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Silo-Guard for forage sorghum silage

Abstract

Two forage sorghum silages (29 to 30% DM) were made October 1 to 3, 1978; one ensiled without additive (control), the other with 1.5 lbs. of Silo-Guard added per ton of fresh crop. Silos were opened after 36 days, and each was full-fed to 15 yearling steers (3 pens of 5 steers) during a 90-day trial (November 9, 1978, to February 7, 1979). Rations contained 84% silage and 16% soybean meal supplement on a DM basis.

Keywords

Cattlemen's Day, 1980; Report of progress (Kansas State University. Agricultural Experiment Station); 377; Beef; Silo-Guard; Sorghum silage

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K**S****U**Silo-Guard for Forage Sorghum Silage¹

Keith Bolsen and Harvey Ilg

Experimental Procedure

Two forage sorghum silages (29 to 30% DM) were made October 1 to 3, 1978; one ensiled without additive (control), the other with 1.5 lbs. of Silo-Guard added per ton of fresh crop. Silos were opened after 36 days, and each was full-fed to 15 yearling steers (3 pens of 5 steers) during a 90-day trial (November 9, 1978, to February 7, 1979). Rations contained 84% silage and 16% soybean meal supplement on a DM basis.

Results

Visual appraisal indicated that both silages were well preserved, and chemical analyses (Table 17.1) showed similar compositions.

Feeding results are shown in Table 17.2. Rate and efficiency of gain were slightly better for the Silo-Guard forage sorghum silage, but these differences were not statistically significant. The unusually high feed-to-gain ratios were the result of severe winter weather during the last 40 days of the feeding period. Feed-to-gain ratios were approximately 8.3:1 for both silages the first 42 days of the trial.

Silage DM fermentation loss was 8 percentage units higher for the control compared to Silo-Guard (13.3 vs. 5.3% of the DM put into the silo) (Table 17.3). Ensiling temperatures are shown in Table 17.4. Temperature of the Silo-Guard silage averaged 6.0°F cooler (83.5 vs. 89.5 F) than the control silage the first 6 days. Silo-Guard silage had a 3-day advantage in stability when exposed to air on feedout (Table 17.5). Although both forage sorghum silages were relatively stable in air (no heating or molding the first 4 days), the control silage began heating on day 5 compared with day 8 for Silo-Guard silage, and the control lost nearly four times more DM after 6 days (16.0 vs. 4.45%).

Table 17.1. Chemical analyses of control and Silo-Guard forage sorghum silages.

| Silage | Dry matter | pH | Crude protein | Lactic acid | Acetic acid | Propionic acid | Butyric acid | ADF-N ^a |
|------------|------------|------|---------------|-------------|-------------|----------------|--------------|--------------------|
| | % | | | | | | | |
| Control | 29.0 | 3.65 | 6.3 | 4.69 | 2.35 | .09 | .05 | 29.0 |
| Silo-Guard | 29.8 | 3.69 | 6.6 | 4.49 | 2.06 | .16 | .01 | 22.9 |

^aADF-N means acid detergent fiber-nitrogen expressed as a percent of total nitrogen.

¹Silo-Guard is an enzyme (and its co-factors) product of International Stock Food, Inc., P.O. Box 29, Waverly, NY 14892.

Table 17.2. Performances by yearling steers fed control and Silo-Guard forage sorghum silages.

| Item | Forage sorghum silage | |
|-------------------------------------|-----------------------|------------|
| | Control | Silo-Guard |
| Initial wt., lbs. | 735 | 731 |
| Avg. daily gain, lbs. | 1.44 | 1.50 |
| Avg. daily feed, lbs. ^a | 20.40 | 20.33 |
| Feed/lb. of gain, lbs. ^a | 14.18 | 13.65 |

^a100% dry matter basis.

Table 17.3. Forage sorghum 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 | 40,000 | 84.1 | 2.6 | 13.3 |
| Silo-Guard | 40,800 | 92.0 | 2.7 | 5.3 |

Table 17.4. Changes in temperature and losses of dry matter during air exposure by forage sorghum silages.

| Silage | Day of initial rise above ambient temp.* | Maximum temp, °F | Accumulated temp. above ambient, °F | | | Loss of DM, % | | |
|------------|--|------------------|-------------------------------------|-------|-------|---------------|-------|-------|
| | | | day 3 | day 6 | day 9 | day 3 | day 6 | day 9 |
| Control | 5 | 89 | ** | 35.1 | 82.6 | 5.4 | 16.0 | 20.0 |
| Silo-Guard | 8 | 98 | ** | ** | 50.0 | 4.5 | 4.5 | 13.1 |

*A 3°F rise or more.

**No rise in temperature.

Table 17.5. Ensiling temperatures for control and Silo-Guard sorghum silages.^a

| Days post-ensiling | Control | Silo-Guard | Adv. ^b |
|--------------------|---------|------------|-------------------|
| | | | |
| 1 | 83 | 80 | +3 |
| 2 | 88 | 82.5 | +5.5 |
| 3 | 91 | 86 | +5 |
| 4 | 91.5 | 85 | +6.5 |
| 6 | 92 | 84 | +8 |
| 8 | 93 | 83.5 | +9.5 |
| 11 | 89 | 82.5 | +6.5 |
| 17 | 88 | 83 | +5 |
| 20 | 86 | 82.5 | +3.5 |
| 23 | 85.5 | 82 | +3.5 |
| 30 | 84 | 81.5 | +2.5 |
| 35 | 83.5 | 80 | +3.5 |

^aEach value is the mean of six thermocouple readings.

^bAdvantage for additive over control (control minus additive).