Effects of Additives on the Quality of *Leymus chinensis* Silage

J. J. Sun  
*Chinese Academy of Agriculture Sciences, China*

Zhu Yu  
*China Agricultural University, China*

Y. L. Xue  
*Inner Mongolia Agricultural and Animal Sciences College, China*

C. S. Bai  
*Shenyang Agricultural University, China*

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

JJ Sun AB, Z Yu B, YL Xue 3 and CS Bai 4

A Institute of Grassland Research of Chinese Academy of Agriculture Sciences, Hohhot, 010030, Inner Mongolia, People’s Republic of China
B College of Animal Science and Technology, China Agricultural University, Beijing, 100094, People’s Republic of China
C Institute of Grassland Sciences, Inner Mongolia Agricultural and Animal Sciences College, Hohhot, 010030, Inner Mongolia, People’s Republic of China
D College of Ecology, Shenyang Agricultural University, Shenyang, 110161, Liaoning, People’s Republic of China

Contact email: sjj8234@126com

**Keywords:** *Leymus chinensis* silage, fermentation quality, *in vitro* digestibility.

**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, 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**


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.**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>pH</th>
<th>DM (g/kg)</th>
<th>Lactic acid (g/kg DM)</th>
<th>Acetic acid (g/kg DM)</th>
<th>Butyric acid (g/kg DM)</th>
<th>Propionic acid (g/kg DM)</th>
<th>Ammonia-N (g/kg TN)</th>
<th>IVDDM (g/kg DM)</th>
<th>IVDCP (g/kg DM)</th>
<th>IVDNDF (g/kg DM)</th>
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<tr>
<td>CK</td>
<td>5.05 a</td>
<td>432.9</td>
<td>8.4 d</td>
<td>25.6 a</td>
<td>0</td>
<td>0.6 a</td>
<td>31.1</td>
<td>665.9 b</td>
<td>587.5 b</td>
<td>539.6 ab</td>
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<td>LAB</td>
<td>3.86 c</td>
<td>430.1</td>
<td>60.5 a</td>
<td>24.9 a</td>
<td>0</td>
<td>0 b</td>
<td>40.5</td>
<td>737.7 ab</td>
<td>544.8 b</td>
<td>629.7 a</td>
</tr>
<tr>
<td>CE</td>
<td>4.33 b</td>
<td>465.4</td>
<td>23.9 c</td>
<td>13.1 b</td>
<td>0</td>
<td>0.3 ab</td>
<td>32.7</td>
<td>667.0 b</td>
<td>579.3 b</td>
<td>456.3 b</td>
</tr>
<tr>
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<td>432.9</td>
<td>50.4 b</td>
<td>20.9 a</td>
<td>0</td>
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<td>1.0</td>
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<tr>
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<tr>
<td>LAB×CE</td>
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<td>*</td>
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