Milk Urea Nitrogen & How to React

by George Cudoc

Milk Urea Nitrogen (MUN) testing is available at all Dairy One milk testing labs. We see the use of this valuable feeding evaluation tool vary from 10% to 50% in different markets. One reason often cited for not testing for MUN is the lack of knowing what to do when the data is in hand. Let's explore the possibilities present when MUN tests are part of a dairy's test day information.

MUN results of 18 and above for the herd or the group average, though often not seen today, indicates the need to re-evaluate protein levels being fed. We should sample the TMR fed and determine if levels of crude protein, DIP (rumen degradable protein), UIP (rumen un-degradable protein), and soluble protein are in line. Low energy levels in the diet are also linked to high MUN. Lack of carbohydrates as indicated by NSC (non-structural carbohydrates) or NFC (non-fiber carbohydrates)will cause an imbalance between protein and energy in the diet resulting in the cow needing to purge the unused portion of protein. This shows up as high MUN. Reproduction can be affected by these severely high MUN levels and certainly the cost of the unused dietary protein will affect the economics for the dairy.

MUN tests of 15-18 are borderline high but will not as likely hinder cow performance productively or reproductively. Procedures should be the same as above and fine tuning the balance between dietary protein and energy will have positive effects on the cost of milk production.

MUN between 10 and 14 is the desired normal range. Once this level is determined for the herd or group that is being evaluated we should turn our attention to the range we see. Expectations are for ranges to be plus or minus six from the average. Cows outside this range suggest abnormal function of individuals. When more than 10% of the cows in the herd exceed this range there may be feed management issues such as feed separation or differences in feed access.

MUN between 8 and 10 are borderline low. Again we sample the TMR to see that we are feeding a properly balanced diet. Underfeeding crude protein, DIP, and soluble protein will cause this level of MUN as will overfeeding of energy components measured by NSC and NFC. Production typically suffers at this level and increases in production can be quickly realized by increasing protein fed.

MUN below 8 indicates a more severe imbalance between protein and energy factions of the diet. We typically loose production at an increased rate.

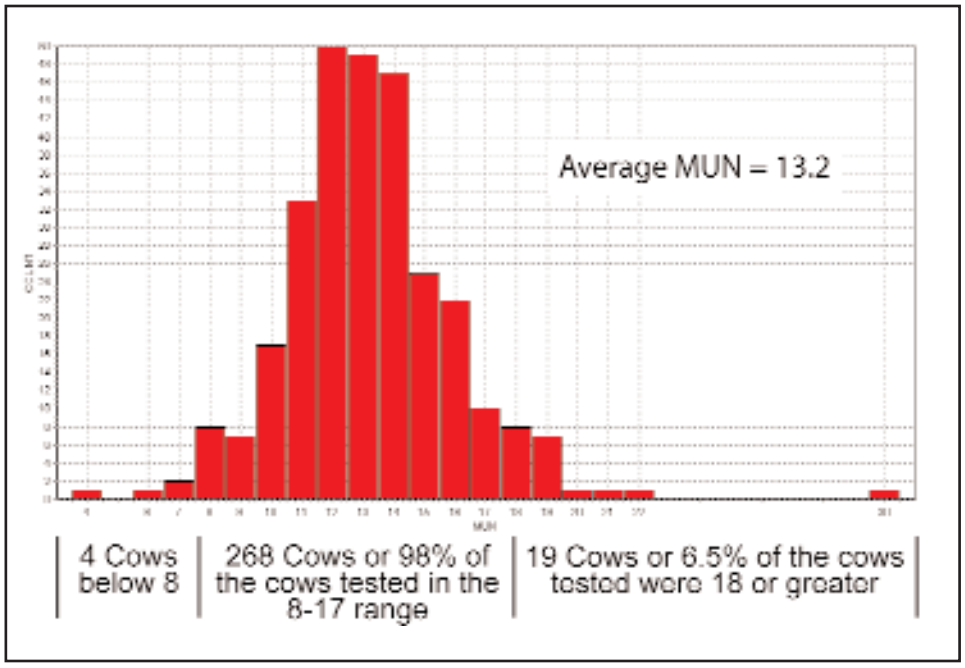
Milk protein coupled with MUN evaluation can help determine if protein or carbohydrate levels are likely to be the cause of MUN levels outside the normal range as indicated in the chart below.

MUN<10 and Milk Protein (low) <3.0%	low DIP and low carbohydrates
MUN<10 and Milk Protein (normal) 3.0-3.2%	low DIP and balanced carbohydrates
MUN<10 and Milk Protein (high) >3.2%	low DIP and high carbohydrates
MUN 10-14 and Milk Protein <3.0%	balanced DIP and low carbohydrates
MUN 10-14 and Milk Protein 3.0-3.2%	balanced DIP and carbohydrates
MUN 10-14 and Milk Protein >3.2%	balanced DIP and high carbohydrates
MUN>14 and Milk Protein <3.0%	high DIP and low carbohydrates
MUN>14 and Milk Protein 3.0-3.2%	high DIP and balanced carbohydrates
MUN>14 and Milk Protein >3.2%	high DIP and high carbohydrates

These are only guidelines for where to begin using MUN test results. Working together with a trained nutritionist will likely get the best results. Together you can look at the following.

1. Establish the average for the herd.
2. Look at the range for the herd.
3. Look at differences between groups.
4. Look at the differences between lactation groups.
5. Look at the differences between stages of lactation.

Let's look at a herd that is feeding a single diet TMR and the resulting MUN numbers.



Graph 1.

Following the above steps to evaluate MUN on this dairy we can conclude the following.

1. The average MUN for the herd falls in the target range of 10-14.
2. MUN numbers range from 4 to 30. Normally we would expect the MUN range to be no greater than (+/-) 6 from the average. That would be 7 to 19 for this example. We did have 6 cows outside the range but considering that 92% of all cows were in the slightly low to slightly high range we conclude no immediate problem is present.
3. Figure 1, shows performance for MUN between groups. Again we see little difference suggesting dispersal of feed as well as overall nutrient balance is acceptable.

By PEN	%COW	#COW	Av MUN
1	11	33	12.1
2	21	62	12.9
3	16	47	13.8
4	27	80	12.7
5	9	25	13.9
10	14	42	14.3
20	1	2	15.0
Total	100	291	13.2

Figure 1.

4. Next we want to examine by Lactation Group.

By LCTGP	%COW	#COW	Av MUN
1	42	121	12.7
2	34	98	13.3
3	25	72	13.9
Total	100	291	13.2

Again we see very little difference by lactation.

Figure 2.

5. Lastly as shown in Figure 3, we would feel confident if the stage of lactation differences were negligible. Other than the 2 cows in very early lactation. The MUN averages are quite consistent. It may not be alarming at this point, but maybe we should look further into cows that are tested at low DIM and determine if we have a tendency to see the much higher MUN levels on these cows as we do on the 2 cows this month.

By DGRP	%COW	#COW	Av MUN
-25-24	1	2	18.5
25-74	18	53	13.0
75-124	8	22	12.9
125-174	9	25	13.4
175-224	13	39	13.2
225-274	18	51	13.0
275-324	15	43	13.1
325-374	9	25	14.1
375-424	7	21	13.4
425-474	1	2	14.5
525-574	1	4	11.0
575-624	1	2	13.5
625-674	0	1	12.0
725-774	0	1	15.0
Total	100	291	13.2

Figure 3.

To make the job of evaluating the MUN numbers, there are two different reports that are commonly used. The DHI-245 and DHI-345 reports both provide needed data grouping and calculation to help analyze.