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Cold-flo, Sila-bac, and Silo-Best for corn silage

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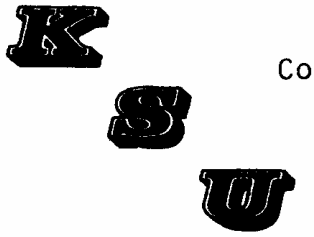
Abstract

Four corn silages (41 to 46% DM) were made August 23 to 26, 1978; treatments were: 1) no additive (control), 2) 8.16 lbs of Cold-flo ammonia per ton, 3) 1.0 lb of Sila-bac per ton, and 4) 1.0 lb of Silo-Best per ton. Silos were opened after 139 days and each was full-fed to 15 heifer calves (3 pens of 5 calves) during a 112-day trial (January 12 to May 4, 1979). The complete-mixed rations contained 88% silage and 12% supplement (Table 19.1). Control silage was supplemented with soybean meal for one group of heifers and urea for another group (urea supplying 33% of the total ration crude protein equivalent). The Cold-flo silage was fed with a milo supplement with no additional crude protein added. Sila-bac and Silo-Best silages were supplemented with soybean meal.

Keywords

Cattlemen's Day, 1980; Report of progress (Kansas State University. Agricultural Experiment Station); 377; Beef; Corn silage; Soybean meal



Cold-flo[R], Sila-bac[R], and Silo-Best for Corn Silage[1,2,3]

Keith Bolsen, Harvey Ilg, and Jack Riley

Experimental Procedure

Four corn silages (41 to 46% DM) were made August 23 to 26, 1978; treatments were: 1) no additive (control), 2) 8.16 lbs of Cold-flo ammonia per ton, 3) 1.0 lb of Sila-bac per ton, and 4) 1.0 lb of Silo-Best per ton. Silos were opened after 139 days and each was full-fed to 15 heifer calves (3 pens of 5 calves) during a 112-day trial (January 12 to May 4, 1979). The complete-mixed rations contained 88% silage and 12% supplement (Table 19.1). Control silage was supplemented with soybean meal for one group of heifers and urea for another group (urea supplying 33% of the total ration crude protein equivalent). The Cold-flo silage was fed with a milo supplement with no additional crude protein added. Sila-bac and Silo-Best silages were supplemented with soybean meal.

Results

Visual appraisal of the silages showed all were well preserved, and differences in chemical analyses (Table 19.2) were relatively small. Cold-flo silage had the highest pH (4.33) and lactic acid (6.39%), and acid detergent fiber-nitrogen was lowest for Sila-bac silage (7.6% of total nitrogen).

Feeding results are shown in Table 19.3. Heifers fed control corn silage + SBM or Sila-bac corn silage had similar performance. Those fed Silo-Best silage had the same daily gain as those fed control silage + SBM, but the latter consumed about 5% less silage. Cold-flo corn silage reduced gains 5% and efficiency 9% compared with control corn silage + SBM, but calves fed Cold-flo silage or control silage + urea had similar performance. Cold-flo silage averaged 11.1% crude protein, which indicates that only about 50% of the Cold-flo nitrogen applied to the fresh crop was in the silage when fed. The relatively high DM content (44%) of the fresh crop probably explains the relatively low recovery of Cold-flo nitrogen.

Each additive reduced fermentation DM losses approximately 3 percentage units (Table 19.4). Ensiling temperatures showed that Cold-flo sharply

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[1]Cold-flo[R] is a non-protein nitrogen product of USS Agri-Chemicals, Division of United States Steel, P.O. Box 1605, Atlanta, GA 30301.

[2]Sila-bac[R] is a lactobacillus inoculant product of Pioneer Hi-Breds International, Inc., Microbial Products Division, 3930 SW Macadams, Portland, OR 97201.

[3]Silo-Best is an enzyme product of Cadco, Inc., 10100 Douglas Ave., Des Moines, IA 50322.

lowered temperatures after day 2; Sila-bac kept temperatures 2 to 10°F below control after day 1; and Silo-Best silage had a lower maximum temperature than control silage (109.5 vs. 116 F), but average temperature of Silo-Best silage the first 35 days was slightly higher than the control silage temperature (Table 19.5).

Stability of the four corn silages when exposed to air on feedout is shown in Table 19.6. Sila-bac silage was more stable than control silage; Cold-flo and Silo-Best silages were not. Temperatures did not rise, and no spoilage was observed in either the control or Sila-bac silages the first 8 days; DM losses were still about 2.7 and 4.4% on days 3 and 8, respectively. Silo-Best silage had initial temperature rise on day 2 compared with day 7 for Cold-flo silage, but Cold-flo lost more DM at day 8 (13.31 vs. 10.38%) and day 17 (25.86 vs. 16.45%) than Silo-Best.

