Virginiamycin in grain based diets for lactating dairy cows

E.H. Clayton¹, I.J. Lean², J.B. Rowe¹ and J. Cox³

¹ Department of Animal Science, UNE, Armidale NSW 2351
² M.C. Franklin Laboratory, University of Sydney, Camden NSW 2570
³ Pfizer Animal Health Pty Ltd. Wharf Rd., PO Box 57, West Ryde NSW 2114

The rapid fermentation of carbohydrates in the gut of cattle and sheep fed diets containing high levels of grain can lead to the accumulation of acid and low pH in the rumen, hindgut and faeces (Dunlop, 1972; Godfrey et al. 1992). This can lead to decreased production and, in severe cases, death.

An experiment was conducted to investigate the roles of virginiamycin (VM), an active agent against gram positive lactic acid producing bacteria, and the buffer sodium bicarbonate in maintaining higher pH in digesta and faeces. The experiment was conducted over 28 days and involved 7 1 dairy cows which were fed 10 kg of high grain pellets per head per day. It was designed as a 2 x 2 factorial design with or without VM (30 mg/kg or 0), and sodium bicarbonate (20 g/kg or 0). Data were statistically assessed using repeated measures analysis. There was no interaction between treatments in their effect on any parameter reported in Table 1.

There was no significant effect of sodium bicarbonate on rumen pH, faecal pH, potential for L-lactic acid accumulation in rumen fluid or milk production. Faecal pH was significantly higher, and the potential for lactic acid accumulation in rumen fluid was significantly lower with inclusion of VM. There was a trend for rumen fluid pH to be higher in cows fed pellets with VM. Cows given VM had a higher milk production over the trial period than those not treated with VM (23.94 vs. 23.32 kg/head/day, P=0.09). Milk fat and milk protein content did not differ significantly (P>0.15) as a result of dietary treatment. It appeared that animals had more stable environment for fermentation, and there was less risk of acute acidosis as a result of including VM in the diet.

References


Table 1. Faecal pH, rumen pH and potential to accumulate L-lactic acid in the rumen of dairy cows fed a high grain pellet without VM (Control) or with VM at 30 mg/kg.

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Control</th>
<th>VM</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faecal pH</td>
<td>6.59</td>
<td>6.72</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Rumen Fluid pH</td>
<td>6.90</td>
<td>7.00</td>
<td>0.09</td>
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<tr>
<td>Potential L-lactic acid accumul</td>
<td>36.0</td>
<td>16.5</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

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University of New England, Armidale NSW 2351, Australia