

## Feeding and Managing for Maximum Milk Protein Production

June 16, 2020

Presenter: Dr. Tom Overton

- 1. Wouldn't insulin reduce preformed milk fat by shifting to adipose tissue fat synthesis?** In our work with insulin administration, milk fat percentage and yield was increased. The proportions of fatty acids in milk were shifted slightly (more de novo, less > C16 FA) with insulin, but the total grams of preformed fatty acids in milk fat likely was not changed.
- 2. What does ECM mean?** Energy corrected milk. It corrects milk production for fat and protein contents.
- 3. Will the response to amino acids be as pronounced on a diet based on grazed grass or grass silage?** I don't know about magnitude of response, but in grass-based diets, histidine has also been shown to be limiting, so that would need to be accounted for when balancing AA.
- 4. What is a realistic goal for lbs of components produced per cow per day?** Many herds are at 6 lbs or more of fat and true protein combined per cow per day. Top component producing herds are over 7 lbs/day.
- 5. How low are you comfortable balancing for MP compared to requirement with CNCPS biology?** I would want to be between 95 and 100% of requirements for high groups of cows.
- 6. As the relative prices of milk fat and milk protein vary over time, do you recommend any dietary changes to take advantage of the economics of milk protein versus milk fat or vice versa?** Certainly. When milk fat prices are high it is attractive to chase some milk fat using the high palmitic acid-based fat supplements. When milk protein price is over approximately \$2.00 per lb, it makes sense to chase some milk protein with AA, etc. In either case, one should always try to focus on achieving excellent ruminal fermentation as the basis for fat and protein production.
- 7. What is the relationship between milk true protein and milk crude protein? Is your data all reporting milk true protein?** Crude protein is typically 0.18 to 0.20 percentage units higher than true protein. Our data would be entirely true protein.
- 8. What is the effect of rumen protected B vitamins on the protein content of Milk?** I am not aware of any controlled research showing effects of rumen-protected B vitamins on milk protein content.
- 9. Can AA supplementation overcome milk protein suppression during heat stress?** Research out of Phil Cardoso's lab at Illinois (Pate et al., 2020. Journal of Dairy Science) suggests that rumen-protected Methionine helps to maintain milk yield and component percentages during heat stress.
- 10. How low can we go with MUN and meet rumen ammonia needs?** As long as everything is characterized and well-balanced, I am comfortable with herd-level MUNs down in the 7 to 8 mg/dl range.
- 11. Which one is more important: absolute amount of Methionine and Lysine OR their ratio?** Both are important. I am intrigued with the ratio of AA to ME concept that Mike Van Amburgh's lab has been working on.
- 12. Is there an ideal ratio in terms of protected AA supply and protected fat supply? If so what is that ratio please?** I don't know if such an ideal ratio exists.
- 13. Do amino acids (especially methionine) also effect fertility and embryonic and fetal losses? Are there any positive results?** Wisconsin researchers have demonstrated favorable effects of rumen-protected methionine on reproduction, the embryo, and early embryonic losses.
- 14. What is the relationship between supplementing FA as an energy source and AA supplementation to increase milk protein yield?** I think that the energy supplementation needed to drive milk protein is in the form of carbohydrates to promote insulin secretion.
- 15. What is better to use as a supplement, rumen protected methionine or rumen protected Choline ?** If you want to increase milk protein, rumen protected methionine. If you want to decrease liver fat accumulation in transition cows, rumen-protected choline.
- 16. In close up rations, is there place for rumen protected forms of Choline, and "B" vitamins and Methionine as well?** I would say that there is a place for choline and methionine. I am not aware of consistent data with any of the B vitamins.
- 17. Is there a difference in using synthetic amino acids (like lysine) vs bypass plant sources in cow responses? Is there a reason to use synthetics if you can get CNCPS to balance with plant sources alone?** It comes down to the economics of the sources, including the digestibility of animal-based protein sources if you are using those.

**18. How is it that no system (even the CNCPS) predicts an improvement in the volume of milk produced with an improvement in the Lysine and Methionine balance when all the tests that you have presented show it?** The only studies that I am aware of that consistently show milk responses to AA are transition cow studies, and in those cases AA are likely causing responses separate from the typical building block for milk protein as we think of during lactation (e.g., effects on immunity and oxidative metabolism).

**19. How accurate is the CNCPS outside the US (using different forages %, different components...)?** It has been used, and has had user feedback, from around the world for decades. The biggest limitation in many areas is getting adequate characterization of forages.

**20. What requirements models do you recommend to use for formulating rations?** CNCPS or any other model based on that biology.

**21. Any comments on Pectin level in the diet and interaction with AA?** No specific comments, other than pectin is very fermentable and a good energy source.

**22. What do you think about RP-glucose?** I don't think that it has been fully evaluated. Of the two trials that I have some awareness of, the K-State study didn't show much and the Iowa State study showed some evidence of decreased inflammation with RP-glucose, but that's about it.

**23. If we are looking at more milk protein, should we be moderate with fat supplementation?** I would focus on using supplemental fat sources that are truly not rumen-active.

**24. If your only option is the CPM or NRC softwares, would you still balance for AA?** Yes, recognizing that the target numbers for balancing vary with the model.