

A COMPARISON OF PRESERVATION METHODS OF ROUGHAGES FROM GRASSLAND IN POLAND

J. Zastawny, B. Paluch, H. Jankowska-Huflejt

Institute for Land Reclamation and Grassland Farming at Falenty, 05-090 Raszyn near Warsaw, Poland.

ABSTRACT

The objective of this study was to determine whether the preservation method has an influence on the nutritive value of roughages obtained from grasslands. The silage made in clamps and in big cylindrical bales were compared. During chemical studies, dry matter, crude protein, crude fiber, crude ash, nitrogen free extracts and fat level were determined. The digestible energy of each feed was calculated. The content of particular acids (lactic, acetic and butyric) in the mass of silage was determined. The silages were tested by feeding to ruminants. The obtained results show that the quality of both silages was good. The difference in the nutritive value between the two silages was not significant.

KEYWORDS

Silage, big bale, clamp, losses, nutritive value, ruminants.

INTRODUCTION

The roughages obtained from the grasslands in Poland are for the most part harvested and preserved as a hay dried on the surface of the meadow. The losses of the nutritive components may reach 50% (Zastawny, 1993). Possibility to improve the feed quality exists through ensiling prewilted sward called haylages. One of the newest methods of preservation in Poland is ensiling in big cylindrical bales. The purpose of this study was to determine whether ensiling prewilted sward according to two different technologies gives feed of different quality.

METHODS

During the years 1993-1995, the studies were conducted on the nutritive value of silage obtained from grasslands. The experiment was carried out at Falenty near Warsaw in an Experimental Plot on a 9 ha meadow. The silage was made according to two methods: in clamps and in big cylindrical bales (about 400 kg). The green material after cutting was pre-wilted on the surface of meadow and was taken for ensiling when a dry matter concentration was approximately 40%. Usually by sunny wether it was on the second day after cutting. Every big bale was wrapped separately in plastic film and stored on the ground of farm. The feeds were taken for feeding in November.

During the feed experiment the silages were sampled and analysed for dry matter content, pH, volatile fatty acids: lactic, acetic and butyric. Their value was presented in scores according to the Flieg-Zimmer scale (Zimmer, 1966). The chemical composition of feed samples was determined and the net energy lactation (NEL) was calculated using digestible coefficient by Borman (1955). They were analysed for: dry matter content (DM), crude protein, crude fiber, crude ash, nitrogen-free extracts and fat level in relation to absolute dry matter.

During 100 days of feeding experiment, the heifers were fed respective silages to appetite. The daily feed intake and refusals were recorded. Liveweight measurements were taken at the beginning, in the middle and at the end of the study.

RESULTS AND DISCUSSION

Chemical analyses. The results of chemical analyses of the silages are shown in Table 1. The mean dry matter content of the silage from clamp and from big bales was 477.4 and 474.5 g kg⁻¹, respectively. The green material contained 182.0 g kg⁻¹ crude protein

and 281.1 g kg⁻¹ crude fiber. Both silages had similar crude protein and crude fiber contents as green material. The digestible energy value of feeds varied between 6.2582 MJ kg⁻¹ abs. DM for silage from clamp and 6.2767 MJ kg⁻¹ abs. DM for silage from big bales. The value of silages presented in scores acc. to Flieg-Zimmer scale was good. Both silages had 70 scores. No butyric acid was found in any feed. pH value in silage from clamp was 5.05 and from big bale - 5.22.

Feed experiment. Both silages were preserved well and readily eaten by heifers. The daily feed intakes (kg head⁻¹ DM) are shown in Table 2. The overall live weight gains on the two treatments were not significantly different (0.608 and 0.551 kg d⁻¹) for silage from big bales and for silage from clamp.

CONCLUSIONS

The obtained results show that the quality of both silages is good. No important in-silo losses were observed. Both feeds had a high, similar nutritive value. The overall live weight gains on the two treatments were not significantly different.

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Table 1Chemical composition (g kg⁻¹ DM) of feeds and fermentation parameters of the ensiled material.

Examined parameters	green material	silage from clamp	silage from bales	LSD $\alpha = 0,05$
Dry matter,	245.9	477.4	474.5	-
Crude protein,	182.0	182.6	177.0	-
Crude fiber,	281.1	26.81	267.5	-
Crude ash,	95.9	108.1	103.3	-
Crude fat,	33.8	25.1	20.0	-
Nitrogen-free extracts	407.1	416.2	424.7	-
Net energy lactation, MJ kg ⁻¹ DM	6.3691	6.2582	6.2767	-
Volatile acids in crude mass of silage (%)				
lactic	-	59.16	58.80	4.10
acetic	-	40.84	41.20	4.10
butyric	-	0.00	0.00	0.00
pH	-	5.05	5.22	0.22
Scores	-	70	70	7.81
Evaluation acc. to Flieg-Zimmer scale	-	good	good	-

Table 2Feed intakes (kg head⁻¹ DM) and mean daily gains in body weight of fattened cattle (kg d⁻¹).

Feed	Feed intake	Daily gains
Silage from clamp	6.25	0.551
Silage from big bales	6.19	0.608
LSD $\alpha = 0,05$	0.56	0.080