

MILK UREA NITROGEN (MUN)

How can you utilize these numbers.

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Urea is a common constituent of blood and other body fluids and is formed from ammonia in the kidney and liver. Ammonia is produced by the breakdown of protein during tissue metabolism and in the rumen due to action of microorganisms during digestion. Ammonia is very toxic, so the conversion of ammonia to urea, primarily in the liver, prevents ammonia toxicity. Urea diffuses readily into body tissue spaces with water like the diffusion from blood into milk.

Urea concentrations in blood vary and are influenced by protein intake, energy intake and urinary excretion (water intake). Consumption of higher protein diets (especially highly degradable protein diets) will result in higher blood urea levels and increasing energy intake will tend to decrease the concentration of blood urea. Increasing water intake, which may increase urine output, will tend to decrease blood urea concentration. Besides the influence of protein, energy and water intake, there is a fluctuation of urea concentrations throughout the day. Concentrations will be highest about 4 to 6 hours post-feeding and lowest just prior to feeding.

As blood urea is freely diffusable into milk, it is possible to estimate the concentration of blood urea nitrogen (BUN) by measuring milk urea nitrogen (MUN) and all the factors which influence blood urea also will influence the concentration of urea in milk. Since milk is an easy fluid to collect and it is done at least twice a day on most farms, measuring milk urea nitrogen is a useful estimate of blood urea levels. MUN could be even a better parameter to measure than BUN because milk is produced throughout the day and is pooled in the udder, milk urea concentrations may dampen some of the changes that occur rapidly in blood seen after a meal.

Concentrations of urea in milk are variable from herd to herd and within cows in the same herd. The variation in MUN between herds and between cows indicates a wide variation in protein, energy and water intake within dairy cows and herds. Given typical ranges of dry matter intake, water intake and milk production within a herd of cows consuming a diet that is balanced for a certain level of production, the mean MUN for these cows would be expected to fall within a predictable range. If the MUN was outside this range it would suggest problems in the amounts of rumen degradable and undegradable (or bypass) protein and rumen fermentable carbohydrate (NSC). However, the mean MUN could not be used to identify specific problems, but to signal potential problems with the feeding program. MUN is only interpretable in relation to an expected ranges which is acceptable for dairy herds. Deviation outside this acceptable range suggests which there are factors within the feeding program that need to be examined. Once there is a significant variation in milk urea concentrations, the MUN values should not be interpreted without examining the entire feeding program on the farm, including ration formulation, ration delivery, mixing of feeds, feed intake and water intake.

MUN values in cows fed and at optimal dry matter intake typically fall in the majority range of 10 to 16 mg/dl. The range of MUN concentration for individual cows consuming the same diet is +6 or -6 from the mean of the group. For example, if a group of cows averaged 12 mg/dl, 95% of the group would fall between the values of 6 and 18 mg/dl MUN.

Given the variation of milk urea, at least 50% of cows in a 50 to 100 cow groups need to be measured within a group of cows to have interpretable results. Testing under 8 cows will not result in a meaningful average of MUN and cannot be interpreted. In addition, the cows that are tested need to be cows that have free access to feed and are healthy. Levels of MUN higher than 16 mg/dl suggest that there are opportunities to improve protein feeding system and can have a potential negative effect on reproductive performance of the herd. It is known that high levels of MUN could be related to low conception rates and embryo losses. High MUN suggests that more protein is fed than is necessary for production with that group of cows, or that feed intake is not as uniform within that group of animals. In this case, it is time to retest forages, to review the ration formulation and check closely the process of feed mixing and delivery.