Effects of Lactic Acid Bacteria on the Quality of *Achnatherum splendens* Silage

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**Keywords:** *Achnatherum splendens*, lactic acid bacteria, silage, fermentation qualities.

**Introduction**

*Achnatherum splendens* is an important forage for ruminant animals, but it has a high fiber content, and there is little information about the quality of *Achnatherum splendens* silage. This experiment was undertaken to study the effects of lactic acid bacteria on the quality of *Achnatherum splendens* (AS) silage.

**Materials and methods**

The AS was harvested at pre-bud stage and immediately cut into 1~2 cm pieces. The AS was ensiled with lactic acid bacteria (LAB1 2.5 g/t, LAB2 5.0 g/t, 5×10⁵ CFU/g FW) and without LAB as control (CK). The three bagged AFR silages of each treatment were stored at room temperature and sampled for analyzing quality at 60d.

**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 56.29 g/kg, 139.36 g/kg, 655.77 g/kg, 126.97 mE/kg, and 456.03 g/kg. The pH of the silage treated with LAB was significantly lower and the LA content was significantly higher than control (*P*<0.01), but the acetic acid (AA) content, and NH₃-N/TN was not significant between treatments (*P* >0.01). There was no PA and BA in the silage. Adding LAB to the silage can significantly increase the IVDMD compared with control (*P*<0.01). When treated with LAB, the DM, CP, NDF and ADF contents in the silage were no different from the control.

**Conclusion**

The fermentation quality of the control was poor. The pH was significantly reduced (*P*<0.05) and the content of lactic acid and the In vitro digestibility of DM were significantly increased (*P*<0.05) in the silage when lactic acid bacteria were added compared with the control. Adding lactic acid bacteria to *Achnatherum splendens* silage has the capacity to improve the quality of the silage.

Table 1. Mean chemical composition (g/kg), buffering capacity (mE/kg) and in vitro digestibility (g/kg) of the silage material

<table>
<thead>
<tr>
<th></th>
<th>DM</th>
<th>WSC</th>
<th>CP</th>
<th>NDF</th>
<th>ADF</th>
<th>ADL</th>
<th>BC</th>
<th>IVDDM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>408.04</td>
<td>56.29</td>
<td>139.36</td>
<td>655.77</td>
<td>364.24</td>
<td>74.45</td>
<td>126.98</td>
<td>456.03</td>
</tr>
</tbody>
</table>

Table 2. The fermentation quality (g/kg), chemical composition (g/kg) and in vitro digestibility (g/kg) of *Achnatherum splendens* silage. Means in the same row with different letters differ significantly (*P*<0.01).

<table>
<thead>
<tr>
<th>Treatments</th>
<th>pH</th>
<th>LA</th>
<th>AA</th>
<th>PA</th>
<th>BA</th>
<th>NH₃-N/TN</th>
<th>DM</th>
<th>CP</th>
<th>NDF</th>
<th>ADF</th>
<th>ADL</th>
<th>BC</th>
<th>IVDDM</th>
</tr>
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<tr>
<td>CK</td>
<td>4.57 a</td>
<td>7.35 b</td>
<td>1.68</td>
<td>0</td>
<td>0</td>
<td>198.62</td>
<td>391.19</td>
<td>142.16</td>
<td>651.94</td>
<td>362.69</td>
<td>72.98 b</td>
<td>481.57 b</td>
<td></td>
</tr>
<tr>
<td>LAB1</td>
<td>4.33 b</td>
<td>11.82 a</td>
<td>2.41</td>
<td>0</td>
<td>0</td>
<td>194.98</td>
<td>400.40</td>
<td>141.87</td>
<td>647.68</td>
<td>363.72</td>
<td>85.94 a</td>
<td>509.71 a</td>
<td></td>
</tr>
<tr>
<td>LAB2</td>
<td>4.26 b</td>
<td>9.35 b</td>
<td>1.78</td>
<td>0</td>
<td>0</td>
<td>189.49</td>
<td>415.73</td>
<td>142.15</td>
<td>650.47</td>
<td>362.72</td>
<td>75.05 b</td>
<td>488.25 b</td>
<td></td>
</tr>
<tr>
<td>SE</td>
<td>0.03</td>
<td>0.55</td>
<td>0.32</td>
<td>0</td>
<td>0</td>
<td>3.10</td>
<td>5.71</td>
<td>1.11</td>
<td>4.20</td>
<td>2.93</td>
<td>0.85</td>
<td>3.75</td>
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