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Silo-Best® for sorghum silages

K. Bolsen

H. Ilg

M. Hinds

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Abstract

Silo-Best lowered the ensiling temperature and increased the dry matter recovered from the silo by over 5 percentage units (82.3 vs. 77.3%). Calves fed the control silage gained faster and consumed more feed, but those fed treated silage were slightly more efficient. The more efficient gain and lowered shrink loss for Silo-Best silage gave 6.4 extra pounds of calf gain per ton of crop ensiled.

Keywords

Cattlemen's Day, 1984; Kansas Agricultural Experiment Station contribution; no. 84-300-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 448; Beef; Sorghum silage; Temperature; Dry matter

Silo-Best® for Sorghum Silages[1]

Keith Bolsen, Harvey Ilg, and Mark Hinds

Summary

Silo-Best lowered the ensiling temperature and increased the dry matter recovered from the silo by over 5 percentage units (82.3 vs. 77.2%). Calves fed the control silage gained faster and consumed more feed, but those fed treated silage were slightly more efficient. The more efficient gain and lowered shrink loss for Silo-Best silage gave 6.4 extra pounds of calf gain per ton of crop ensiled.

Experimental Procedures

Two whole-plant forage sorghum silages were compared: control (no additive) and Silo-Best applied at 1.0 lb per ton of fresh crop. The silages were made in 10 x 50 ft concrete stave silos on September 28 and 29, 1982 from Asgrow Titan R forage sorghum, harvested in the dough stage at 25 to 26% dry matter (DM). Ensiling temperatures were monitored for the first 42 days and nylon bags (6 per silo) were buried in each silo for additional observations of silage DM recoveries. The silos were opened on December 20 and 21.

Each silage was fed to 18 steer and heifer calves in three pens of six calves per silage. The calves were Hereford, Simmental, and Hereford x Angus and weighed 435 lb initially. The 94-day feeding trial began December 21, 1982 and ended March 25, 1983. Silages were full-fed and all calves received 2.0 lb of supplement daily. Rations were formulated to provide 12.5% crude protein (DM basis), 150 mg of monensin per calf daily, and equal amounts of calcium, phosphorus, and vitamin A.

All calves were weighed individually after 16 h without feed or water on 2 consecutive days at the start and again at the end of the trial. Intermediate weights were taken before the a.m. feeding on days 28 and 56.

Silage samples were taken twice weekly from each silo. Feed offered was recorded daily for each of the six pens and the quantity of silage fed was adjusted daily to assure that feed was always in the bunks. Feed not consumed was removed, weighed, and discarded every 7 days.

Three aerobic stability (bunk life) measurements were made on each silage as described on page 28 of this report.

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[1]Silo-Best contains Lactobacillus plantarum, L. acidophilus, and dried Streptococcus faecium and Pediococcus fermentation products and is produced by Cadco, Inc., Des Moines, IA 50308. Partial financial assistance was provided by Cadco.

Results and Discussion

Both the control and Silo-Best silages appeared to be well preserved. Chemical analyses are shown in Table 9.1. The DM content of the pre-ensiled forages and silages was rather low: 25.9 and 24.3% for the control; 25.2 and 23.8% for the Silo-Best. In the first 10 days to 2 weeks after filling, effluent flowed from both silos, but less effluent appeared to come from the treated silage.

Adjusted ensiling temperatures are shown in Figure 9.1. Both silages reached a maximum temperature of 14.5 F above initial forage temperature on day 6. However, Silo-Best silage returned to its initial temperature on day 31 post-ensiling; control silage was 10.0 F above its initial temperature on day 31 and was still above initial by 3.0 F on day 42. These data indicate that the treated silage lost less energy during fermentation.

Silage recovery and loss data are shown in Table 9.2. In the concrete stave silos, DM lost during fermentation, storage, and feedout was 27.2% less for the Silo-Best silage (15.1%) than for the control silage (20.8%). The data from the buried nylon bags gave similar results—treated bags had 9.3% less DM loss than control bags (10.1 vs. 11.2%). Results of four previous trials have shown consistent improvements in DM recovery for Silo-Best silages (see page 26 of this report).

Performance by calves fed the two forage sorghum silages is shown in Table 9.3. Throughout the 94-day trial calves fed control silage consumed more feed than those fed Silo-Best silage. Although calves fed treated silage gained slightly less than calves fed control silage, they had a 2.1% better feed conversion.

Also shown in Table 9.3 are calf gains per ton of forage sorghum ensiled. These data combine silage recovery (Table 9.2) and calf performance. Silo Best produced 6.4 extra pounds of calf gain per ton of crop ensiled. In three of four previous trials, gain produced per ton of whole-plant corn, sorghum, or high-moisture corn ensiled with Silo-Best was increased by an average of over 6.0 pounds when compared with control silages (Reports of Progress 377 and 413).

Aerobic stabilities of silage from the top, middle, and bottom thirds of each silo are shown in Table 9.4. Both silages were unstable near the top of the silos, heating after only 1 or 2 days of air exposure. However, silages from the middle and bottom thirds of each silo were extremely stable. No heating or deterioration occurred during 21 days of air exposure.

