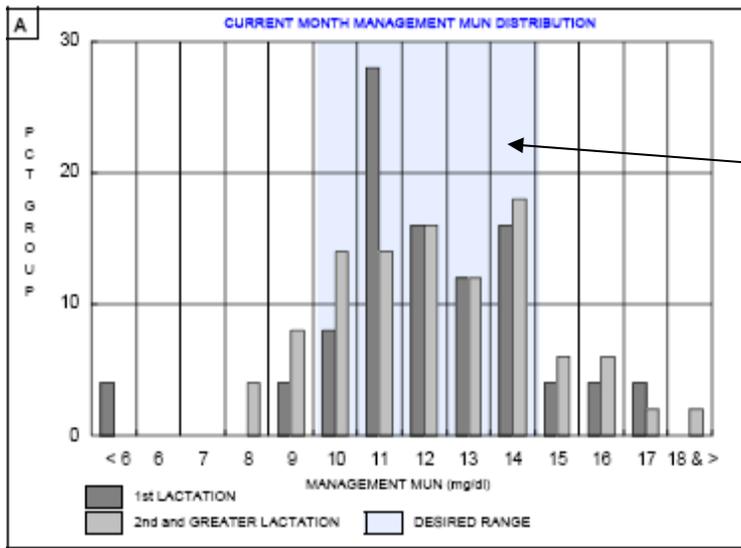




Management MUN Frequently Asked Questions

What can I do with Management MUN information? The Management MUN Summary is a ration quality control tool. AgSource recommends having a report run on each of your milking groups fed a different ration. If Management MUN values are high or low, it doesn't necessarily mean the ration has too much or too little protein. It means they aren't maximizing the utilization of protein. This could be because there is excessive or insufficient ration energy or non structural carbohydrates. It could also mean the ration is not being mixed or weighed properly.

How do you interpret the results?



You want a high proportion of the group's Management MUN in the 10-14 mg/dl range, (highlighted in blue).

It is unrealistic to expect *all* of the cows in the group to be in the desired range. The herd in the above example has cows that are both too low and a higher number with excessively high Management MUN levels. Data in Block E gives a more detailed analysis.

E	1st LACTATION						2nd & > LACTATION						
	LOW MGT MUN COWS < 10 mg/dl			HIGH MGT MUN COWS > 14 mg/dl			LOW MGT MUN COWS < 10 mg/dl			HIGH MGT MUN COWS > 14 mg/dl			
Test Date	Avg Mgt MUN	% Total Group	Avg DIM	Avg Mgt MUN	% Total Group	Avg DIM	Test Date	Avg Mgt MUN	% Total Group	Avg DIM	Avg Mgt MUN	% Total Group	Avg DIM
12/13/2005	7.1	8	421	14.9	28	287	12/13/2005	8.8	12	185	14.8	33	143
11/8/2005	6.3	8	99	15.7	25	193	11/8/2005	8.4	28	168	15.0	24	235
10/17/2005	8.8	19	211	21.5	58	256	10/17/2005	7.4	26	202	20.8	62	207

Outliers

Outliers

For both 1st and 2nd and greater lactation cows, high outlier numbers are greater than the low ones. This indicates that not all protein in the ration is being used effectively or that excess protein is being fed.

- If a high proportion of 1st lactation cows have Management MUN levels outside of the desired range and older cows are in the correct range, consider splitting the groups.
- Large numbers of cows split fairly evenly between the high and low outlier groups may indicate overcrowding.

Our Management MUN levels are high. We lowered the protein in the ration and our production went down. What went wrong?

If Management MUN levels are high, it means the cow is excreting excess protein. This could be because she has too high a protein level in her ration or that she isn't making use of the protein she is being fed. This could be caused by having too little energy or non-structural carbohydrate in the ration. Management MUN is a quality control tool. The report tells you if the ration is right for the cows. If it isn't correct, you need to dig deeper to determine what the cause is.

Our Management MUN levels are low. Should we add more protein to the ration?

Maybe. Other causes could be excess energy or non-structural carbohydrates in the ration. Management MUN is a quality control tool. The report tells you if the ration is right for the cows. If it isn't correct, you need to dig deeper to determine what the cause is.

The ration we are feeding is right, yet the majority of our herd's Management MUN numbers are out of range. What's happening?

