low, or if a certain stage of lactation is out-of-line. These can all be masked by a bulk tank sample and won't tell you where to look for a ration or group problem. Averaging of individual cows or groups of cows is recommended." This is therefore **only possible with individual sample testing**.

#### Feeding Factors that impact MUN

The key factor is providing adequate rumen available carbohydrates to provide the energy for the rumen microbes to convert ammonia into microbial protein. The following feeding situations could lead to higher MUN values in your herd.

1. Feeding too much total crude protein in the ration may result in the excess protein being wasted.
2. Feeding too much rumen degraded protein (RDP) and/or soluble protein can raise MUN even if ration crude protein was normal.
3. If rumen acidosis occurs, microbial protein growth will be inhibited and ammonia will not be captured.
4. Rations low in fermentable carbohydrates (such as starch, sugar, and/or digestible fiber) can reduce microbial growth, leading to higher MUN values.<sup>4</sup>

#### Sources:

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8. Allen Young, 2001. Milk Urea Nitrogen Test. Utah State University Extension.