

## Baleage as an Option for Dealing with Wet Fall Harvest Conditions

by Brian Dougherty, Extension Ag Engineering, 14858 West Ridge Lane, Dubuque, IA  
Cell: 563-239-7070; Email: [brian1@iastate.edu](mailto:brian1@iastate.edu); Twitter: @NEIowaAgEng

Wet conditions have created significant challenges this year for producers who are working to put up hay for winter forage needs. Shorter days and cooler fall temperatures add to the challenge of putting up dry hay. Producers who still need to put up hay this fall may want to consider making baleage as an option for dealing with cold and wet weather conditions.

### Making baleage

Making baleage is a method of preserving forage where bales are made at a higher moisture content than dry hay and then sealed in plastic wrap for storage. The high moisture level and air-tight environment causes the forage to ferment. The optimum moisture range for baleage is 40-50% DM, with an acceptable range of 35-60% DM. Baling at the proper moisture content is important for good fermentation. Forages baled at less than 40% moisture are more likely to have poor fermentation and greater mold production. At moisture levels greater than 65% the chance of undesirable butyric acid fermentation increases.

The time needed to cure forage for baleage is drastically reduced compared to production of dry hay, thus reducing the impacts of weather on harvest. This is a significant advantage when trying to harvest forages in conditions that are poor for making dry hay. However, the higher moisture also makes bales considerably heavier. Bale size may need to be reduced to accommodate existing machinery. In many operations, round bale diameter is reduced 12 inches or more to keep bale weight within a manageable range for bale carriers, front-end loaders, and feed mixing equipment. Keep in mind that a 1500 lb dry hay bale would weigh nearly 2600 lb at 50% DM. Baleage bales need to be sized so that your equipment can lift and transport them in a safe manner. A smaller bale size will also result in more total bales from a given field compared to dry hay, so it is important to plan ahead to ensure that adequate storage space is available.

### Equipment needs

Producers may be able to utilize existing equipment for the production and feeding of baleage. One question that often comes up is whether or not a conventional baler can be used for making baleage. The answer is that it depends on the baler. Some newer balers can achieve sufficient bale density for making quality baleage. However, balers made specifically for baleage typically have modifications including heavy duty bearings to handle extra weight and scrapers to prevent buildup of material on rollers and belts. Producers should try to achieve a bale density of about 10 lb DM/ft<sup>3</sup> when baling, which may not be possible with some baler models. Some manufacturers offer 'silage kit' upgrades that can be added to conventional balers. This may be worth considering if the baler is still in good condition. Another popular add-on to silage balers is a set of pre-cutter knives that process the hay into shorter lengths. A 4-inch cut length is recommended. This allows for greater bale density, less plastic usage, less feed waste in bale feeders, and eases use of bales in a feed mixer. It is best to consult with the equipment manufacturer if you have specific questions about using your baler for making baleage.

The next equipment decision a producer needs to make is how to wrap the bales in plastic. Bales can be wrapped individually on a bale wrapping table or they can be wrapped in-line with a 'tube' wrapper. A third option is to place the bales into individual bags that can be sealed by hand. Wrapping bales is faster than bagging, but requires a bale wrapping machine. The advantage

of the tube wrapper is that a conventional bale spear on a front-end loader can be used to load the bales into the wrapper. Individual bale bags can be a good option if a bale wrapper is not available, but good bag fit is important. It is critical that excess air is pushed out of the bag before sealing. It may require two people to twist the plastic tightly over the bale and tie it off. Both individually wrapped bales and bagged bales will require a bale grabber capable of lifting bales without puncturing the plastic if the bales need to be moved or stacked after bagging.

### **Tips for making high quality baleage**

Mowing with a mower-conditioner and laying the forage out in a wide swath is recommended. This will speed up the drying rate and can improve feed quality by reducing carbohydrate loss. Bales should be made as densely as possible. This allows for more dry matter in the same bale volume and reduces the oxygen content in the bale. The result will be better fermentation and less spoilage and heating. Reducing ground speed during baling can help to produce more densely packed bales.

Bales should be tied with plastic twine or net-wrap. Avoid using sisal twine as it contains chemical preservatives that can degrade plastic wrap over time. Net-wrap has the advantage that it creates a smoother bale surface and helps prevent coarse stems from poking through the plastic wrap. Wet bales can quickly lose their shape and become very difficult to handle and wrap. Therefore, bales should be moved and wrapped as soon as possible after baling. This will help reduce heating and improve feed quality. Use of hay preservatives and inoculants should not be necessary if the bale is wrapped properly. Regardless of wrapping technique, plastic should be at least 6 mm thick to ensure good fermentation.

The bale storage site should be well-drained and free of sharp objects that could puncture the plastic wrap. Keep weeds under control and clean up any spoiled feed in the area to help prevent rodent and insect damage. Holes in the plastic

should be covered as soon as possible with tape that is made specifically for patching holes.

### **Feeding considerations**

Compared to dry hay from the same field, baleage production reduces DM and leaf loss during harvest, providing for increased protein and total digestible nutrients (TDN). Baleage also results in less waste at the feeder compared to dry hay in most cases. However, baleage will begin to spoil once exposed to air so it is recommended that baleage be consumed within 48-72 hours of air exposure. Smaller bales consisting of less dry matter also increase the frequency in which bales must be delivered to cows.

The time it takes for baleage to completely ferment will vary depending on forage maturity at harvest and weather conditions. Wait 6 to 8 weeks after harvest before feeding baleage if possible. If a TMR mixer or other grinder is used to process bales, make sure that the machine is capable of handling baleage. Grinding baleage requires a heavy-duty machine capable of withstanding tremendous forces. Keeping knives sharp will reduce wrapping in the mixer and tractor horsepower required for grinding.

### **Wrapping it up**

Making baleage is an effective method of preserving wet hay. With good management and a bit of planning it can produce feed of equal quality to silage placed in bags or bunkers. When deciding whether to make baleage instead of dry hay consider the suitability of your equipment for harvesting, handling, and feeding baleage. Hiring a custom operator can be a good option if you are not set up to make baleage with your own equipment. Also consider where you will store the bales and how that will impact your feeding operations.

For more information see the Iowa Beef Center Publication IBCR 202 *Making the Switch to Baleage* available at:

<https://store.extension.iastate.edu/product/14489>