

Improving Forage and TMR Bunk Life

by Jim Leverich and Randy Shaver

Introduction

Forages and total mix rations (TMRs) that begin heating after they are fed can lower dry matter intake and animal performance. Proper management during ensiling and feeding can minimize heating in the feed bunk and improve palatability.

What causes feed to heat in a bunk?

During the ensiling process, bacteria ferment silage sugars to lactic acid. The lactic acid is responsible for lowering silage pH. Any oxygen that is present in the silage mass after packing is used up in the fermentation process. The combination of low pH and lack of oxygen stabilizes the silage while it is in the silo.

During feed-out, oxygen is re-introduced into the silage and yeast can become active causing the silage to heat up. Because of high yeast content and available sugars, corn and small grain silages are more prone to heating during feed-out. The tendency to heat during feed-out is also prevalent in grass or legume silage that did not ferment well.

Management options to minimize silage heating and spoiling.

Several management factors help to minimize heating and spoilage of silage that occurs after feed-out. In general, harvest management practices that promote a desirable fermentation will help to reduce post-feeding losses. These practices include:

- harvesting forages at the correct moisture content,
- chopping forage at the correct particle length,

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- packing silage to a density of 15 lb DM per cubic foot and,
- covering the silo with plastic.

Along with these practices, it is recommended that the harvested forage be inoculated with a minimum of 100,000 colony-forming units (cfu) of lactic acid producing bacteria at ensiling. This usually improves silage fermentation and in some cases may improve bunk life. However, bunk life is often not improved in silages with a very high lactic acid content such as corn silage. Lactic acid is an energy source for yeast fungi and can promote a fast yeast buildup in silages during feed-out. High levels of yeast activity lead to heating of fed silage.

To enhance the bunk stability of corn silage, anhydrous ammonia can be added during the ensiling process. However, the use of anhydrous ammonia may actually reduce DM recovery from the silo. The recommended rate of application is 7 lb per ton of 35% DM corn silage. All safety precautions must be followed when using anhydrous ammonia.

Another option for improving bunk life of fed silage is the use of propionic acid based products. These commercially available products reduce the growth of yeast and molds in silage when added during the ensiling process. These products often contain some acetic acid or benzoic acid to make them more effective against yeast. Since these are buffered-acid products, corrosion of harvesting equipment or blowers is not a concern. These products are usually added at a rate of 2-4 lbs/ton of 35% DM silage. Because of cost, their use at ensiling has been limited, but their use at the time of TMR mixing is becoming more common.

Finally, removal of sufficient quantities of silage from the silo each day to keep the face or surface cool is extremely important. Silage needs to be removed evenly across the whole face or surface of the silo. A minimum of 6 inches of feed (or enough to keep the face cool between feedings) should be removed each day to minimize oxygen exposure and keep feed fresh. Any feed that is loosened during feed-out but left in the silo has been exposed to oxygen and it could start to heat. So, keep the face even and tightly packed and feed up any loose silage.

Managing TMR mixes to minimize heating?

Manage the wet feed ingredients (i.e. silage, wet brewers grains, corn gluten feed, etc.) that will be added to the TMR to minimize heating in them. “Hot” ingredients added to a TMR will cause it to heat up in the bunk. “Hot” ingredients that can not be controlled may need to be fed as a lower proportion of the mix or removed from the TMR.

Prepare the TMR mix just prior to feeding it. Mixing a TMR and allowing it to sit over night before feeding will allow it to heat up.

Keep a clean bunk. Remove all feed refusals daily before any new TMR is fed. To keep the feed fresh in tie-stall barns, use manger liners and drinking cup anti-splash guards, and ventilate the barn properly.

Feed a sufficient number of times each day to keep the feed in the bunk cool. Frequency of feeding often needs to be increased during hot, humid weather patterns.

Are there products that can be added to the TMR to reduce heating?

A number of propionic acid based products are available that reduce growth of yeast and molds when added to the TMR. By reducing the potential for yeast and mold growth, bunk life may be enhanced. These products often contain some acetic acid or benzoic acid to make them more effective against yeast. Since these are buffered-acid products, corrosion of the mixer is not a concern. These products are typically added during mixing time at rates of 2-4 lbs/ton of TMR. They usually cost about \$1.00 per lb. or about \$0.15 per cow per day. Because of high cost, these products are typically used only during the summer or when “hot” ingredients are being added to the TMR.

