



Colorado State University Extension Golden Plains Area Extension

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Utilizing High-Nitrate Forages

Extreme dry weather has left livestock forage short in Colorado and increased the nitrate levels in hay and stubble fields stressed. As hay prices continue to rise and native range is depleted, producers need economical and safe ways to possibly utilize feeds that test higher for nitrates. Often high-nitrate feeds can be blended or fed to non-pregnant animals. If a producer is contemplating feeding a high-nitrate feed in such a manner, it is imperative to do quantitative nitrate analysis on all the forages they are using. For questions on taking samples or assistance with testing, contact your local Colorado State University Extension Office. The CSU Extension fact sheet found online at <https://extension.colostate.edu/topic-areas/agriculture/nitrate-poisoning-1-610/> contains guidance for testing and information about what levels are safe for different classes of livestock.

The way to feed high-nitrate hay safely is to blend or dilute it with low-nitrate feeds or supplements. This will decrease the total diet nitrate level (including water levels) down to a safe and useable level. When mixing low and high-nitrate hay together, it is critical that animals consume both high and low-nitrate hays in the correct ratio. Most likely this will require grinding, mixing and delivering the hay in a total mixed ration. Increased energy in the diet has been shown to help speed up and convert nitrate to protein in the rumen, thus adding grain or other high energy feeds in the ration may effectively help reduce nitrate levels.

Do not simultaneously feed free-choice one bale of low-nitrate hay and another bale of high-nitrate hay. Similarly, rolling out hay or using bale processors for separate low- and high-nitrate hays doesn't work. Certain animals may prefer consuming the high-nitrate hay. Due to "pecking order" only the timid cows may get the high-nitrate feed. If hays cannot be mixed properly, it is better to feed the low-nitrate hay first and immediately after cows clean it up then follow with the high-nitrate bale. Since rate of nitrate consumption is important, never feed high-nitrate hay to hungry cattle, or if animals have been restricted from feed such as being in dry lot over night or during and directly after a snowstorm. Moreover, avoid feeding high-nitrate feeds when it is damp, as they become more toxic most likely because the nitrates are already converting to the toxic nitrite from before being consumed. Standing forages such as failed sorghum or corn, as well as stubble fields will also contain various amounts of nitrates. It is important to sample test such fields prior to grazing, especially those with failed crops that may have been heavily fertilized. Most stressed plants store excess nitrates in the stalk of the plant, thus such fields may provide some grazing availability, so long as livestock are allowed to consume the preferred grain, leaf and husk material and not forced to eat the plant stalk.

It is important to remember that feeding higher levels of nitrates has everything to do with bacteria population in the rumen. Livestock are able to acclimate to higher levels over time as the rumen bacteria are able to change. This is accomplished by feeding smaller amount of higher nitrate hays more frequently, and not in a single daily feeding that floods the rumen with nitrates. If cattle are allowed to adjust slowly over a period of time to feeds that have potentially toxic levels of nitrates, they will develop a population of microbes in the rumen that convert nitrates to a non-toxic form. There are also direct-fed microbial products available that contains a specialized bacteria culture intended to develop a rumen population that produces enzymes to convert nitrates and nitrites that enter the rumen to a non-toxic form. If such a product is used, all animals must get the proper amount to establish the needed microbial population. Using feeds that contain high nitrate concentrations is not without risk, but feeds that contain nitrates can be fed successfully. Use the management practices mentioned above to reduce the chance of animal loss.

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