# Comparing SHREDLAGE® and Conventional Silage as a Roughage Component in Steam-Flaked Corn Diets for Finishing Cattle

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### Summary with Implications

*A study was conducted at the Panhandle Research and Extension Center feedlot evaluating SHREDLAGE® processed at 26.5 mm and 1 mm gap; by CLAAS, to conventional chopped corn silage at 13 mm with a standard CLAAS processor set to 1 mm, as a roughage source at two inclusions for cattle fed steam-flaked corn based finishing diets. Yearling steers (930 lb) were fed finishing diets containing 9 or 14% (dry matter basis) conventionally chopped corn silage or corn SHREDLAGE® in a 2 × 2 factorial treatment arrangement. Cattle fed rations containing SHREDLAGE had greater final body weight, hot carcass weight, average daily gain, and less dry matter intake, which resulted in better conversions (P < 0.05) than cattle fed conventionally chopped corn silage. Feed efficiency was improved when 9% silage was fed compared to 14% silage. Feeding SHREDLAGE and reducing the amount of roughage fed resulted in improved hot carcass weight, daily gain, and efficiency compared with feeding traditional silage at 14% inclusion. These results suggest shredding silage, resulting in larger particles, can improve performance at lower inclusions compared to traditionally chopped silage.*

### Introduction

Roughage is a necessary component in finishing diets for beef cattle as it helps maintain rumen function and reduces digestive upset. However, roughages are bulky, somewhat expensive for feedlots to acquire and store, and increase the volume in the feed truck, which increases the number of loads it takes to feed cattle thereby increasing the cost of feeding. Therefore, if the amount of roughage fed could be reduced without negatively impacting feedlot performance, efficiency of production could be improved.

Steam-flaking corn improves the utilization of the energy in corn, but can also make cattle more susceptible to digestive upset due to the rapid digestion of starch in the rumen compared to dry rolling corn. Larger particles of roughage might help alleviate rumen digestive disorders. Therefore, a study was conducted at the Panhandle Research and Extension Center feedlot evaluating SHREDLAGE at 26.5 mm and 1 mm gap SHREDLAGE processor, (CLAAS), to conventional chopped corn silage at 13 mm with a standard CLAAS processor set to 1 mm, as a roughage source at two inclusions for cattle fed steam-flaked corn based finishing diets.

### Procedure

The corn silages used in this study were produced at the Panhandle Research and Extension Center (PREC). The traditional silage as well as the SHREDLAGE® were harvested and stored in 7ft silage bags on September 9 and 10. All the corn silage material was harvested from the same flood irrigated field. The conventionally chopped material was harvested at a length of 13mm with a standard corn processor set at 1 mm gap. The shredded material was chopped at a length 26.5mm with the corn processor set at 1 mm gap. Silage was ensiled over 60 days prior to trial initiation. The dry matter of both silages averaged 35–37% for the duration of the trial.

Crossbred steers (n=288; initial body weight 930 lb) were utilized in a 128 d feeding trial to evaluate silage processed as SHREDLAGE® or traditional corn silage at 9% or 14% inclusion on a dry matter (DM) basis in steam-flaked corn diets (Table 1). Treatments were set up in a 2 × 2 factorial arrangement with processing method and silage inclusion as the factors. Cattle were vaccinated against respiratory and clostridial pathogens and treated for parasites prior to trial initiation. Cattle were implanted with Revalor 200 on day 23. At the conclusion of the trial, cattle were weighed on a pen scale and harvested at a commercial abattoir in Ft. Morgan, CO where hot carcass weight (HCW) and liver scores were collected on the day of slaughter and longissimus muscle area (LM), marbling score and back fat were recorded after a 48 hr chill. Final body weight (BW), average daily gain (ADG), and feed efficiency (F:G) were calculated based on HCW and a dressing of 63%.

Data were analyzed considering pen as the experimental unit. The model was a randomized complete block design. Cattle were blocked by weight and each block contained one replicate of treatments. Treatments were managed as a 2 × 2 factorial arrangement. This was done using the General Linear Model software of SAS. Liver damage was evaluated as frequency data using animal as the experimental unit (Chi Square test) as well as by transforming liver scores for pen mean tests analyzed using the same statistical methods applied to body weight tests.

### Results

There were no interactions so main effects are presented. Cattle fed rations containing SHREDLAGE had greater final BW, ADG, and less DMI, which resulted in lower F:G ($P < 0.05$) than cattle fed conventionally chopped corn silage (Table 2). Hot carcass weight was greater for the SHREDLAGE than the conventional corn silage ($P < 0.02$) while backfat, marbling, yield grade, and liver scores were not significant ($P > 0.20$).

