



## Niacin Supplementation During Transition

by Jack Garrett, PhD, ACAN Dipl

The supplementation of niacin to dairy cows has been a subject of discussion since the 1960s and 1970s. Initial thoughts were that the microbial population of the rumen, through their fermentation of feeds, produced enough B-vitamins to adequately supply the nutritional needs of the dairy cow. However, subsequent research indicated that transitioning cows could benefit from the addition of niacin to their diet.

The transition period for a dairy cow is the point that sets her up for the entire length of her lactation. Social interaction, physiological and nutritional changes are occurring simultaneously to her at this time. The closer she gets to calving, the faster she declines in dry matter intake, which begins the move into a negative energy balance state. As she progresses toward early lactation, dry matter intake continues to trail behind her ability to produce milk, causing her energy balance status to deteriorate further. This can lead to a series of cascading metabolic disorders.

One of these disorders is fatty liver syndrome, in which mobilized fat, in the form of non-esterified fatty acids (NEFA), is transported to the liver and subsequently stored, instead

of being metabolized into energy. This limited conversion to energy could be due to several reasons, including overwhelming the metabolic machinery with an excess of substrate, an inadequate concentration of cofactors, or other issues. One of the ways the cow deals with this situation is to partially metabolize the fat to the point of producing ketones, and releasing them back into the blood stream. Although ketones are not an ideal energy source, they can be utilized by muscle adequately.

One of the things to consider with this transitioning dairy cow is that changes in her metabolism are occurring relatively fast. As she goes through the last few days of pregnancy, her dry matter intake is dropping due to hormonal changes and physical discomfort of carrying several hundreds of pounds of fetus and other fluids. Once she calves, lactation sets in and she is pushed to reach her maximum milk production as quickly as possible. All this time, she is still recovering from the trauma of calving and trying to get back onto feed.

During this transition period, 21 days pre-calving to 21 days post-calving, the dairy

# ANEVIS®

rumen-protected niacin



cow is typically in a negative energy balance, meaning dry matter intake is not keeping up with energy demands. This could also mean that energy metabolism is not keeping up with energy demand. This is where niacin can come into play.

Although it has been thought that fermentation will supply all the niacin and B-vitamins a cow needs, during this transition phase fermentation will be limited and thus not supplying the typical end products of fermentation in adequate quantities. Thus, niacin production could be limited in the rumen. The niacin that is supplied in the raw form in the diet might be utilized as an energy source for the microbial population, thus causing some of the variation in responses that have been observed when niacin has been fed. Also, during this period of time, the need for niacin by the cow for metabolic processes could be significant, and providing 6-12 g/d of niacin is inadequate to actually meet her needs.

Research in the last few years has shown that infusing high levels of niacin into the cow can reduce or completely drop NEFA release from fat stores. But it has also shown a negative rebound effect of NEFAs in the blood. Thus, the supplementation of niacin has been suggested as a way to reduce this negative blood NEFA situation, but with the cautionary phrase that the rebound could be worse.

Recent reviews of niacin feeding have shown that the 12 g/d feeding level provided better responses than the 6 g/d level. A review of feeding niacin from Wisconsin indicated that, even though there wasn't an observable response in metabolic markers, the economics of feeding 12 g/d of niacin was still very positive. It has also been shown that a rumen bypass niacin product should help to better control the delivery of niacin to the lower digestive tract. One such product, ANEVIS®, is a rumen bypass source that will deliver 8 times more niacin to the cow than feeding raw niacin.

Recent research out of California has shown that feeding adequate levels of ANEVIS® will provide enough niacin to influence the incidence of ketosis and milk fat production by cows in early lactation<sup>1</sup>. Conclusion by the researchers from this study was that feeding niacin from ANEVIS® should be done until dry matter intake was back to normal, thus reducing any risk of a "rebound" effect of blood NEFAs. The research also indicated that very high levels of bypass niacin supplementation could cause the situation observed with the infused studies, thus more isn't necessarily better. Low feeding levels of ANEVIS®, at 5 g/d, can optimize response in metabolic condition management and milk production.



**To learn more about the benefits of ANEVIS® rumen-protected niacin, contact Jack Garrett at 303-506-7200 or email [jackg@qualitechco.com](mailto:jackg@qualitechco.com)**

<sup>1</sup> J. M. Havlin, P. H. Robinson and J. E. Garrett (2016) Niacin feeding to fresh dairy cows: immediate effects on health and milk production. *Animal Production Science*, 2017, 57, 1069-1078



At QualiTech®, partnership with our customers drives innovation — creating products that help animals, plants, people and the environment thrive.