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Chopped Sugar Beets as a Component of Beef Cow Diets

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Summary with Implications

Sugar beets not accepted for human consumption were evaluated as an energy source in a limit fed ration for confined beef cows. Initial and final body weight and body condition score were not different between wheat straw based diets containing wet distillers grains and either chopped sugar beets or corn. Body condition score change tended to be greater for the diet containing corn. However, cows on both treatments finished the study with a body condition score of 5.7. Chopped sugar beets mixed with wheat straw and stored in an agricultural bag underwent ensiling and did not result in choking issues. Sugar beets appear to be similar to corn and are an acceptable energy source for maintaining gestating beef cows.

Introduction

Sugar beets contribute $165 million to the local economy in the Nebraska Panhandle. There are approximately 300 western NE farmers who produce 1.3 million tons of sugar beets on about 50,000 acres. This results in 225,000 tons of crystallized sugar. Therefore having a strong sugar beet industry is important to Nebraska. Unfortunately, there are times when unfavorable fall and winter weather conditions result in decay of stockpiled sugar beets making them unacceptable for human consumption. Additionally, there are times the amount of sugar beets produced exceeds the contract for beets needed for sugar production. Both scenarios create a supply of sugar beets which will not be used for human consumption. Knowing how to incorporate rejected sugar beets into beef cattle diets can be beneficial to both the sugar beet producer and the beef producer as the sugar beet producer at least receives a salvage value for the beets and the beef producer may be able to buy an energy dense feed at a discounted price. Chopped sugar beets have a neutral detergent fiber (NDF) content of 15.4% as opposed to sugar beet pulp which has 45.4%. Therefore, the objective of this research was to evaluate chopped sugar beets as an energy source compared to corn in beef cow diets.

Procedure

Two months before the initiation of the experiment, the diet containing the sugar beets was mixed and stored in an agricultural bag. In yr 1, rotting chipped sugar beets were mixed with wet distillers grains and wheat straw prior to bagging. In yr 2, fresh chipped sugar beets were mixed with wheat straw only and stored in the bag. Wet distillers grains were added to that diet upon feeding. In April of each year, late gestation multiparous crossbred cows (n=40 in yr 1 and 36 in yr 2; initial BW = 1265 lb, SE=36 lb;) were used in a complete randomized design. Cows were randomly assigned to one of eight pens each year (4 or 5 cows/pen). The treatments were chopped sugar beets (BEETS) or corn (CORN) as an energy source in a total mixed ration (Table 1). Cows were limit fed (1.6% BW) either diet to supply 13 lb of TDN. Cows were limit fed 70:30 wheat straw and wet distillers grains at 2% body weight (BW) for 5 d prior to the initiation of the experiment and prior to collecting end BW and body condition score (BCS) to minimize gut fill effects. The experiment was terminated two weeks before calving and lasted an average 50 days. Initial and ending BW, BCS, and BCS change were determined.

Table 1. Diets for evaluating sugar beets for gestating beef cows

Ingredient, % DM	Sugar beet diet	Corn diet
Sugar beets	20	——
Corn	——	20
Wet distillers grains	20	20
Wheat straw	60	60

Results

In both years, the beet mixtures were sealed and stored 2–3 months before being fed and underwent ensiling during storage (Table 2). In both years beet pieces were small and soft after ensiling and did not result in choking issues. The rotting beets in 2015 had lower sugar content than the fresh chipped beets in 2016. A direct comparison of the two types of beets on cattle performance was not possible. However, there were no treatment by year interactions which suggests the feeding value of the rotting and fresh beets were similar. Initial and ending BW and BCS change were not different ($P > 0.50$) for CORN or BEETS. There was a tendency for BCS change to be greater for CORN than BEETS ($P = 0.08$) (Table 3).

These results suggest chopped sugar beets can be mixed with low quality forage or residue and a protein source, such as distillers grains and limit fed to gestating beef cows to maintain body condition.

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Table 2. Composition of sugar beets and ensiled sugar beet mixtures

Item	2015 Rotting sugar beet mix at bagging[1]	2015 Rotting sugar beet mix after ensiling	2016 Fresh sugar beet mix at bagging[1]	2016 Fresh sugar beet mix after ensiling	2015 Rotting sugar beets	2016 Fresh sugar beets
DM, %	43.9	47.2	33.0	40.4	31.2	25.5
Lactic Acid,%	1.34	0.81	0.17	2.45	2.16	0.00
Acetic Acid, %	0.96	5.02	0.19	1.96	2.61	0.09
L/A ratio	1.39	0.16	0.89	1.25	0.83	0.00
pH	4.8	4.2	6.8	4.1	4.3	6.6
Crude protein	10.8	12.4	4.8	5.8	4.6	4.5
WSC[2]	7.1	1.8	50.7	4.0	26.9	73.0
ESC[2]	6.1	1.3	49.0	2.9	22.7	69.5
NH_3-N	1.56	4.63	1.77	2.80	2.00	0.82

[1]Rotting sugar beet mixture was 20% sugar beets, 20% wet distillers grains, and 60% straw on a dry matter basis, fresh sugar beet mixture was 70% straw, 30% sugar beets on a dry matter basis. Wet distillers grains was added before feeding.
[2]WSC = water soluble carbohydrate, ESC=ether soluble carbohydrate

Table 3. Performance of cows limit fed diets containing sugar beets or corn

	Sugar beet diet[1]	Corn diet	SE	*P* value
Initial BW[2], lb	1261	1269	36	0.88
Final BW, lb	1341	1318	33	0.61
Initial BCS	5.4	5.2	0.16	0.50
Final BCS	5.7	5.7	0.14	0.71
BCS change	0.27	0.49	0.12	0.08

[1]Sugar beet diet was 20% sugar beets, 20% wet distillers grains, 60% wheat straw; corn diet was 20% corn, 20% wet distillers grains, 60% wheat straw
[2]BW=body weight, BCS = body condition score on a 1–9 scale