Ridin' Herd

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Just bag it

Research indicates that grain byproducts from the production of ethanol fit nicely into high-forage diets. Cows need very little supplementation during the spring, summer and early fall when the primary component of the diet is grazed forages. From a cost perspective, distillers' grains are cheapest in the summer, when we typically don't need to supplement beef cow diets. The price increases in the fall and winter, when we would consider supplementation in beef cow diets. How can cow-calf producers take advantage of the price differential of distillers' grains and use them in winter supplementation programs?

Storing grain byproducts

Wet distillers' grains with solubles (WDGS) are an excellent supplement for cows or calves consuming medium- to low-quality forages fed or grazed during the winter. Usually WDGS are delivered by the semi-load and should be fed within a week (summer) to two weeks (winter) or the product will get rancid and spoil. The relatively short shelf life is a key obstacle to using the product for cow-calf producers.

For a cow-calf producer, there is a disconnect between supplementation needs (winter) and the lowest price (summer, greatest supply) at which to purchase the feedstuff. Research has shown that WDGS will not spoil if the oxygen is removed during the storage process. WDGS, at 65% moisture, cannot be stored successfully in a bunker silo or in silo bags.

Fig. 1: Traditional WDGS at 65% moisture bagged in combination with different forages

The numbers depict amount of forage added on a dry-matter (DM) basis. As shown, the bag split when the level of forage was too low.

Fig. 2: 35% grass hay, 65% WDGS mixture (DM basis) stored in a bunker silo

Inclusion of forage

This spring the University of Nebraska conducted a small-scale experiment to determine the levels of forage to add to WDGS to adjust the moisture level to successfully bag the product or pack it in a bunker silo. The feeds that were used in addition to WDGS were alfalfa, grass hay, wheat straw, a modified WDGS product and wet corn gluten feed (WCGF). When the combinations were bagged, the bagger was held at a constant pressure of 300 pounds per square inch (psi).

Height and width of the bag after bagging is a good indicator that the WDGS and forage combination is close to optimal. If the height of the bag was about 4 feet (ft.), 6 inches (in.) and the width was between 13 and 14 ft., then the bag did not split, oxygen was eliminated, and the bag remained sealed.

In Fig. 1, the foreground of the picture shows that where the forage content of the mixture is the greatest, the bag is taller and thinner. As the forage content decreases, the bag begins to "squat." As the bag squats, the pressure increases and there is a greater potential for the bag to split.

Table 1 illustrates the amount of forage to include in the mix on a dry-matter (DM) basis to successfully bag WDGS. The attempt was to get as much WDGS in the bag as possible without splitting the bag.

When grass hay was used to bag WDGS, the optimal mixture was 15% grass hay and 85% WDGS on a DM basis. If we assume WDGS are 65% moisture (35% DM) and the grass hay is 15% moisture (85% DM), we can calculate the amount of grass hay and WDGS needed to make a ton of this mixture on an "as-ensiled" basis.

A ton of this mixture on a DM basis would be 1,700 pounds (lb.) (2,000 lb. × 0.85) of WDGS and 300 lb. (2,000 lb. × 0.15) of grass hay. Converting these numbers to an as-ensiled (adjusting the feeds for their water content) basis, the mixture would include 4,857 lb. of WDGS that are 35% DM (1,700 lb. ÷ 0.35) and 353 lb. of grass hay at 85% DM (300 lb. ÷ 0.85).

With these numbers, the percentage of each of the two feeds needed in a ton of the mixture to get 85% WDGS and 15% grass hay can be calculated. The total as-ensiled mixture of the two feeds is 5,210 lb. (4,857 lb. from WDGS, plus 353 lb. from grass hay).

As a percentage of the total, WDGS are 93% [(4,857 lb. ÷ 5,210 lb.) × 100] and grass hay is 7% [(353 lb. ÷ 5,210 lb.) × 100].

Understanding the calculations is critical because it illustrates the need to know the moisture content of the WDGS and the grass hay. To mix a ton of WDGS and grass hay so that the mix is 85% WDGS and 15% grass hay, the mix would contain 1,860 lb. of WDGS (2,000 lb. × 0.93) and 140 lb. of grass hay (2.000 lb. × 0.07). The DM content of the mixtures of WDGS and forage that we bagged ranged between 38% and 40%.

Bunker vs. bag

The percentage of forage and WDGS that is optimal is different when storing in a bunker silo compared to a silo bag. Our experiment indicates that the percentage of grass hay needed in the mixture is between 30% and 40% on a DM basis. The 40% grass hay, 60% WDGS mixture packed best when using large, heavy equipment for packing. Our work indicated that a 25% wheat straw,

75% WDGS mixture on a DM basis is too wet to get a good pack and seal.

A producer in our area used a ratio of 35% wheat straw to 65% WDGS on a DM basis and, using heavy equipment to pack the mixture, indicated that the material packed well. The WDGS that the producer used contained more moisture than what we used. This again illustrates the need to know the moisture content of the feeds used in the mixture.

Be flexible — you will know right away if the mixture is too wet or too dry. If it is too wet, the equipment will sink and the mixture will be difficult to drive on. If it is too dry, it will be "spongy." Either way, you will not get a good seal for the ensiling process.

In the bunker silo, our data indicated about a 3- to 4-in. layer of spoilage for the 35% grass hay, 65% WDGS combination on a DM basis. The DM content of the mixture was about 40%.

Our research indicated that a mixture of 50% WDGS and 50% dry distillers' grains with solubles (DDGS) on a DM basis was the optimal combination to bag. In addition, a mixture of 60% wet corn gluten feed (WCGF), 40% WDGS was optimal for bagging these two ingredients.

Table 1: WDGS[a] ingredient combinations[b] when stored in a silo bag or bunker silo

	Bag[c]	Bunker
Grass hay, %	15.0	30-40
Wheat straw, %	12.5	25-32
Alfalfa hay, %	22.5	45-55
DDGS, %	50	—
WCGF, $	60	—

[a]WDGS used was 35% dry matter, 65% moisture.

[b]Percentages are presented on a dry-matter basis.

[c]300 PSI.

Source: Adams et al., University of Nebraska.

Some ethanol plants produce a modified WDGS product that is 45%-50% DM. This product is dry enough to bag by itself.

Final thoughts

Because feed costs are the greatest portion of annual cow costs, some creative thinking may be needed to accumulate feeds when they are cheap for use at a later time in the production cycle. Usually, the longer the period of time throughout the year that the cow is harvesting her nutrient needs, the lower the feed costs. There are times in some management schemes where the grazed forage resource is limited and feed must be carried to the herd. A "bagged" or bunker-siloed WDGS-forage combination may fit your nutrition program.

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Editor's Note: *"Ridin' Herd" is a monthly column written by Rick Rasby, professor of animal science at the University of Nebraska. The column focuses on beef nutrition and its effects on performance and profitability.*