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Storage losses in net-wrapped, large, round bales of alfalfa hay

Abstract

Net- and twine-wrapped alfalfa hay bales were stored from July, 1990 to April, 1991 in three Kansas counties (Reno, Saline, and Stafford). Dry matter losses and changes in acid detergent fiber and acid detergent insoluble nitrogen levels during storage were not significantly different between net- and twine-wrapped bales. Although a significant difference in dry matter recovery between inside and outside bale storage occurred in Saline County, it was not considered important because all recoveries were high. No significant differences in ADF or ADIN increases were found between initial core samples and samples from the outer 4 in. of the bales at the end of storage. The minimal deterioration and weathering were probably due to below average rainfall (less than 14 in.) during the 9- mon. storage period. Net wrapping is probably not justified on the basis of reducing storage losses in low rainfall areas.

Keywords

Cattlemen's Day, 1993; Kansas Agricultural Experiment Station contribution; no. 93-318-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 678; Beef; Alfalfa; Hay; Round bales; Storage

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STORAGE LOSSES IN NET-WRAPPED, LARGE, ROUND BALES OF ALFALFA HAY[1,2]

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Summary

Net- and twine-wrapped alfalfa hay bales were stored from July, 1990 to April, 1991 in three Kansas counties (Reno, Saline, and Stafford). Dry matter losses and changes in acid detergent fiber and acid detergent insoluble nitrogen levels during storage were not significantly different between net- and twine-wrapped bales. Although a significant difference in dry matter recovery between inside and outside bale storage occurred in Saline County, it was not considered important because all recoveries were high. No significant differences in ADF or ADIN increases were found between initial core samples and samples from the outer 4 in. of the bales at the end of storage. The minimal deterioration and weathering were probably due to below average rainfall (less than 14 in.) during the 9-mon. storage period. Net wrapping is probably not justified on the basis of reducing storage losses in low rainfall areas.

(Key Words: Alfalfa, Hay, Round Bales, Storage.)

Introduction

Large round bales are a popular hay packaging system because of high capacities, and the fact that they can be handled by one person. Because bales are typically stored outside, the cost of owning a storage structure is eliminated. However, round bales are not easily stacked, so long distance transportation and inside storage are not as efficient as with square bales.

Net or mesh wrapping of large round bales is becoming a popular alternative to twine tying. It takes less time to apply, so baler capacity is increased. In addition, net-wrapped bales appear better contained with a smoother exterior, which should improve transportability and minimize rainfall penetration. Our objective was to determine the effects of net wrap and plastic twine on preservation of quality of large round bales of alfalfa hay during storage.

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of each wrapping material were stored either inside or outside. Inside storage was not available in Stafford County, so bales were placed on pallets and covered with a plastic tarp. Each bale was weighed and core sampled before storage. Bales stored outside were stacked tightly, end-to-end in north-south rows in a well drained area with approximately 6 ft between rows.

Bales were removed from storage in April, 1991 and were weighed and core sampled. In addition, all bales stored outside were sampled to a depth of 4 in. from the surface on the sides and top.

Results and Discussion

The precipitation in all three counties was below average for the storage period. Table 1 lists the DM recovery, average initial moisture content, and initial and final ADF and ADIN levels. There were no significant differences in DM recovery among wrapping treatments for individual counties. A statistical difference between storage method was found in Saline County ($P < .05$). However, it was of little practical significance, because all DM recoveries were high.

Although no interaction or significant differences in ADF changes were found among treatments ($P > .05$), ADF increases were generally greater for twine-wrapped bales stored outside than their net-wrapped counterparts. No interactions or significant differences among treatments were found for ADIN changes.

The bales stored outside were also compared based on samples taken from the outer 4 inches. No significant differences in ADF or ADIN were found between wrapping materials in any county. No significant differences were found in ADIN levels between wrapping materials.

Table 1. Dry Matter Recovery, Initial Moisture Content, and Chemical Composition of the Alfalfa Stored in Each County

					ADF			ADIN		
county	Bale wrap	Storage	DM recovery[a]	Initial moisture, %	initial core	final core	final 4 in.	initial core	final core	final 4 in.
					% of the hay DM					
Reno	Net	Inside	95.8	21.4	37.7	37.5		1.35	1.58	
		Outside	95.4	21.6	35.6	36.3	39.1	1.31	1.57	1.37
	Twine	Inside	94.7	19.6	37.6	39.1		1.16	1.43	
		Outside	96.9	20.5	37.7	39.4	39.9	1.21	1.88	1.58
Saline	Net	Inside	99.9	9.6	30.6	32.3		.89	1.21	
		Outside	97.9	9.6	34.4	35.0	37.0	1.03	1.28	1.35
	Twine	Inside	99.8	8.8	32.6	34.0		.98	1.05	
		Outside	97.6	8.5	32.1	33.7	36.4	1.03	1.18	1.31
Stafford	Net	Inside	99.2	11.9	28.7	30.7		.77	.77	
		Outside	98.3	11.4	30.0	32.0	33.5	30	1.24	1.06
	Twine	Inside	98.9	12.3	26.1	27.0		.70	.68	
		Outside	99.2	12.7	27.3	29.8	30.7	.81	.92	1.10

[a]As a % of the initial hale wt (DM basis).