

The influence of the application of a biological additive on the fermentation process of red clover silage

E. Rajčáková¹, R. Mlynár¹ and M. Gallo²

¹The Research Institute of Animal Production, Nitra, Institut of Animal Nutrition, Research Station Poprad, SNP 2/1278, 058 01 Poprad, Slovak Republic, Email: rajcak@rsp.vuzv.sk, ²Biofaktory, s.r.o., Čerňyševského 26, 851 01 Bratislava, Slovak Republic

Keywords: red clover, silage, fermentation

Introduction In Slovakia, mainly in the submontane and mountainous regions, growing of red clover is an important source of proteinous feeds. It is grown on 3.0% of arable land. It was the aim of this work to verify the possibilities of using a biological additive in red clover silage conservation.

Materials and methods The experiments were carried out with crops of tetraploid red clover from the second cut, wilted for 48 hours (Table 1). The cut crops were homogenised and filled into 1.7 l silos. The filled silos were placed in a dark room at 22°C. For treatment the following biological additive was used, consisting of *Lactobacillus plantarum* (DSM 3676, 3677) and *Propionic bacterium* (DSM 9576, 9577). The application rate was 4 l additive/t feed. After 180 days of incubation the samples were examined for nutrient content and basal characteristic of the fermentation process.

Results Application of silo additive proved to have a positive effect on the fermentation process. Untreated samples have lower pH, higher content of acetic and butyric acid and lower content of NH₃-N of total N. Differences in nutrient levels between silages were minimal. Treated silage had a higher content of crude protein and fat and a lower content of crude fibre and ash. The digestibility of dry matter and organic matter was also higher in treated silage. There were also minimal differences between silages. Silage treated with biological additive appeared slightly better. Observations similar to this study were reported by Hetta (1999) during grass and clover-grass crops conservation with lactic acid bacteria. The author reported decreased pH, acetic acid and alcohol levels as well as decreased NH₃-N of total N in treated clover-grass silage. From the point of view of nutrient levels the author observed a decrease in crude fibre content and in fractions in clover-grass silage which corresponded with our findings. Earlier research (Gallo *et al.*, 2001 and Gallo *et al.*, 2002) also showed that the application of a biological silage additive produced a positive effect in the conservation of red clover.

Table 1 Nutrient composition and parameters of the fermentation red clover silage in g/kg DM

Parameter n = 6	Fresh matter		Untreated		Treated		Statistical significance of differences	
	\bar{x}	s	\bar{x}	s	\bar{x}	s	P<0.05	P<0.01
Dry matter	279	263	2.47	265	2.24			
Crude protein	195	192	0.94	188	2.40			**
Crude fibre	287	289	4.86	282	4.59	*		
Fat	24	29	0.91	30	2.41			
Ash	81	87	0.97	85	0.41			**
pH	-	4.45	0.02	4.14	0.05			**
Lactic acid	-	58	6.32	87	12.14			**
Acetic acid	-	13	1.10	8	1.69			**
Butyric + isobutyric acid	-	0.4	0.35	0.3	0.02			
NH ₃ - N of total N	-	92	2.2	67	9.4			**
Digestible DM	-	603	0.60	605	0.76			
Digestible OM (g/kg)	-	568	0.66	571	0.75			

Conclusions Application of biological additive showed its positive effect on the quality of fermentation process and nutrient levels in clover silage with a low content of dry matter.

References

- Gallo, M., V. Jambor, R. Mlynár & E. Rajčáková (2002). Effect of the application of different silage preparations upon the fermentation process in red clover. In: *Proceedings of the XIIIth International Silage Conference, Great Britain, Auchincruive: SAC*, pp. 110–111.
- Gallo, M., R. Mlynár & E. Rajčáková (2001). The effect of the combination of biological and biological-enzymatic additive with sodium benzoate upon the fermentation process in red clover silages. In: *The Xth International Symposium Forage Conservation, Brno* : MZLU Brno, pp. 100–101.
- Hetta, M. (1999). Ensiling during difficult conditions of two direct cut forages, with different botanical composition. In: *Proceedings of the XIIth International Silage Conference, Uppsala*, pp. 94–96.