

# Effects of additives on the quality of *Leymus chinensis* silage

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## Introduction

*Leymus chinensis*, which is a perennial plant with good palatability and high forage value, is widespread from the southern Chinese Loess plateau to northern Russian Baikal and from the Sanjiang plain of eastern China to Ulaanbaatar in Mongolia. Grazing and hay are the most common ways *Leymus chinensis* is utilized. The quality of *Leymus chinensis* silage is poorly understood. This study was conducted to investigate the fermentation quality and the *in vitro* digestibility of *Leymus chinensis* silage treated with lactic acid bacteria (LAB) and cellulose (CE).

## Materials and methods

*Leymus chinensis*, harvested at early heading, was chopped into pieces of about 20 mm and ensiled in plastic bags with LAB (2.5 g/t), CE (2.5 g/t), LAB+CE (2.5 g/t+2.5 g/t) and without additives as control (CK). Three replicates of each treatment were stored at room temperature for 60 days.

## Results

The water soluble carbohydrate (WSC), crude protein (CP) and neutral detergent fibre (NDF) content, buffering

capacity and *in vitro* digestibility of silage material were 52.7 g/kg, 101.9 g/kg, 690.7 g/kg, 114.97 mE/kg, and 645.0 g/kg. The pH of the silage with additives was significantly lower and the content of lactic acid was significantly higher than the control ( $P<0.05$ ). The *in vitro* digestibility of CP in the silage with LAB+CE was significantly higher than other treatments. The LAB and CE had interactive effects on pH, lactic acid and acetic acid content, and *in vitro* digestibility of CP.

## Conclusions

LAB and CE can improve the fermentation quality of *Leymus chinensis* silage. It is recommended that the two additives be added simultaneously.

## Background Literature and References

Yu Zhu *et al.* (1999) Ensiling characteristics and ruminal degradation of Italian ryegrass and lucerne silages treated with cell wall-degrading enzymes. *Journal of the Science of Food and Agriculture* **79**, 1987–1992.

ZG Weinberg *et al.* (1993) Ensiling peas, ryegrass and wheat with additives of lactic acid bacteria (LAB) and cell wall degrading enzymes. *Grass and Forage Science* **48**, 0-78.

**Table 1. The fermentation quality and *in vitro* digestibility of *Leymus chinensis* silage. Within a row means without a common superscript letter differ ( $P<0.05$ ). Significant differences between means at \*  $P<0.05$ ; \*\*  $P<0.01$ ; NS, not significant.**

Treatment	pH	DM (g/kg)	Lactic acid .....g/kg DM.....	Acetic acid	Butyric acid	Propionic acid	Ammonia- N (g/kg TN)	IVDDM .....g/kg DM.....	IVDCP	IVDADF
CK	5.05 a	432.9	8.4 d	25.6 a	0	0.6 a	31.1	665.9 b	587.5 b	539.6 ab
LAB	3.86 c	430.1	60.5 a	24.9 a	0	0 b	40.5	737.7 ab	544.8 b	629.7 a
CE	4.33 b	465.4	23.9 c	13.1 b	0	0.3 ab	32.7	667.0 b	579.3 b	456.3 b
LAB+CE	3.96 c	432.9	50.4 b	20.9 a	0	0 b	32.9	776.1 a	744.8 a	638.8 a
SE	0.05	13.3	1.0	1.4	0	0.1	2.7	1.86	27.6	25.8
LAB	**	NS	**	NS	NS	**	NS	**	NS	**
CE	**	NS	*	**	NS	NS	NS	NS	**	NS
LAB×CE	**	NS	**	*	NS	NS	NS	NS	**	NS