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Cost Effectiveness of Ammoniating Low Quality Forages

As a result of this year's drought, US cattle farmers are facing a short feed supply. Farmers searching for affordable feedstuffs should consider ammoniating low quality forages, like corn stalks, to supplement their feeding programs.

Ammoniating low quality forage produces several benefits. Ammoniation increases the digestibility and crude protein content of forage. It also improves intake and inhibits mold development in high moisture roughage. Farmers who choose to ammoniate low quality forage (forages with less than 50 percent TDN) can expect digestibility to increase 8 to 18 percent depending on the type of forage ammoniated and its initial digestibility level. Ammoniation can also increase crude protein content by 4.5 to 11 percent. Furthermore, ammoniation can improve dry matter intake by over 30%. Because intake is one of cattle producers' biggest concerns when it comes to meeting cows' nutritional requirements with forage, dry matter intake is probably the greatest benefit of ammoniation.

While there are many benefits to ammoniation, a farmer must also consider the added costs of ammoniating forages. With regard to material costs, the main items required are anhydrous ammonia, polyethylene sheeting, tubing, and tractor fuel. In addition to the cost of these items, a farmer may also wish to include the cost of his labor in his calculations. Of all the costs, the cost anhydrous ammonia will undoubtedly be the greatest.

To add further detail to the cost analysis, consider the following scenario. Using a 40' by 100' sheet of black polyethylene, which costs \$180, a farmer can ammoniate approximately 70 large round bales. If each bale weighs 1000 pounds, the farmer has 70,000 pounds of forage. If the bales are 85 percent dry matter, the farmer has 59,500 pounds of dry matter. If the recommended amount of anhydrous to use is 3 percent of the dry matter weight, the farmer needs to use 1,785 pounds of anhydrous. The price of anhydrous ammonia in this example is \$720 per ton, which means that it costs \$643 to purchase the recommended amount of anhydrous. If tubing supplies cost \$50, tractor fuel costs \$38, and labor costs \$180, the total costs of ammoniation are \$1091 or \$31 per ton of forage.

As noted earlier, ammoniation can substantially increase the quality of forage. To understand whether the increase in quality is worth the extra cost ammoniation, a dollar value must be assigned to the improvement in quality. In order to quantify the value of improved quality, reference values for TDN and crude protein must be obtained. For this purpose, assume that a pound of TDN from corn is worth 15 cents and a pound of crude protein from soybean meal is worth 31 cents. (These values are based on an \$8 per bushel corn price and a \$537 per ton price for soybean meal.) Using reference values for TDN and crude protein derived from the

price of corn and soybean meal, a dollar value can be obtained for the added TDN and crude protein achieved through ammoniation.

If ammoniation improves TDN by 5 percent and crude protein by 8 percent, an equivalent of 100 pounds of TDN and 160 pounds of crude protein are added to a ton of forage through ammoniation. Using the reference values of 15 cents per pound of TDN and 31 cents per pound of crude protein, ammoniation increases the value of forage by \$55 per ton on a dry matter basis or \$47 per ton with forage at 85 percent dry matter. Compared to ammoniation costs of \$31 per ton (calculated earlier in the article), the value added to forage, \$47 per ton, is enough to justify the decision to ammoniate low quality forage.

For more information about ammoniating forages contact your local MU Extension center. There are several important considerations in ammoniating forages, so please seek advice before ammoniating forages for the first time.