Table 19.1. Composition of supplements fed with the corn silages.

Ingredient	Corn silage		
	Control (SBM), Sila-bac and Silo-Best	Control (urea)	Cold-flo
	lbs. per ton		
Milo, rolled	147	1562	1650
Soybean meal	1690	---	156
Urea	---	238	---
Tallow	20	20	20
Salt	42	42	42
Dicalcium phosphate	77	120	112
Limestone	6	---	---
Trace minerals	5	5	5
Vitamin A[a]	3	3	3
Aureomycin[b]	10	10	10

[a]Added to supply 30,000 IU of vitamin A per heifer daily.

[b]Added to supply 70 mg of aureomycin per heifer daily.

Table 19.2. Chemical analyses of control, Cold-flo, Sila-bac, and Silo-Best corn silages.

Silage	Dry matter	pH	Crude protein	Lactic acid	Acetic acid	Propionic acid	Butyric acid	ADF-N[a]
	%		% of the DM					
Control	41.9	4.00	8.68	4.99	2.20	.11	.04	9.6
Cold-flo	44.1	4.33	11.08	6.39	2.11	.07	trace	8.5
Sila-bac	44.4	3.98	8.70	4.88	2.83	.13	trace	7.6
Silo-Best	46.0	4.12	8.73	4.63	1.96	.13	trace	9.9

[a]ADF-N means acid detergent fiber-nitrogen expressed as a percent of total nitrogen.

Table 19.3. Performances by heifer calves fed control, Cold-flo, Sila-bac, and Silo-Best corn silages.

Item	Corn silage				
	Control				
	+SBM	+urea	Cold-flo	Sila-bac	Silo-Best
Initial wt., lbs.	429	430	426	433	432
Avg. daily gain, lbs.	2.15	2.01	2.04	2.15	2.15
Avg. daily feed, lbs.[1]	15.60	16.51	16.20	15.91	16.44
Feed/lb. of gain, lbs.[1]	7.28[a]	8.21[d]	7.93[cd]	7.41[ab]	7.68[bc]

[1]100% dry matter basis.

[a,b,c,d]Values with different superscripts differ significantly ($P<.05$).

Table 19.4. Corn silage fermentation and spoilage losses.

Silage	DM put into the silo	DM taken out of the silo and fed	DM not fed (spoilage)	DM lost through fermentation
	lbs.	% of the DM put into the silo		
Control	57,100	88.7	2.8	8.5
Cold-flo	50,260	91.5	4.5	4.0
Sila-bac	51,500	91.7	3.3	5.0
Silo-Best	49,450	91.3	4.0	6.3

Table 19.5. Ensiling temperatures for the four corn silages.[a]

Days post-ensiling	Control	Cold-flo	Adv.[1]	Sila-bac	Adv.[2]	Silo-Best	Adv.[3]
				°F			
1	106	107	-1	110	-4	109.5	-3.5
2	116	110.5	+5.5	106	+10	108	+8
3	113	106	+7	106	+7	109	+4
4	113	99	+14	105	+8	108.5	+4.5
5	110	86.5	+23.5	104.5	+5.5	108	+2
6	105	85	+20	104	+1	108	-3
8	104	83	+21	101	+3	105	-1
14	102	87	+15	99	+3	103	-1
17	101.5	84	+17.5	98.5	+3	103	-1.5
20	101	84	+17	97.5	+3.5	102.5	-1.5
24	100	76	+24	94.5	+5.5	100.5	-0.5
30	97	70	+27	93.5	+3.5	100	-3
35	95	71	+24	91.5	+3.5	96	-1

[a]Each value is the mean of six thermocouple readings.
[1,2,3]Advantage for additive over control (control minus additive).

Table 19.6. Changes in temperature and losses of dry matter during air exposure by corn silages.

Silage	Day of initial rise above ambient temp.*	Maximum temp, °F	Accumulated temp. above ambient, °F			Loss of DM, %			
			day 8	day 11	day 17	day 3	day 8	day 11	day 17
Control	9	93	**	54.8	212.3	2.9	4.3	9.1	21.0
Cold-flo	7	125	25.0	166.3	332.3	2.5	11.2	13.3	25.9
Sila-bac	15	85	**	**	55.0	2.6	4.5	4.5	9.6
Silo-Best	2	117	140.6	197.3	307.3	5.8	9.4	10.4	16.5

*A 3°F rise or more.
**No rise in temperature.