



Sorghum BMR silage made for dairy cattle

SORGHUM is a tropical grass grown primarily in semiarid and dry parts of the world, especially in areas that are too dry for corn. The diverse range of climates that sorghum can grow in, as well as the fact that it is heat and drought tolerant, makes it an important cereal crop. That's particularly true in dry regions of the world.

Nutrient composition of forages reported by a commercial laboratory from New York shows that the average content of starch in sorghum silage is less than that of corn silage (10 percent versus 32 percent of dry matter or DM, respectively). It also has greater fiber (neutral detergent fiber; 58 percent versus 44 percent of DM) and lignin content (5.4 percent versus 3.3 percent of DM). Altogether, sorghum silage has a lower energy content (net energy for lactation: 0.54 Mcal/pound versus 0.73 Mcal/pound of DM) than corn silage.

For this reason, it is difficult to meet the nutritional requirements of high-producing cows when feeding significant amounts of conventional sorghum silage in the diet.

Look to BMRs

However, forage sorghum hybrids with the brown midrib (BMR) gene have shown positive results in lactating cow diets. They are becoming popular in the U.S. because they feature the lower water requirement

of conventional sorghum compared to corn. Researchers from the University of Georgia analyzed the production response of lactating cows to diets based on corn or dwarf BMR sorghum silage harvested from two crops during two seasons.

In the first study (2015), corn was planted in March and harvested in July, and a second corn crop was planted in July and harvested in November. Dwarf BMR sorghum was planted in April, harvested in July, fertilized, and harvested a second time in November.

The fiber digestibility of sorghum BMR at 30 hours was similar to that of the summer corn silage crop (47 percent versus 46 percent of fiber). However, fiber was 9 percentage units lower in the sorghum crop chopped in fall (37 percent versus 46 percent). Average starch concentrations were 16 and 36 percent of DM in sorghum and corn silages, respectively. Diets formulated from the crops included 39 percent of DM of either corn or sorghum silage from first or second crop.

The results, published in the *Journal of Dairy Science*, showed no difference in cow performance between forages. Dry matter intake (49.7 pounds per day), milk production (74.4 pounds per day), protein yield (2.01 pounds per day), fat yield (2.42 pounds per day), and feed efficiency (1.43 pounds of energy-corrected-milk per pound of DM intake) were comparable by forage type. Moreover, there were no dif-

ferences in the production response between first and second crops.

Comparable to corn

The second study was published in *The Professional Animal Scientist* (2017). In this trial, corn was planted in April and harvested in July, and a second crop was planted in August and harvested in November. Forage sorghum was planted in April, harvested in July, allowed to ratoon, and harvested again in November.

In this case, sorghum silage fiber digestibility was similar to corn silage in both crops (51 versus 53 percent of fiber in summer and 53 versus 52 percent in fall).

Lactating cows were fed 42 percent of DM of corn or sorghum silage. Similarly, milking cows did not show a difference in production between forages. Forage type did not affect intake (53.1 pounds DM per day), milk production (78.8 pounds per day), energy-corrected milk (77.8 pounds per day), milk protein yield (2.05 pounds per day), and fat yield (2.42 pounds per day).

However, milkfat yield was lower on the second corn silage crop diet (1.12 pounds per day) compared with the other forages (1.29 pounds per day).

The results from the aforementioned studies have been corroborated in a meta-analysis presented at the 2017 American Dairy Science Association Annual Meeting held in Pittsburgh, Pa.

Using data from nine published

articles between 1984 and 2015 (13 comparisons; 204 cows), the researchers contrasted the production response of lactating cows fed corn silage or BMR sorghum silage. The analysis found no difference in intake, milk production, or milk component yield between forages.

However, compared to cows eating corn silage, cows fed BMR sorghum silage had higher milkfat and lower milk protein percentage by +0.1 and -0.06 units, respectively.

Must process the berry

Starch digestibility in sorghum grain is more resistant to microbial fermentation than corn. Sorghum grain is composed of 84 percent endosperm, half of which is flinty. The grain is characterized by smaller starch granules, tightly enveloped by a continuous protein matrix, composed of highly insoluble glutenin and prolamin. Therefore, special attention should be paid to kernel processing during the harvesting process.

Researchers from Kansas State University have developed the "Berry Processing Score (BPS)" for sorghum silage. The method is similar to the kernel processing score for corn silage but uses a 1.7 millimeter screen (instead of a 4.75 millimeter screen) to measure the percent of starch passing through.

In conclusion, silage from BMR sorghum can produce similar milk yields to corn silage as long as sorghum kernels are processed adequately. 🐄

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