There was a tendency for the 9% roughage inclusion to improve final BW ($P = 0.06$) and ADG ($P = 0.09$) while F:G was improved ($P = .04$) Dry matter intake was not different ($P > 0.20$). There was a tendency for hot carcass weight and marbling ($P > 0.07$) to be greater for the 9% inclusion level

**Table 1. Finishing diets for steers fed either SHREDLAGE® or traditional corn silage at 9 or 14% of diet dry matter**

| Ingredient, % DM | 14% corn silage or SHREDLAGE® | 9% corn silage or SHREDLAGE® |
|---|---|---|
| Corn silage | 14.0 | 9.0 |
| Steam Flaked Corn | 66.0 | 71.0 |
| WDGS | 15.0 | 15.0 |
| Supplement[a] | 5.0 | 5.0 |

[a] custom formulated suspension, formulated to supply 360 mg/hd monensin, and vitamins and minerals to meet or exceed NRC requirements for finishing steers.

**Table 2. Main effects for performance and carcass characteristics of steers fed conventional corn silage or SHREDLAGE at 9% or 14% dry matter.**

| | Chop Method | | *P* | Silage Level | | | |
|---|---|---|---|---|---|---|---|
| | Conventional | SHREDLAGE® | value | 14% | 9% | *P* value | SEM |
| Initial BW, lb | 926 | 930 | NS | 927 | 929 | NS | 2.7 |
| DMI | 22.42 | 22.10 | 0.02 | 22.32 | 22.21 | NS | 0.088 |
| F:G | 5.95 | 5.87 | NS | 5.94 | 5.88 | NS | 0.056 |
| Final BW[2] | 1408 | 1425 | 0.02 | 1409 | 1423 | 0.06 | 5.0 |
| ADG | 3.76 | 3.87 | 0.05 | 3.77 | 3.86 | 0.09 | 0.036 |
| F:G | 5.97 | 5.72 | 0.01 | 5.93 | 5.76 | 0.04 | 0.054 |
| HCW, lb | 887 | 898 | 0.02 | 888 | 897 | 0.06 | 3.1 |
| LM, in | 0.55 | 0.56 | NS | 0.54 | 0.56 | NS | 0.011 |
| Marbling[3] | 586 | 588 | NS | 578 | 597 | 0.07 | 6.8 |
| Yield Grade[4] | 3.19 | 3.11 | NS | 3.11 | 3.18 | NS | 0.053 |
| Liver Score[5] | 0.70 | 0.67 | NS | 0.67 | 0.70 | NS | 0.112 |
| Normal, % | 64 | 61 | | 65 | 61 | | |
| A, % | 13 | 15 | | 15 | 13 | | |
| A+, % | 23 | 24 | | 20 | 26 | | |

[1] $P > 0.2$ listed as NS

[2] Final BW = HCW/0.63

[3] 400 = Select$^0$; 500 = Small$^0$

[4] camera Yield Grade

[5] No abscess = 0; A = 1; A$^+$ = 2

**Table 3. Simple effects for cattle performance.**

| | Chopped Silage | | Shredded Silage | | |
|---|---|---|---|---|---|
| Carcass BW basis | 14% | 9% | 14% | 9% | SEM |
| Final BW, lb | 1399 [c] | 1416 [b,c] | 1419 [a,b] | 1431 [a] | 7.0 |
| ADG | 3.72 [c] | 3.80 [a,b] | 3.81 [a,b] | 3.92 [a] | 0.051 |
| DMI | 22.55 [b] | 22.29 [a,b] | 22.08 [a] | 22.12 [a] | 0.124 |
| F/G | 6.07 [c] | 5.87 [b,c] | 5.80 [a,b] | 5.65 [a] | 0.077 |
| HCW | 882 [c] | 892 [b,c] | 894 [a,b] | 901 [a] | 4.4 |

| Liver status | Frequency, % | | | |
|---|---|---|---|---|
| Normal | 69 | 60 | 61 | 62 |
| A | 14 | 12 | 16 | 14 |
| A+ | 17 | 28 | 23 | 24 |

[a, b, c] means lacking a common superscript differ ($P<0.05$)

(Table 2). Liver scores were not significantly different across treatments.

## Conclusion

These results suggest that a procedure that shreds silage, leaving larger particles, as opposed to conventional chopping results in improved performance over traditionally harvested corn silage. Including 9% silage improves feed efficiency and hot carcass weight compared to 14% silage.

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