

CAUSES OF RUMINAL ACIDOSIS

Poor adaptation of the rumen to ration changes that occur in early lactation as well as rations which predispose the cow to ruminal acidosis are management practices which result in rumen acidosis. The poor ruminal adaptation of the post-calving cow is usually the result of failing to appropriately transition dry cows from their rations to lactating cow rations. This adaptation failure has two consequences: 1) The microbial population of the rumen is poorly adapted to increasing concentration of grain in the diet resulting in the production of lactic acid and a drop in rumen pH. 2) The rumen papillae are not stimulated to develop and increase the absorptive area of the rumen resulting in slower absorption of acids from the rumen and greater drops in rumen pH following feeding. Rations that cause ruminal acidosis can result either from errors in formulation or errors in feeding of rations.

The transition ration allows for the adaptation of the ruminal microbes to the fermentation of concentrates without the accumulation of lactic acid. It stimulates the development of ruminal papillae, increasing the surface area of the rumen and promoting faster absorption of acids produced via fermentation. National Research Council (NRC;1989) estimates dry matter intake (DMI) of dry cows to be 1.8 to 2.0% of body weight. However, several trials have shown that DMI drops by as much as 30% the last week prior to calving. This prepartum decrease in DMI requires that a transition ration be developed with higher nutrient densities and be fed to dry cows 2-3 weeks prior to calving in order to meet their nutrient requirements.

In order to prevent ruminal acidosis in the lactating cow, rations should meet or exceed the minimal NRC guidelines for acid detergent fiber at 21% of dry matter and neutral detergent fiber at 28% of dry matter. A minimum of 18 to 21% of the NDF should be derived from forage. Even when minimal fiber guidelines are met, other factors can contribute to ruminal acidosis. 1) Saliva is an important source of buffer for the rumen. The buffering capacity in one day's production of saliva is equivalent to 7 pounds of sodium bicarbonate. Any factor that reduces the amount of saliva produced will increase the risk of ruminal acidosis. If forage particles are too small, the forage losses effectiveness in stimulating rumination, less saliva is added to the feed, and ruminal acidosis may develop. Silages are frequently finely chopped to enhance packing and reduce the amount of trapped oxygen. However, finely chopped silages have a greater surface area than coarsely chopped silages, which increases the rate of fermentation. In addition, silages are moist and require the addition of less saliva for ingestion than dry hay, further exacerbating the risk of ruminal acidosis. By chopping silages more coarsely, the silages will stimulate greater saliva production. Silages should contain at least 25% of the particles greater than 1.5 inches in length. 2) Changes in silage moisture can also contribute to the risk of ruminal acidosis. If the moisture content of a silage increases but goes unnoticed, the amount of forage dry matter in the ration will decrease relative to the concentrate.

The nonstructural carbohydrates (NSC) represent the more rapidly fermenting starches and sugars in the ration. The level of nonstructural carbohydrate (NSC) in the ration should not exceed 40%. This recommendation is tempered by the source of the NSC. Rumen fermentability can be reduced by substituting corn for barley or wheat. Moist grains ferment more rapidly than dry grain.

Supplemental ruminal buffers such as sodium bicarbonate or sesquicarbonate fed in early lactation can reduce the risk of ruminal acidosis. The recommended feeding rate of sodium bicarbonate is .75 to 1% of the total ration dry matter. *Jerry D. Olson, DVM, MS, Diplomate ACT. Presented at the Minnesota Dairy Health Conference, 1996.*

