

## WISCONSIN-Utility of Alfalfa Stemlage for Feeding Dairy Heifers

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**D**airy heifers are typically offered high-forage diets to control weight gains; however, forage-based diets often contain significant portions of corn silage or other high-quality forages with low fiber content. Inadequate dietary fiber can lead to greater feed and energy intakes, causing excessive weight gains (>1.8-2.2 lbs/day) and overconditioning, especially for pregnant heifers having higher potential intakes but relatively low energy needs. For farmers with confinement housing, and reduced weather and mud exposure, overconditioning can be further complicated by limited exercise. Excessive body condition (>3.5 on 5-point scale; ideal is 3-3.5) can lead to difficult calving and metabolic problems after calving. Typically, they will eat about 1% of bodyweight in neutral detergent fiber (NDF), so by increasing dietary NDF, you can reduce feed intake. This led to much research at the University of Wisconsin Marshfield Agricultural Research Station on using high-fiber, low-energy dilutant forages (e.g., wheat straw, eastern gamagrass, corn stover, tropical corn silage, forage sorghums) to increase fiber and lower energy content of diets to better control weight gain.

The project objective was to evaluate inclusion of alfalfa stemlage or wheat straw in pregnant dairy heifer diets, and to compare subsequent voluntary intakes and weight gains of those heifers consuming a control diet with no dilution. It was thought stemlage may help control intake and weight gains similar to straw, which previously was demonstrated. Alfalfa stemlage was produced by a novel leaf-stripping technology developed at the USDA Dairy Forage Research Center. The stripper removed a majority of alfalfa leaves to be used as high-quality feed for lactating cows or potentially as protein sources for other livestock (e.g., poultry, swine, fish) or for human use. Stems remaining in the field were cut, wilted overnight, baled into large square bales, and individually wrapped. Stemlage nutrient composition was 63% dry matter (DM), 11% protein, 65% NDF, and 40% total digestible nutrients (TDN). Stemlage diet had about 32% stemlage, 35% corn silage, and 33% haylage; straw diet had 31% straw, 30% corn silage, and 39% haylage; and control diet had 56% corn silage and 44% haylage. Diets had similar protein contents (12.8% CP), but stemlage and straw diets had 44-46% NDF and 59-61% TDN compared to 40% NDF and 67% TDN for the control. Each diet was fed to 3 pens of 8 pregnant dairy heifers (total - 9 pens, 72 heifers) for 56 days with intakes recorded daily and weights and body measurements taken at the beginning and end of the study.

Inclusion of stemlage or straw dilutant forage effectively reduced daily feed and energy intakes (average of 22.8 lbs DM and 13.9 lbs TDN) compared to control (24.9 lbs DM and 16.7 lbs TDN). NDF intakes were similar across the 3 diets at about 10 lbs/day with heifers eating approximately 0.9% of bodyweight in NDF each day. Lower energy intakes resulted in more desirable weight gains for heifers fed stemlage and straw (2.2 lbs/day) than heifers fed control (2.9 lbs/day). As a result, heifers fed the corn silage/haylage control diet gained more condition than heifers on diluted diets even within the short 56-day study. Digestibility of control and straw diets were greater compared to stemlage diet with heifers fed stemlage, excreting 11.8 lbs fecal DM (72 lbs wet feces) compared to about 9 lbs fecal DM (60 lbs wet feces) for both control and straw. Increased fecal amount may be problematic when feeding high-fiber, low-digestibility forages since some dairies have limited manure storage. Sorting against straw and stemlage was observed. Harvesting stems as chopped silage or as dry hay and then bale grinding would likely reduce sorting. Overall, alfalfa stemlage had similar positive results on performance as straw and can be a useful dilutant in heifer diets to control intake and growth.