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Silage additive update: 1985

Abstract

Silage additives are receiving fairly widespread acceptance in the U.S. as management tools that are important for silage-making. Many products, which are added to the crop at the time of harvest or ensiling, are available commercially in Kansas. Some manufacturers/distributors make no claims for their products, primarily because management is such an important factor in making a good quality silage. Others claim their product will improve silage quality. When a claim is made, it is wise to check for evidence that the product has a favorable effect on the silage crop in question. Farm-scale silo trials at Kansas State University have shown that a few silage additives repeatedly reduced "in silo" losses. But results will probably not be favorable with all additives under every farm condition. Therefore, results obtained with a commercial product in our trials may not apply to other products on the market, however similar in ingredient formulation.; Dairy Day, 1985, Kansas State University, Manhattan, KS, 1985;

Keywords

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SILAGE ADDITIVE UPDATE: 1985

K.K. Bolsen and J.D. Hoover

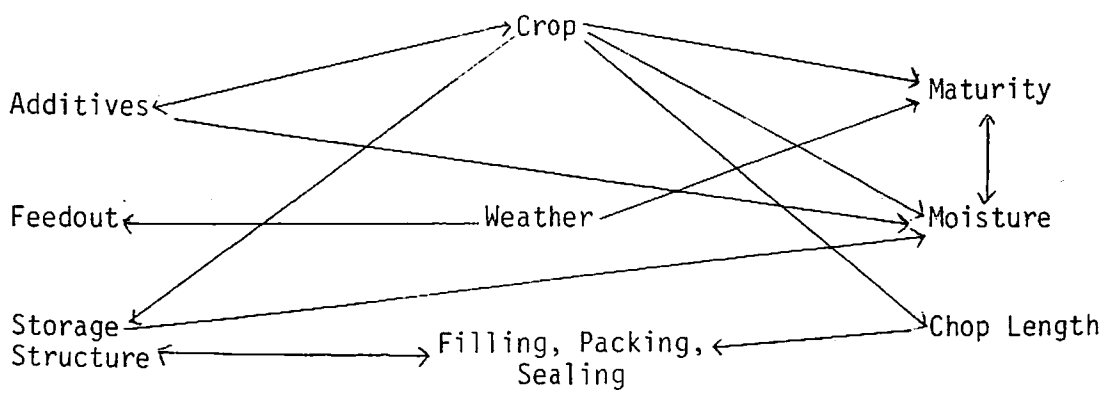
Summary

Silage additives are receiving fairly widespread acceptance in the U.S. as management tools that are important for silage-making. Many products, which are added to the crop at the time of harvest or ensiling, are available commercially in Kansas. Some manufacturers/distributors make no claims for their products, primarily because management is such an important factor in making a good quality silage. Others claim their product will improve silage quality. When a claim is made, it is wise to check for evidence that the product has a favorable effect on the silage crop in question. Farm-scale silo trials at Kansas State University have shown that a few silage additives repeatedly reduced "in silo" losses. But results will probably not be favorable with all additives under every farm condition. Therefore, results obtained with a commercial product in our trials may not apply to other products on the market, however similar in ingredient formulation.

Introduction

With few exceptions, a satisfactory silage can be made from most crops grown in Kansas. However, to consistently make high quality silage, the silage-maker must pay attention to details, apply sound management, and understand the importance of the main factors that affect the quality.

Figure 1. Factors that affect silage quality.



CROP. The ideal crop should offer the greatest economic advantage with the most nutrients per acre. It should have adequate fermentable carbohydrates, a low buffering capacity; a physical structure suitable for compacting (to exclude oxygen), and a harvest period of several days.

MATURITY. Harvesting at the optimum stage of maturity is often a compromise between increasing yield and decreasing quality as the crop matures. The following harvesting guidelines are most common:

Alfalfa	late bud to 1/10 bloom
Corn	fully dented kernels
Sorghum	hard-dough kernels
Winter cereals ...	Boot stage for maximum protein content, or soft-dough stage for maximum tonnage and TDN yields.

MOISTURE. This is probably the most important factor affecting silage quality. The optimum level for most crops lies between 60 and 70% moisture. However, the level varies with the crop. If silage is made below 55 to 60% in conventional silos, it is difficult to pack well enough to eliminate air for proper fermentation. Above 70%, high fermentation losses, seepage and reduced animal performance occur.

CHOP LENGTH. Theoretically, 1/4 to 1/2-inch length is recommended, but fineness varies with the crop, power requirement, tonnage per hour, etc.

FILLING, PACKING, SEALING. The crop should be harvested and the silo filled, packed, and sealed in the shortest possible time.

STORAGE STRUCTURE. A solid, well-constructed, properly managed silo is essential if storage losses are to be kept to a minimum.

FEEDOUT. In practice, the rate of silage removal from the face and progress through the silo must be fast enough to prevent deterioration and heating.

WEATHER. This uncontrollable factor interacts with most of the other factors. It can delay harvest and prevent crops from being ensiled at their optimum maturity, can lengthen wilting time, or may cause over-wilting.

ADDITIVES. Silage additives are designed to improve the job of silage-making. They can be classified into 5 main categories: 1) Fermentation products, 2) Cereal by-products and other energy and nitrogen containing ingredients, 3) Organic chemicals, 4) Inorganic chemicals, and 5) Other.

Silage Additive Results

Many questions arise when assessing an additive. The most important assessment of a product is its efficacy and the best way for dairy farmers to determine this is to compare in-silo losses and pounds of milk produced per ton of crop ensiled. Five criteria are essential when treated and untreated silages are evaluated: 1) Does the additive lower the ensiling temperature? 2) Does it increase

dry matter and nutrient recovery from the silo? 3) Does it increase aerobic stability? 4) Does it improve feed value and animal performance? and finally 5) Does the improvement offset costs and give a return on investment?

Results of research conducted from 1975 to 1983 at Kansas State University with several fermentation and nitrogen additives were presented in 1984 Cattlemen's Day Report of Progress 448.

For more details on silage additives, see K.K. Bolsen and J.I. Heidker. 1985. Silage Additives USA. A Guide to Products Available in the United States. Chalcombe Publications. P.O. Box 1222. Manhattan, Kansas 66502.