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Utilizing High Nitrate Forages

A couple of articles ago we looked at testing for nitrates and prussic acid in forage as the growing season ends. There have been forage nitrate tests rolling through the office and fortunately most have been of no concern, but what if they do come back with higher levels? Let's look at what management strategies might be. If help is needed in developing a high nitrate forage plan, reach out to your Extension agent for help. The K-State publication MF 3029 – Nitrate Toxicity is a good resource.

Nitrate toxicity is a misnomer because nitrite (NO2), not nitrate (NO3), is what is toxic to animals. Rumen bacteria rapidly reduce nitrates in the forage to nitrites. Normally, the nitrites are converted to ammonia and used by rumen micro-organisms as a nitrogen source. But, if nitrite intake is faster than its breakdown to ammonia, nitrites will begin to accumulate in the rumen. Nitrite is rapidly
absorbed into the blood system where it converts hemoglobin to methemoglobin. Red blood cells containing methemoglobin cannot transport oxygen, and the animal dies from asphyxiation.

Depending on what research is referenced, nitrate recommendations are generally considered low risk at 3000 ppm or lower. The level of nitrate tolerance by the animals is very dependent on the situation. Nitrates in the 3000-6000 ppm range can be utilized with caution at less than fifty percent of the ration, 6000-9000 ppm utilized with extreme caution and over 9000 ppm is considered dangerous.

Grazing is one utilization method and often where the most concern arises. If the forage to be grazed is high moisture it is often lower risk, as fresh forages release nitrates into the rumen at a slower rate than dry/mature forages. Keep in mind these management tips for using higher nitrate forages. Adapt animals slowly to the forage and allow selective grazing. Fill the rumen prior to turning out with dry hay or other harvested forage. Higher dietary energy increases the rate of detoxification, so feeding a small amount of corn while grazing has been shown to have positive effects. Ultimately, the decision to graze high nitrate fields is a judgement call and a question of how risk adverse the manager is.

Harvesting and storing forages is the other option. While the window is narrowing this fall, when done right, ensiling high nitrate forages can decrease the nitrate content of the forage by roughly half. A twenty-one-day fermentation process has been found to be the minimum to most effectively reduce nitrates. Conversely, the drying process for hay does not decrease nitrates, so high nitrate hay needs to be diluted with other forages low in nitrates. Grinding and blending low and high nitrates hay is the best risk reducing method. If grinding is not an option, start feeding low nitrate hay first, working up to higher levels mentioned above, as animals can build tolerance over time. The same rules on consumption and rumen fill discussed with grazing apply in feeding harvest forages as well.