

## New Bolton Research Explains Use Of MUN

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Concentrations of urea in milk are variable from herd to herd and from cow to cow in the same herd.

Across all cows in Pennsylvania we could expect to find a wide variation in MUN (milk urea nitrogen) concentrations. This is the case for samples run in the Pa. DHIA testing laboratory.

Since Sept. 25, 1995, through Sept. 30, 1996, a total of 566,764 samples have been analyzed for urea concentration by the Pa. DHIA laboratory. Across all cows, mean urea nitrogen was 14.3 mg/dl with a range of .5 to 39.5 mg/dl and a standard deviation of 4.2.

There was no different in mean MUN by lactation number.

To look at production effects, MUN was examined by dividing herds into quartiles of milk production (RHA) within breed.

### What Should Values Be?

The variation in milk urea concentrations between herds and between cows indicates wide variations in protein, energy and water intake.

Rations should be appropriately balanced for rumen digestion and absorption of needed nutrients for maintenance of both body tissue and production of milk. When rations are well formulated, they contain acceptable rations of rumen degradable and undegradable protein, rumen fermentable carbohydrate, and post-ruminal absorption of energy metabolites.

Given typical ranges of dry matter intake and production for a herd consuming a diet that is blended for a certain level of milk production, the mean MUN should be within a predictable range. If the MUN was outside this range, it would suggest problems with a feeding program.

It could not be used to identify a specific problem.

However, looking at urea concentration in milk may provide an opportunity to address problems with the feeding program on a farm.

Important questions are: What should milk urea concentrations be? What should the herd average be? What should cows average at different production levels?

Just as somatic cell counts are only interpretable within the framework of a goal, milk urea concentrations are only interpret-

able in relation to goals acceptable by the dairy producer and his/her advisors.

Deviation from an acceptable range suggests that there are factors within the feeding program that need to be examined.

If mean MUN is outside an acceptable range, changing MUN concentrations may not be made without some functional change in the forage program on the farm.

Urea values should not be interpreted alone.

That is, they should not be interpreted without also examining the entire feeding program on

the farm, including ration formulation, ration delivery, mixing of feeds, feed intake, and water intake.

Given these provisions, what should urea values be?

MUN values in cows fed at optimal dry matter intake typically fall in the range of 10 to 14 mg/dl. The range of MUN concentration for individual cows consuming the same diet is +6 or -6 from the mean of the group. That is, if a group of cows averaged 12 MUN mg/dl, 95% of the group would fall between the values of 6 to 18 mg/dl MUN.

TABLE A

Breed	n	Urea N, mg/dl	sd
Ayrshire	1209	13.5	4.9
Brown Swiss	2469	16.7	5.0
Guernsey	3784	14.2	4.1
Holstein	534760	14.3	4.2
Jersey	17987	16.7	4.6
Mixed Breed	4479	15.0	4.0
Red and White	1942	15.4	4.4

TABLE B

Breed	Num. Herds	MUN, mg/dl	Mean sd
Ayrshire	22	15.4	3.2
Brown Swiss	65	16.3	3.2
Guernsey	54	14.5	2.9
Holstein	6543	14.4	3.1
Jersey	260	16.6	3.2
Mixed Breed	366	15.0	3.2

TABLE C

Quartile	RHA, lbs	MUN, mg/dl	Mean sd
1	15829	14.0 <sup>a</sup>	3.1
2	18704	14.6 <sup>b</sup>	3.0
3	20391	14.6 <sup>b</sup>	3.1
4	23280	14.7 <sup>b</sup>	3.1



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### How many cows should I sample?

Given the variation of milk urea, at least eight cows should be tested within a group to have interpretable results. Testing fewer than eight cows will not result in a meaningful average value of milk urea and cannot be interpreted. In addition, the cows to be tested should be cows that have free access to feed and are healthy.

If mean values of milk urea should be 10 to 14 mg/dl, why is my herd at 16 mg/dl and should I be concerned about it?

The fact that a mean milk urea nitrogen concentration of 16 mg/dl is found means there is some inefficiency in protein feeding. High MUN suggests that more protein is being fed than is necessary for production for that group, or that feed intake is not as uniform as desired for the group.

If diets contain high amounts of rumen degradable protein, such as high alfalfa diets, MUN may be "high."

Alfalfa haylage or hay provides a high concentration of rumen degradable nitrogen which may not be captured as microbial protein given constraints on the rumen fermentable carbohydrate included in the ration. In this situation, MUN may be higher than ideal.

If the milk urea levels are 16 mg/dl, should I try to reduce them?

The higher levels of MUN con-

centration suggests that there are opportunities to improve the protein feeding system. You need to determine what factors may be contributing to the elevated milk urea and examine management options which may balance the nitrogen supply in the rations. These may also be opportunities to reduce ration costs and improve efficiency of feed delivery.

### Experiences With MUN

At our dairy at the University of Pennsylvania we have examined blood urea, milk urea through the DHIA test, and milk urea from a.m. samples and p.m. samples using our clinical laboratory, from 295 samples.

The table contains the mean values for blood, milk urea a.m., milk urea p.m. and DHIA milk urea for 295 samples from 37 cows samples repetitively from December through August. Cows are fed a total mixed ration at 11 a.m.

One group is fed a high production ration balanced for 90 lbs. of milk and a low production group ration is balanced for 55 lbs. of milk. Milking occurs twice a day at 5 a.m. to 7 a.m. and 4 p.m. to 6 p.m. Blood samples were collected around 2 p.m. The average fat test was 3.6% and protein 3.3%.

The DHIA MUN concentration represents a composite sample taken from morning and evening

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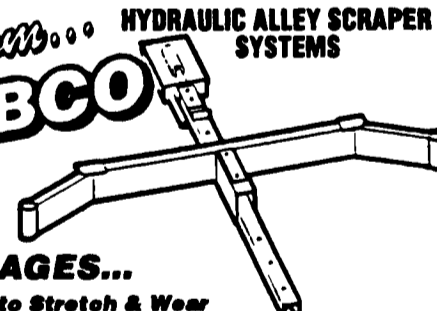


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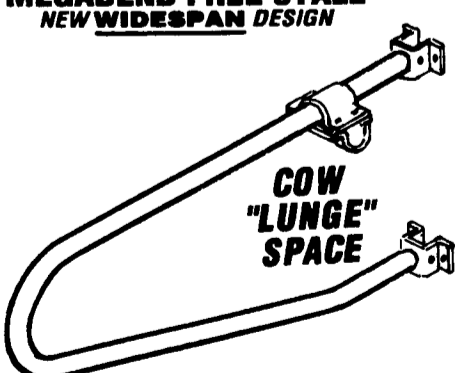


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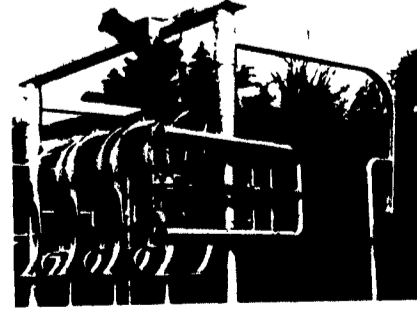
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