

Adding Anhydrous Ammonia to Corn Silage

by Ronald T. Schuler

Introduction

Application of anhydrous ammonia (NH₃) is a low cost method of adding non-protein-nitrogen to your corn silage. If you have a shortage of high protein feed, such as good quality alfalfa silage or hay, adding anhydrous ammonia to corn silage may be appropriate.

Anhydrous ammonia must be applied to corn silage before it enters storage. The crude protein content of corn silage can be increased from 8% to 12% by adding 7-lbs of NH₃ per ton of 65% moisture silage (assuming a 20% loss).

This *Focus on Forage* will discuss the procedure and precautions required for adding anhydrous ammonia to corn silage.

At what rate is anhydrous ammonia added to corn silage?

The recommended rate is 6–8 lbs NH₃ per ton of silage (65% moisture content silage). Adding more than 8-lbs results in excessive ammonia losses to the atmosphere and has an adverse impact on the fermentation process. Adding less than 6-lbs per ton is usually not cost effective.

Is there a problem adding anhydrous ammonia to very wet or excessively dry corn silage?

Yes, anhydrous ammonia addition to dry corn silage (less than 60% moisture content) is often not very effective because of volatilization and poor retention of ammonia in the silage. Also, anhydrous ammonia addition to wet corn silage containing greater than 70% moisture content can result in extensive loss of ammonia in the seepage.

Ronald T. Schuler - Extension Agricultural Engineer
Department of Biological Systems Engineering
University of Wisconsin-Madison
rschuler@facstaff.wisc.edu

When is anhydrous ammonia added to corn silage?

Anhydrous ammonia can be added at the forage harvester (chopper) in the field during harvesting or at the blower. If you are storing the corn silage in an upright silo, it is better to add the anhydrous ammonia at the blower. If you are storing the corn silage in a bunker or a horizontal storage unit, then applying NH₃ at the forage harvester is better. Adding anhydrous ammonia to corn silage as you are filling a horizontal (bunker) storage unit is not recommended.

What equipment is needed to add anhydrous ammonia to corn silage?

Several pieces of equipment are required to properly apply anhydrous ammonia at a correct rate and in a safe manner. The key application component is the cold flow converter. This device converts the high-pressure liquid ammonia to a low-pressure gas.

Another important component is a meter to measure the flow of anhydrous ammonia. With a properly functioning application meter, the rate can be adjusted to match the amount of silage being treated.

The remaining components consist of a high-pressure tank, high-pressure release valve, shut-off valve and high-pressure hoses. For application with a forage harvester, quick release hose fittings are needed if the tank is carried on a separate wagon or running gear. The tank can also be transported mounted on the tractor or self-propelled harvester.

Will anhydrous ammonia affect fermentation of corn silage?

Addition of anhydrous ammonia to corn silage alters the fermentation of corn silage. Anhydrous ammonia is basic in nature and immediately after application will elevate the pH of corn silage. Afterwards the pH slowly declines via normal fermentation but fermentation will not be as extensive as untreated corn silage. Because of a less extensive fermentation some research has demonstrated a higher DM loss associated with adding anhydrous ammonia to corn

silage. Anhydrous ammonia however has excellent anti-fungal properties and can effectively reduce yeast and mold populations within the silage. As a result, anhydrous treated corn silage often has better bunklife and reduced DM loss at feedout.

What precautions should be taken when applying anhydrous ammonia?

Anhydrous ammonia causes severe burns when it comes in contact with skin. Operators should wear protective clothing to insure that anhydrous ammonia does not come in direct contact with skin. There should always be a clean supply of water readily available for flushing off and cleaning accidentally exposed skin.

Precautions should be taken to protect against exposing skin to anhydrous ammonia when assembling equipment and applying product. Operators should wear a full-face shield, heavy-duty long sleeve clothing, rubber gloves and heavy-duty shoes for optimum protection.

© University of Wisconsin Board of Regents, 2001

