

Milk Urea Nitrogen

Summer 2016



DFO has begun reporting bulk tank milk urea nitrogen (MUN) for every pickup as of May 1, 2016

What is MUN?

Milk urea nitrogen is a normal constituent in milk. It is a natural product of protein breakdown. Excess protein is broken down in the rumen and is eventually converted into urea. Urea circulates in the blood and enters the milk and urine.

MUN is an indicator of protein excess or deficiency in the ration. Excess urea can also contribute to nitrogen excretion into the environment.

What's normal?

The traditional accepted range for bulk tanks samples is 10 to 14 milligrams per decilitre. With modern ration balancing programs, MUN ranges between 8 and 12 mg/dl are more common.

How can we use it?

MUN can be used as a management tool for your herd to improve nutrition and monitor protein status for the herd.

Through CanWest DHI testing, MUN has been used at the individual cow level but DFO is reporting bulk tank results (herd level sample). Therefore it needs to be recognized that:

1. DFO is reporting bulk tank samples, which is a composite sample of all lactating cows and may span multiple feeding groups. Therefore these results cannot be used to assess the ration of an individual feeding group.
2. The results are not weighted by each cow's milk production (which the DHI average is) and therefore will disproportionately represent the higher producing cows.
3. There is normal variation that occurs between tanks. This is due to both instrumentation and biologic variation. (see Table 1 on reverse)

Because of the normal variation between tanks it is important to look at trends in MUN, as opposed to short-term fluctuations. Therefore, an individual farm baseline will need to be established prior to using MUN as a monitor for nutrition and protein status.

What do we know?

Based on more than 120,000 bulk tank tests from 3,750 Ontario herds, we have compiled the summary data presented in Table 1. This demonstrates the observed variation between tank pickups. Based on these data, normal variation can be up to 3.8 MUN points between pickups.

This normal variation between tanks is based on the operational variation in the instrumentation used to measure urea, as well as normal biologic variation.

MUN has normal daily and seasonal variations as well. Milk urea tends to trend with the monthly temperature (higher in the summer and lower in the winter).

MUN typically tends to be slightly higher in Jerseys and Brown Swiss than Holsteins.

Table 1. Observed changes from one milk pickup to the next.

Component	95% of bulk tank values fall in this range:	In 95% of cases the change from one tank test to the next was less than:
Milk Fat (kg/hl)	3.48 to 4.68	± 0.17
Protein (kg/hl)	3.00 to 3.72	± 0.07
Urea (mg N/dl)	2.62 to 16.62	± 3.8

How can we use it? (cont'd)

High MUN (>14mg/dl) tends to be the result of excess protein in the diet compared to the production level of the cows. In high protein diets, less of the dietary protein is incorporated into proteins in the cow and therefore more dietary protein is being broken down and converted into urea. This results in more nitrogen being excreted into the environment. High MUN may also be a result of too little carbohydrates in the ration.

Low MUN (<8 mg/dl) may reflect low protein levels in the ration or excess levels of carbohydrates. Low MUN may result in reduced milk production and lowered milk protein.

Milk urea is highly influenced by the ration, specifically the protein and carbohydrate sources. Common dietary protein sources include protein supplement, forages, haylage, hay balage, soybean meal, canola, corn gluten and by-products (i.e. brewer's grain, corn distiller). Common dietary carbohydrate sources include corn, barley, wheat and corn silage.

Once you've established a baseline MUN level for your farm, then it can be used to more closely monitor nitrification and the level of protein in the ration.

For more information, please contact your nutrition advisor.