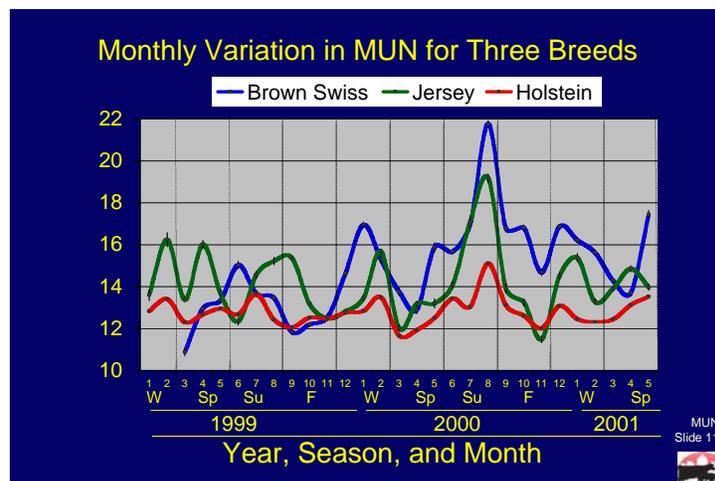
There are a number of things to check:

- Are the forage samples you based your ration on accurate?
 - Are the samples representative of what's being fed?
 - Were they taken recently?
 - Is the forage analysis accurate? AgSource provides both wet chemistry and NIR analysis. For more information, go to <http://www.crinet.com/fnfanal.htm>
- Are ration ingredients being accurately weighed going into the TMR mixer?
 - Is the scale accurate?
- Are the dry matters of the forages accurate? Are they regularly checked?
- Is the ration too dry, allowing for separation?
- If the herd is fed a TMR, is there one feed (dry hay, for example) fed free choice outside of the TMR?
- Is the TMR top dressed with additional protein supplement for certain cows?
- Is one or more of the forages chopped too coarsely - allowing the cows to separate the ration?
- Do the cows have access to feed at least 21 hours per day?
- Is plenty of water available?

- Are all of the feeds free of mold?
- Are cows healthy?
- Are stalls designed correctly with adequate cushion?
- Is there adequate air movement?
- Recheck the ration

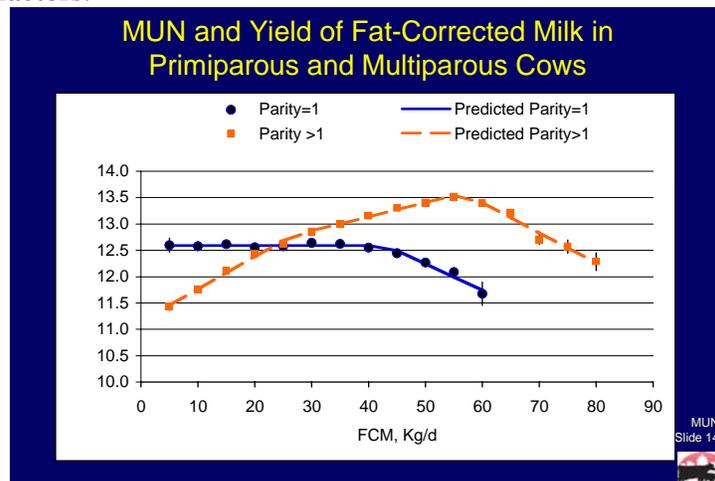
I thought you were supposed to establish a baseline MUN for each herd and then stay in that range?

Work by Michel Wattiaux of the University of Wisconsin – Madison Dairy Science Department based on over 400,000 AgSource MUN records shows wide variations in MUN by season. Trying to maintain a “baseline” MUN with conventional MUN results will decrease profits.



Besides illustrating the wide variation in MUN levels based on season, the above graphic shows the difference in MUN levels based on breed.

What is the right MUN level for a herd of cows? There is no “right” MUN level for all cows. Wattiaux’s research found that average MUN values are different for cows based on a number of factors.



Although there are no “right” MUN levels, Management MUN takes all of these variations into the calculations so we can say a Management MUN level of 10-14 mg/dl is correct.

What else affects MUN values?

Sampling time has a large impact on MUN (AM vs. PM)

- AM = 12.3 mg/dl
- PM = 13.2 mg/dl

What has AgSource incorporated in Management MUN?

