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Silage additives

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Silage additives

Abstract

Six commercial silage additives were evaluated in five trials with corn, forage sorghum, and alfalfa. In general, each additive improved the silage in at least one of four criteria we used for the comparisons: ensiling temperature, silage dry matter (DM) loss during fermentation, cattle performance, and silage stability in air. The additives lowered ensiling temperatures during the first week by about 5F (range, 2.7 to 9.9F). Additives consistently reduced DM lost during fermentation. Loss from five control silages averaged 10.0% compared with 4.7% from nine silages with additives. No silage additive significantly affected rate of gain or silage intake in the four trials with growing cattle. In three of six comparisons, additives increased feed efficiency slightly; but in the other three, additives decreased feed efficiency slightly. In five comparisons, additives increased aerobic stability of silages on feedout, but again in the other five, additives decreased silage aerobic stability on feedout.

Keywords

Cattlemen's Day, 1980; Report of progress (Kansas State University. Agricultural Experiment Station); 377; Beef; Silage additives; Fermentation; Dry matter

Silage Additives[1]

Keith Bolsen and Harvey Ilg

Summary

Six commercial silage additives were evaluated in five trials with corn, forage sorghum, and alfalfa. In general, each additive improved the silage in at least one of four criteria we used for the comparisons: ensiling temperature, silage dry matter (DM) loss during fermentation, cattle performance, and silage stability in air.

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No silage additive significantly affected rate of gain or silage intake in the four trials with growing cattle. In three of six comparisons, additives increased feed efficiency slightly; but in the other three, additives decreased feed efficiency slightly.

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Introduction

Most crops grown in Kansas can be harvested and stored as silage, and good silage fermentation should produce a well-preserved, palatable feed with a minimum loss of nutrients. However, conditions for making silage are not always ideal (i.e., changing weather, equipment breakdown, crops too wet and immature or crops too dry and mature). What can be done to reduce such risks when making silage?

Are commercial silage additives that have appeared on the market the last few years beneficial to silage? Do they lower ensiling temperatures and conserve more of the nutrients in the crop (particularly energy and protein)? Do they produce a more palatable silage with higher feeding value? Do they make silage more resistant to aerobic spoilage when it's being fed? And, finally, do an additive's benefits offset its cost?

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[1]Mention of products and companies is made with the understanding that no discrimination or endorsement is intended. Also, no criticism is implied of products and companies not mentioned.

Our objective in the five reports that follow was to evaluate several commercial silage additives for three common silage crops in Kansas: corn, forage sorghum, and alfalfa.

Experimental Procedures

Many of the procedures were the same in the five trials. Silages were made in 10-ft x 50-ft concrete stave silos from crops obtained at a single source. Harvests were with a Field Queen forage harvester equipped with a 2-inch recutter bar for corn and sorghum and a "haylage" bar for alfalfa. Corn and sorghum were direct-cut, but alfalfa was swathed with a mower-conditioner and field-wilted for approximately 24 hours. Each load of fresh crop was weighed, sampled, and had additives applied at the silo blower. In trials 2 to 5, thermocouple wires were embedded in the silages at uniform spacing, and ensiling temperatures were recorded for 4 to 6 weeks.

Silages were full-fed in rations that were formulated to contain equal amounts of crude protein, minerals, vitamin A, and aureomycin. Ration consumption was recorded daily with feedbunks cleaned periodically (usually every 7 days), so the silage not consumed could be weighed.

All cattle were fed a standard ration of alfalfa and/or prairie hay and grain at a dry matter intake equal to 1.5 to 2.0 percent of body weight for 5 to 7 days before each trial began, and all were weighed individually after 16 hours without feed or water at the start and end of the trials.

During the trials, silage samples were taken weekly from each silo and DM determined. Additional analyses included: proximate, Van Soest, pH, fermentation acids, hot-water insoluble nitrogen, and ammonia nitrogen.

In trials 2 to 5, approximately 50 lbs of fresh silage was obtained from the center of each silo and divided into eight equal lots of 4.4 lbs. Each lot was placed in an expanded polystyrene container lined with plastic, a thermocouple wire was inserted in the center of the silage, and cheesecloth was stretched across the top of the containers, which were stored at 62 to 65 F. Silage temperature was recorded twice daily. At various days after exposure to air, duplicate containers of each silage were weighed, mixed, sampled, and dry matter loss was determined.