

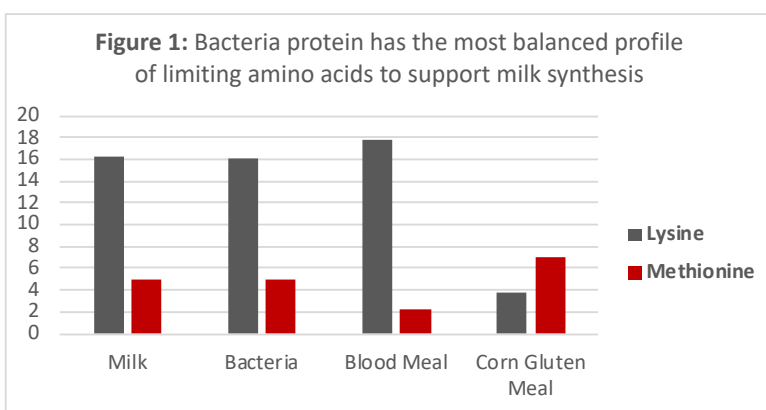
TECHNICAL BULLETIN

DAIRY



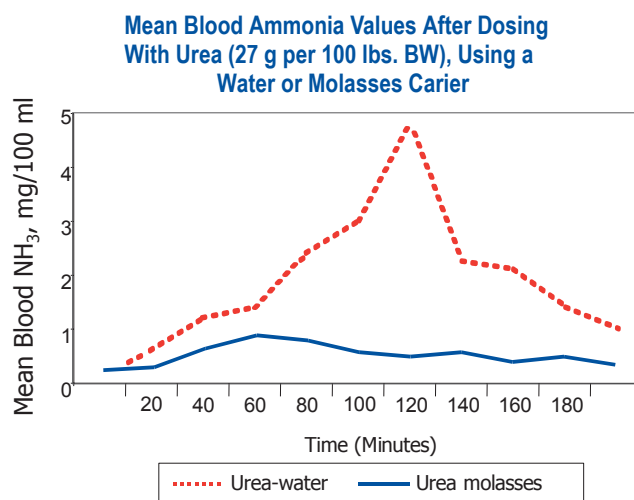
ONE OF THE MOST ECONOMICAL WAYS TO MAXIMIZE MILK COMPONENTS: FEEDING UREA THROUGH MOLASSES-BASED LIQUID FEEDS

In today's tough milk market, producers and nutritionists are trying to maximize milk components using the most economical dietary strategy. One of the best ways to achieve this goal is to maximize rumen microbial biomass, because 1) increased short-chain fatty acids from feed fermentation by rumen microbes are important building blocks for milk fat synthesis; 2) rumen microbial protein is the highest quality metabolizable protein with desirable profile of amino acids, especially the most limiting amino acids (see Figure 1 right), to optimize milk component production; 3) more protein provided by rumen microbes allows us to reduce dietary protein supplementation and feed costs.



What are the advantages of feeding urea through molasses-based liquid feeds?

Urea is typically the most economical source of crude protein. The concept of synchronization between protein and carbohydrates in ruminants is known among nutritional professionals. Research showed that the rate of urea release matches up with the rate of sugar fermentation, and we found that on farm milk component response from feeding urea together with molasses-based liquid feeds is superior to feeding dry urea alone or simply feeding molasses products without urea. One of the key reasons is that when rumen microbes are exposed to fast energy source like molasses sugar, they grow rapidly. If we can also provide them with quick nitrogen source like urea, microbes can efficiently assimilate the nitrogen and convert to microbial protein. In addition, research from Texas A&M University (see Figure 2 right) found that compared with ruminant animals dosed with urea using water as the carrier, animals dosed with urea using molasses as the carrier did not had spikes in blood



Lichtenwalner and McClain, 1978

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ammonia levels. This result suggests that 1) ruminants can utilize urea much more efficiently in the presence of molasses; 2) the risk of overfeeding urea and increased blood ammonia is much less when using molasses liquid feed as the carrier; 3) rumen microbes can use both urea and sugar efficiently together and maintain blood ammonia concentration.

How much urea should we feed?

How much urea can be added to the ration depends on a variety of factors such as protein and soluble protein contents from other ingredients, amounts and types of carbohydrate sources, degradation rates of carbohydrate sources and etc. Field experience tells us ration formulation programs are oftentimes unable to accurately predict rumen ammonia concentrations, due to the complex nature of feed and the difficulty of predicting dynamic rumen system. The best way is to start with formulation software to make sure there is a sufficient amount of rumen-degradable protein (RDP) and rumen ammonia, and watch the responses from cows and adjust accordingly. Generally speaking, QLF liquid supplements with 20% crude protein contain about 1 oz urea per pound of feed on as-fed basis. Feeding 4 to 5 lbs of QLF products is recommended because sufficient amounts of sugar (at least 6 to 7% of diet DM) and urea are needed to jumpstart rumen bugs and change rumen fermentation dynamic. To maximize responses, amounts of dietary urea amounts need to match up with the amounts of sugar: the more sugar in the ration, the more urea is needed. After dietary changes, MUN (milk urea nitrogen) may fluctuate in the next few days, but should stabilize overtime. We usually target a stable level around 12 to 13. Keep in mind our goal is not to shoot for the lowest MUN to starve the rumen and maximize nitrogen efficiency, our goal is to maximize dairy profitability by providing sufficient nitrogen and carbohydrate to grow rumen microbial protein. From the economical standpoint, because urea is much more affordable than soybean meal, bypass protein, and supplemental amino acids, feeding more urea through QLF molasses-based liquid feeds and cutting back some other protein sources can reduce feed costs.

Summary

Overall, optimizing the production of metabolizable protein from rumen microbes is the most economical way to drive milk components. This requires the proper balance of sugars, nitrogen, and other sources of carbohydrates and protein. Supplementing urea through QLF liquid feeds not only minimizes the safety concerns of feeding urea but also offers unique opportunity to optimize the efficiency of urea utilization and reduce feed costs. QLF has the expertise of properly hydrating and suspending urea in liquid feeds, and manufacturing high quality custom products to tailor to the ration of each individual farm. By working with nutritionists and implementing this feeding strategy, we have had success of increasing milk components and on-farm profitability.