
DAIRYTECH NUTRITION

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MUN

No, I didn't spell it wrong. I know it's her special day in May, but this is Milk Urea Nitrogen. Milk Urea Nitrogen, or MUN, is a measure of urea nitrogen content in milk, and is very directly related to nitrogen excreted via urine and manure, and hence is an easy way to measure nitrogen, or rumen ammonia waste and excess.

Nitrogen is the basic building block of protein in feeds. Obviously, wasted nitrogen equates to wasted protein. When protein is added to a grain mix, it is typically the most expensive purchased feed component. Management of this expense has implications initially, in feed cost or Income Over Feed Cost which equates to profit, but also, and particularly in Australian grazing dairy farming, health costs. For the majority of our grazing season, pasture has very high soluble protein/rumen degradable protein (N), frequently well in excess of our cows' capacity to utilize it by converting it to milk protein and milk income.

Warrnambool Cheese and Butter Factory are to be applauded for their industry initiative in starting MUN testing of supplier's milk daily. Although these results are not yet being advised to their suppliers as a daily report like BF%, MP%, BMCC and litres, I'm confident this will soon be the case. When this does happen, it will be a 'win win' for both suppliers and the environment through improved protein/nitrogen management. For these reasons we need to start understanding just what this data will tell us, and how we can use this information to lower feed cost, reduce waste and pollution from excesses urea entering the environment, and certainly, cow health and productivity.

Crude protein levels of 35% are not uncommon in ryegrass pasture through winter. Most of us are well familiar with loose blackish manure at this time. As crude protein rises in pasture there is a multiplier effect with the percentage of soluble protein (essentially nitrogen) rising also. I hasten to add here, from my testing of pasture, there was not a connection between applying urea fertilizer and pasture soluble protein (beyond 10+ days post application); in fact, it appeared the reverse – higher crude protein in pastures that had not had urea applied.

Those loose blackish manures are not confined to grazing high soluble protein winter pasture, but are regularly seen when grazing summer crops like turnip. There are two contributing factors; the high soluble protein and very fermentable fibre that does not perform well in providing good rumen "effective fibre". Both will cause loose/scour type manures, but the blackish colour is very indicative of excess rumen nitrogen which equates to wasted protein and lost milk protein income. These manures are usually accompanied by low MP%.

There is a third possible contributor to this problem, and that is insufficient energy to convert this surplus protein nitrogen to milk protein. In our “slug feeding” systems in Australia, we feed rapidly fermented starch in the dairy in the form of cereal grain, then, well after this starch has been digested, we graze 4 kgs dry matter of pasture at 30+ crude protein with 30+% soluble protein (N). If we could match the starch and soluble protein in the rumen at the same time, we would eliminate the problem.

During periods of high pasture N, typically late winter, but not confined to then, we have fed corn in the grain mix for its slower digestion rate to try to achieve more available starch at 11 am when the cows have grazed pasture for several hours and have large excesses of rumen nitrogen. We have seen positive results, but are really ‘driving blind’ without daily data such as MUN information to judge the economics and effectiveness of this system.

The health issues that occur from excess rumen nitrogen are all connected with the cow’s attempt to remedy the problem by mobilising excessive amounts of body fat to both supply this energy deficiency, but also to supply the energy necessary to convert the excess nitrogen to urea for excretion via urine. We have now plummeted our cow into excessive negative energy balance which initially will lower MP% and litre price, but also, into at least sub-clinical ketosis and risk of fatty liver syndrome.

Although research conducted by Dr John Roche, DairyNZ, demonstrated high blood nitrogen levels did not affect conception rates, excessive negative energy balance certainly does. Frequently, joining and high pasture soluble protein coincides.

MUN test data is not going to fix these problems, but it will be the first true indicator of the magnitude of the issue, and a measure of our effectiveness in dealing with both the negative aspects and the potential positives of increased milk income through better utilization of protein and reduced environmental impacts; there will be a financial cost to this very soon too.

We are currently planning trial work on a natural feed additive which has considerable data behind it to suggest its effectiveness in mitigating surplus rumen nitrogen and contributing to utilization of this nitrogen to milk and milk protein. We will monitor pasture soluble protein, rations for protein/energy content, ratio and sequence, record MUN data when it becomes available in “ON/OFF” trials with this product in around 10 of our clients’ herds. The MUN data will certainly verify this product’s effectiveness and enable us to calculate return on investment in this product. Likewise, other methods of rumen nitrogen mitigation will be assessable via MUN testing. I trust WC&BF’s initiative in MUN testing; their contribution to both their supplier’s economic welfare and environmental stewardship will be rapidly duplicated by other milk processors.