A Few Main Points of this Analysis

- A significant proportion of cows are either under or over fed protein:
 - MUN < 9 17% of test-day records
 - MUN 10-14 54% of test-day records
 - MUN > 15 29% of test-day records
- A significant proportion of herds are over feeding protein:
 - MUN < 9 6% of herds
 - MUN 10-14 81% of herds
 - MUN > 15 22% of herds
- Cows of different breeds have contrasting MUN
 - Holstein 12.8
 - Jerseys 14.0
 - Brown Swiss 14.8

MUN
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A Few Main Points of This Analysis

- Large monthly (seasonal) variation in MUN makes it irrelevant to use “industry” or “within herd” base-line data as benchmarks
- DIM 0-35 MUN may reflect more the energy and protein status of the cow than the adequacy of her ration.
- In Multiparous Holsteins
 - MUN increased 0.06 unit/kg FCM between 10-25 kg/d
 - MUN increased 0.03 unit/kg FCM between 30-55 kg/d
 - MUN decreased 0.06 unit/kg FCM between 60-80 kg/d
- In Primiparous Holsteins
 - MUN did not change with FCM between 5-40 kg/d
 - MUN decreased 0.05 unit/kg FCM between 45-60 kg/d

MUN
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A Few Main Points of This Analysis

- Sampling time has a large impact on MUN (AM vs. PM)
 - AM = 12.3 mg/dl
 - PM = 13.2 mg/dl
- Interactions cannot be ignored in predicting MUN
 - Milking frequency
 - Season
 - Level of production
- Adjusting MUN for breed, parity, AM/PM, season and the interactions between season and milking frequency and FCM and milking frequency allowed to "standardize" Holstein MUN values to a common reference point.

MUN
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Are many herds outside of the 10-14 milligram per deciliter level of suggested Management MUN levels?

Management MUN Data for 48 AgSource Herds

<u>MUN, mg/dl</u>	<u>1st Lactation</u>	<u>2nd & > Lactation</u>
Average	13.5	13.5
2/3rd's Range	9.1 - 17.1	9.1 - 16.4
Minimum	6.1	6.0
Maximum	26.8	28.8
% > 14	46	48
% < 10	25	21

Data Collected January- March 2005

Herd Size: Average=79.2; Range=1 to 663

Although the *average* of the herds in the table is within the 10-14 mg/dl level, **over two-thirds of the herds are either above 14 mg/dl or below 10 mg/dl!**

How accurate are AgSource's NIR MUN measurements? All AgSource DHI MUN analysis are done with a Foss 6000. Following are research segments on instrument accuracy.

“A small positive linear bias was evident for Bentley and Skalar instruments compared with the CL 10, and an opposite linear bias was evident for the Foss 6000 compared with the CL 10. It is not possible from these data to say which instrument was most accurate,

but the magnitude of the linear bias was small enough that differences are not likely to affect interpretation of MUN results in the field.”

R. A. Kohn, K. R. French, and E. Russek-Cohen

J. Dairy Sci. 87:1848–1853

“The laboratories analyzed MUN using CL-10 (n = 3), Skalar (n = 2), Bentley (n = 3), Foss 4000 (n = 3) or Foss 6000 (n = 3) systems. When recovery of MUN was evaluated among the 5 analytical methods, the mean recoveries for the Bentley, Foss 6000, and Skalar systems were 92.1 (SE = 2.76%), 95.4 (SE = 10.1%), and 95.1% (SE = 7.61%), respectively, and did not differ from each other.”

A. B. Peterson, K. R. French, E. Russek-Cohen, and R. A. Kohn

J. Dairy Sci. 87:1747–1750

Why should I pay for a Management MUN Summary when I get daily bulk tank MUN reports for free?

Management MUN Summaries have the following advantages:

- You can troubleshoot each ration group with Management MUN Summaries.
- Management MUN provides the distribution of Management MUN levels in a group. This is much more valuable than a simple weighted average from a bulk tank.
- AgSource MUN measuring instruments are rigorously tested for accuracy at levels exceeding DHI requirements. Milk plant MUN testing units are not required to have any accuracy checks.
- Management MUN adjusts each cow’s raw MUN value based on her,
 - Breed
 - Parity (number of calvings)
 - Season
 - When sampled
 - Production level
 - Frequency of milking

This provides you the most accurate information for determining if a ration is maximizing protein utilization in each herd.