

Vet Call

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Ammoniate crop residue to improve feeding value

In order for the cost of production of beef cattle to remain competitive with other protein sources, feed costs per dollar of product produced must be minimized by using low-quality forages. An economically rewarding practice to lower feed costs in wintering rations of brood cows is to replace expensive feeds, such as grass hays, with less-expensive feeds, such as crop residues, that have been ammoniated to increase their nutrient content.

Ammonia treatment improves forage nutritional value in several ways. First, it increases the digestibility of crop residues by breaking down lignin-cellulose bonds in the plant fiber. Ammoniation also solubilizes plant carbohydrates and improves dry-matter digestion by swelling the plant tissue.

Treatment of crop residues with ammonia improves the palatability over untreated residues, so feed intake is increased 15%-20%. Ammonia treatment usually doubles crude-protein (CP) content and serves as an excellent source of nonprotein nitrogen (NPN), which can be used by calves and brood cows. This treatment also preserves forage that is 25%-

30% moisture because it is an excellent fungicide and prevents heating.

It is not recommended to treat higher quality grass hays, such as brome, fescue, small grains, forage sorghum or sudan. The high carbohydrate content of these forages combines with ammonia to produce compounds that cause hyperactivity, convulsions or death, especially when treated forage makes up most or all of the ration.

Research in Kansas showed that ammoniated wheat straw is an acceptable base forage for pregnant beef cows. However, cow body weight and condition can be improved by feeding grain-based supplements in conjunction with ammoniated wheat straw.

Increasing the protein concentration in grain-based supplements (20%-30% CP) fed to cows consuming ammoniated wheat straw will improve the response to supplementation. Enhanced performance seems to be, at least partly, a response to increased digestible dry matter.

Ammoniation can be applied to any forage package

— square or large round bales, loaves, or loose stacks. It is best to apply ammonia treatment soon after harvest to prevent weathering and feed loss. The forage must be covered with plastic to seal in the ammonia. The bales or stacks should be grouped together for efficient plastic use.

You should select a level site with wind protection if possible. If available, a bunker or pit silo is a good site. Cover the stack with 6- to 8-millimeter (mm) black or UV-resistant clear plastic. Seal well around the edges with dirt or gravel. Plastic is not needed under the forage. One roll of 40 × 100-foot plastic will cover a six-bale pyramid stack 14-15 bales long (84-90 bales).

Apply about 3% [60 pounds (lb.)/ton] ammonia to the forage through a hose or pipe sealed under plastic at the center of the stack. Use a 1-inch (in.) plastic pipe with holes drilled in it. Use a regulator for accurate application or order a nurse tank with only the amount of ammonia needed for treatment.

Apply ammonia slowly to minimize ballooning of plastic; 10-60 lb./minute of ammonia works well (takes 6-8 hours to ammoniate). During

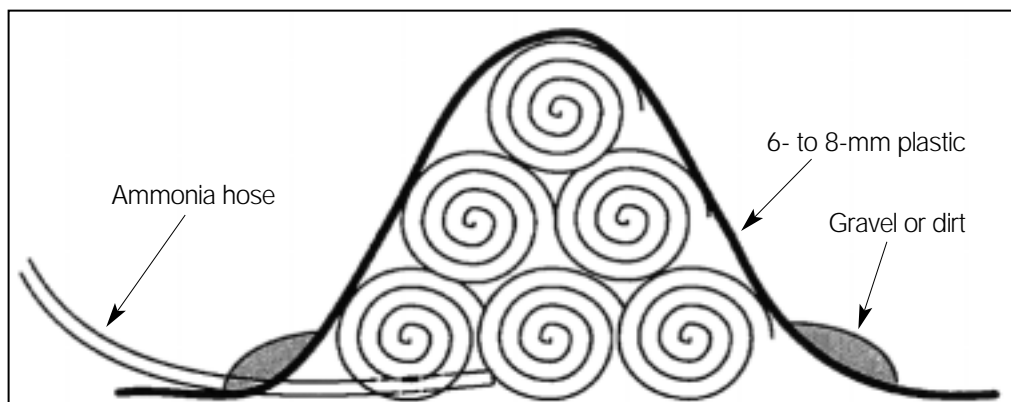
application, some of the ammonia will turn to a cold liquid, and a depression or trench under the stack will help to contain it. The gaseous ammonia will balloon the plastic for 1-4 hours.

Make sure your equipment is in good shape, work upwind and handle ammonia safely. Do not ammoniate on hot days (higher than 95° F) because the forage will take up too much ammonia.

Keep the stack covered for 5-45 days, depending on temperature. Warm weather accelerates the treatment effect (3-7 days). During cold weather the treatment effect may take 30-45 days. Even though the treatment won't be lost if the plastic is removed after 5-45 days, it is best to leave the stack covered until you are about ready to feed to prevent weathering.

Uncover the part of the stack you will be using 3-7 days prior to feeding to allow residual ammonia to escape. The forage can be tub-ground before feeding without loss of the treatment effect. The ration should be supplemented with minerals, vitamin A, energy or protein as needed. If the treated forage is analyzed for crude protein, label the sample "ammonia treated" so the lab can analyze it correctly.

Remember that working with ammonia can be dangerous, and all precautions should be taken to minimize risk.



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