

Silage production under organic farming principles in a mountainous region

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Introduction

In Switzerland the proportion of farms cultivated according to organic farming principles is increasing. In previous years, it has mainly been farmers in the grassland regions who have changed their farming system. This is also a result of the new agricultural policy. On the other hand more and more forage is ensiled for winter feeding in the mountainous regions, whereas hay production is decreasing. Silage production has become increasingly popular, especially with the big bale technique.

In a mountainous region in the canton of Graubünden serious problems with milk quality have occurred. The poor silage quality was thought to be responsible for the poor milk quality and therefore, the silage quality was investigated and advice was given concerning silage production.

Materials and methods

From 1997 to 1999, in about 30 organic farms in a valley in the canton of Graubünden (1200 – 1700 m above sea level), silage samples were taken during the winter. Fermentation parameters (pH, acids, ethanol and ammonia) were analysed as well as nutrient content. According to the Swiss guidelines the silage was classified into three categories: good, defective and poor. The butyric acid content being the most important factor. Good quality silage had less than 5 g butyric acid per kg DM. Silage of defective quality had between 5 and 20 g and silage of poor quality had more than 20 g butyric acid.

In spring 1998 and 1999 the farmers and contractors who produced the big bales were informed about the results and for the new season we recommended the use of silage additives.

Results and discussion

The DM-content and the nutrient contents of the silage varied greatly between the different farms over the three years (Table 1). In 1999 the conditions for pre-wilting were not as good and some silages had relatively high ash content. The average crude protein content was similar over the three years. On the other hand the crude fibre content decreased slightly. One problem being that some farmers ensiled relatively old forage.

Large differences in the silage quality were found between the three years. In 1997 only 36% of the silage was classified as good and 12% as poor. According to the Swiss guidelines farmers are not allowed to feed dairy cows silage of poor quality. In 1998 and especially in 1999, in spite of bad conditions for ensiling in the summer 1999, the quality of silage was improved, 59 and 74% of the silage was of good quality, respectively. Consequently the proportion of silage of defective and poor quality was reduced. In these two years about 2/3 of the silage was treated with silage additives (inoculants).

Table 1. DM-content, nutrient contents and silage quality

		1997 (n = 33)		1998 (n = 27)		1999 (n = 27)	
		Mean	s.d.	Mean	s.d.	Mean	s.d.
Dry matter		33.8	8.0	41.8	13.9	35.9	9.8
Ash	g/kg DM	109	19	104	16	129	27
Crude protein	g/kg DM	146	26	148	24	149	15
Crude fibre	g/kg DM	264	44	253	44	249	38
Silage quality							
- proportion of good quality	%	36.4		59.3		74.1	
- proportion of defective quality	%	51.5		33.3		22.2	
- proportion of poor quality	%	12.1		7.4		3.7	

Conclusions

The results of this investigation show that the application of good techniques is necessary and that with the use of effective silage additives the silage quality can be improved.