Table 9.1. Chemical Analyses for the Control and Silo-Best Silages Made in the Concrete Stave Silos.[1]

Item	Silage treatment	
	Control	Silo-Best
Dry matter:		
pre-ensiled, %	25.9	25.6
silage, %	24.3	23.7
	% of the DM	
Lactic acid	6.30	6.17
Acetic acid	4.56	5.80
Propionic acid	.52	.69
Butyric acid	.06	.01
Total fermentation acids	11.11	12.69
Crude protein	7.24	7.32
Hot water insoluble-nitrogen	.75	.74
pH	3.77	3.79
Ratio: lactic:acetic	2.07	1.14

[1] Each value is the mean of 13 samples taken during the feeding trial.

Table 9.2. Forage Sorghum Silage Recoveries and Losses From the Concrete Stave Silos and Buried Bags for the Control and Silo-Best Silages.

Item	DM recovery		DM lost during fermentation, storage, and feedout
	Feedable	Non-feedable (spoilage)	
	% of the DM ensiled		
Concrete stave silos			
Control	77.2	2.0	20.8
Silo-Best	82.3	2.6	15.1
Buried nylon bags[1]			
Control	88.8	—	11.2
Silo-Best	89.9	—	10.1

[1] Each value is the mean of six bags.

Table 9.3. Performance by Calves Fed the Control and Silo-Best Treated Sorghum Silages and Calf Gain Per Ton of Forage Sorghum Ensiled.

Item	Silage treatment	
	Control	Silo-Best
No. of calves	18	18
Avg. daily gain, lb	1.18	1.10
Daily feed intake, lb[1]		
silage	9.15	8.21
supplement	1.80	1.80
total	10.95[a]	10.01[b]
Feed/lb of gain, lb[1]	9.33	9.13
Silage fed, lb/ton[2]	1545	1646
Silage/lb of gain, lb[2]	25.83	24.88
Calf gain/ton of crop ensiled, lb[2]	59.8	66.2

[ab]$P<.05$.

[1]100% dry matter basis.

[2]All values are adjusted to the same silage DM content, 30 percent.

Table 9.4. Aerobic Stabilities of the Control and Silo-Best Forage Sorghum Silages.

Replication and silage	Days of initial temp. rise above ambient (64 F)	Maximum temp. (F)
Replication 1[a]		
Control	2.0	111
Silo-Best	<1.0	117
Replication 2[b]		
Control	*	*
Silo-Best	*	*
Replication 3[c]		
Control	*	*
Silo-Best	*	*

[a]Silage removed from the top one-third of the silos (January 4, 1983).

[b]Silage removed from the middle one-third of the silos (March 11, 1983).

[c]Silage removed from the bottom one-third of the silos (April 5, 1983).

*No rise in temperature or visible aerobic deterioration occurred during 21 days of air exposure.

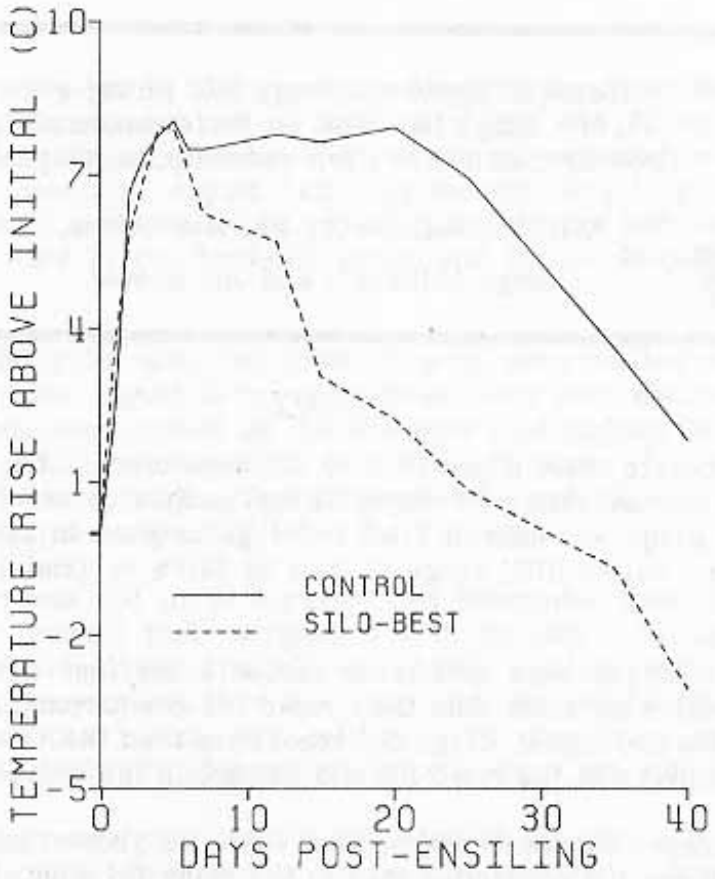

Figure 9.1. Adjusted ensiling temperature rise above the initial forage temperatures.