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Ammoniating Low Quality Forages

I've heard local hay reports recently ranging from "best we've had" to "half as much as last year". Anyone following the Kansas Direct Hay Report, knows that volume has remained high and prices strong. Recent rains have been helpful to extend forage production, but the predicted stretch of hot, dry weather could change things rapidly. Today let's take a look at an option that may, or may not, make sense for livestock producers to explore to feed ruminants.

Ammoniating low quality forages can make some really decent feed, making use of feedstuffs that might otherwise go unused, due to bulkiness, low protein and energy levels. Although we don't sit in the wheat capital of Kansas, wheat and other cereal grain straw is a classic go-to for ammoniation. Right now, straw tends to be more available out of the field. Really any forage less than 5 percent crude protein and 45 percent TDN on a dry matter basis, are candidates for ammonia treatment. CRP hay might be another example, if low quality.

While it can be time consuming, labor intensive and requires close monitoring during the process; ammoniation can create a feedstuff that rivals good quality grass hay. Ammoniation increases the digestibility of crop residues by breaking lignin-cellulose bonds in plant fiber. Dry matter digestion (TDN) typically increases 8 to 15 percentage units. Feed intake can be boosted 15 to 20 percent or more because of improved forage digestibility and increased rate of passage through the digestive tract. Typically, you can expect crude protein content of the low-quality forage to double. Ammoniating using a rate of 3 percent, which equates to 60 pounds of ammonia per ton of dry matter forage, will yield the expected results.

What do you need to consider to see if this is an option for your operation? You first need a source of low-quality forage. Next, the bales need to be stacked (*three by two round bale pyramids are common*) on a level, firm, tight, soil surface and then covered with 6 to 8 mil black plastic, sealing the edges with at least 12 inches of soil. It is best to leave a few inches between pyramids to help with the treatment process. It will be critical to keep the plastic secure and free of punctures, to hold the ammonia. Finally, the ammonia (*NH3 a readily available source*) is slowly released into the stack over a period of several hours. This is best accomplished with a pipe or hose system that evenly distributes the NH3 through the middle of the covered stack. The full ammoniation process can take a few days, to weeks, depending on the temperature. Safety around NH3 is of the utmost importance and discussed in the resources mentioned later.

So, does it make economic sense to do all this work? If higher quality forage is readily available, it may be the more logical choice, but even in today's higher priced NH3 environment, ammoniation may still pencil out. Here's a quick example using the July 12 Kansas Hay Market report. Good quality brome hay (*assuming 9 percent crude protein and 56 percent TDN*) sold for $140 per ton. Straw traded at $90 per ton. Work out of Nebraska estimates that total cost of NH3 at $800/ton, plastic, equipment use, labor and miscellaneous fees equals about $40/ton. That said, there is an economic advantage to ammoniated straw at roughly $130/ton. Of course, this is just an example and many factors go into making this decision on your operation, but it might just be worth pushing the pencil in times of short available hay & other forage supply.

Research conducted by K-State in 2014 (*of which Meadowlark District was a part of*) looked at a half rate of NH3, 1.5 percent, with favorable results nearly that of a full rate in increased digestibility & crude protein, it can be reviewed at: http://hdl.handle.net/2097/17779 Through that study, we have an ammonia distribution manifold available for checkout through our Offices, please let us know if you're interested in renting this tool. Resources can be found in the KSU Forage Facts Notebook at: https://www.bookstore.ksre.ksu.edu/pubs/s115.pdf and video of the process viewed at: https://www.youtube.com/watch?v=-JtjJb-umpk