

Milwaukee Quality Lab and Fox Valley Quality Lab **MUN Testing**

Milk Urea Nitrogen (MUN)

What is it? What does it measure?

Milk Urea Nitrogen, the concentration of urea nitrogen in the milk, is an indicator of the efficiency of utilization of dietary crude protein (CP). It is expressed in milligrams per deciliter, (mg/dl) with 95% of all values ranging from 5.0 to 20.0 mg/dl for a group of Holstein cows; the desired group or herd concentration is 10-12 mg/dl, Individual cow samples are not meaningful as there are season, breed, parity, milking frequency, and days in milk that influences that affect MUN levels. However, bulk tank samples for one-group TMR herds &/or string (group) samples from differing TMRs can be evaluated with the corresponding TMR analysis report sheet to fine tune rations. MUN is higher when (a) excess Rumen Degradable Protein (RDP) is fed, (b) excess Rumen Undegradable Protein (RUP) is fed, or (c) when RDP is not balanced with dietary Non-fiber Carbohydrates (NFC). Examples include feeding high levels of immature alfalfa silage as the sole forage in the diet, feeding to large an amount of raw beans, or feeding excess urea. These situations cause elevated rumen ammonia, blood urea (absorbed ammonia is converted to urea in the liver) and MUN.

How do we use it?

More and more milk processors are offering MUN test results on bulk tank samples taken at milk pick-up on the farm. These MUN values give a frequent look at how cows are utilizing the protein being fed. Poor utilization means that urea will end up in the blood, urine and milk. Concentrations that are high (>14mg/dl) for a herd or string suggests that CP, RDP or RUP intakes may be above cow requirements or that dietary NFC may be too low. Concentrations that are low (< 8mg/dl) may suggest feed changes (lower protein haylage) or protein-limited rations. Poor feed mixing, poor delivery of TMR, or ration changes not accounted for by your nutritionist may also affect MUN.

What numbers are acceptable?

Current research suggests that for a herd or string of Holstein cows and MUN of 10-12 mg/dl is adequate and will optimize milk and protein yields while maximizing nitrogen excretion. In research conducted at the U.S. Dairy Forage Research Center by Glen Broderick, cows receiving 16.7% crude protein appeared to optimize milk, fat and protein yields, however lower protein levels showed more efficient use of nitrogen. MUN guidelines from Brown Swiss and Jerseys may be one unit higher to optimize milk production.

Why do you care?

Overfeeding protein is expensive and increases excretion into the environment. Underfeeding protein may reduce milk income. Current guidelines recommend 17% CP (DM basis) diets for most lactating cows. Many nutritionists have become more sophisticated with their formulations for RDP, RUP and NFC. Besides being costly, excess protein is excreted as urinary nitrogen that is highly unstable on the farm, thus creating an environmental concern. Using MUN in combination with TMR analysis can help fine tune rations by looking for changes in MUN levels before we notice changes in silage or other feedstuffs. Thus measuring and using MUN is a way to let the cow's own system tell us how we are doing with diet and formulation of the feeding program.

Stage of Lactation	<10	10-12	13-14	>14
Early 0-30 days	Lack Dietary Protein	OK	OK	Excess Dietary Protein
Peak & Post Peak 31-150 days	Intake & Milk Yield may be Suboptimal	Most Desirable	May be Acceptable	Check Dietary
Mid to Late >150 Days		Most Desirable	RDP, RUP &/or adjust NFC	

*For Jerseys & Brown Swiss herds add 1 unit to all MUN values