Long-term effects of different pulsation characteristics on teat thickness, teat skin moisture and teat skin pH of dairy cows

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Ten identical twin sets, located at the research station of Dexcel Ltd., Hamilton, (New Zealand), were submitted to two different pulsation modes in a long-term trial, in split twin set design. The group, treated with the ‘fast’ milking mode, with a dynamic [b] phase, exhibited significantly higher teat thickness changes than the group treated with ‘slow’ pulsation mode. The pulsation treatment had no significant effect on teat skin moisture or pH.

Key words: Teat thickness, teat skin moisture, teat skin pH, pulsation

The pulsation rate is of importance for cow comfort, teat condition and new infection risk. If pulsation is faulty or ineffective, congestion and oedema of the tissues surrounding the teat canal is resulting. The purpose of this study was to determine the long-term effect of different pulsation modes on teat tissue and teat skin moisture and pH.

The pulsation effect on teat tissue change is demonstrated in Figure 1. The analysis of variance with repeated measurements showed significant differences between the treatment groups ‘fast’ and ‘slow’ (P = 0.001).

The duration of the open phase of the liner influences the teat thickness change significantly. Yet this was the first study to demonstrate this over a whole lactation. Bigger teat end thickness is known to be a sign of increased congestion or oedema in the teat tissue. The lactational changes in teat skin pH and moisture (data not shown) were interesting findings, but a more complicated trial design will be required to determine the delicate effects of pulsation on teat skin parameters.
Different pulsation on teat thickness

Figure 1. Mean teat thickness change (%) of 5 twin sets, during an entire lactation (W1 – 8 and P1 – 3 weekly, M1 – 5 monthly determinations).

Data for Figure 1: Per cent teat thickness change

<table>
<thead>
<tr>
<th>Treatment</th>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
<th>W6</th>
<th>W7</th>
<th>W8</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>M5</th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fast</td>
<td>5.9</td>
<td>4.4</td>
<td>6.3</td>
<td>1.6</td>
<td>5.2</td>
<td>11.5</td>
<td>11.7</td>
<td>6.8</td>
<td>7.6</td>
<td>3.3</td>
<td>1.1</td>
<td>1.2</td>
<td>-0.6</td>
<td>2.2</td>
<td>7.0</td>
<td>-0.6</td>
</tr>
<tr>
<td>Slow</td>
<td>2.3</td>
<td>0.4</td>
<td>1.1</td>
<td>-3.1</td>
<td>-1.5</td>
<td>-0.1</td>
<td>-0.8</td>
<td>0.1</td>
<td>-4.3</td>
<td>-6.6</td>
<td>-2.2</td>
<td>-1.3</td>
<td>-6.9</td>
<td>-5.2</td>
<td>-7.7</td>
<td>1.9</td>
</tr>
</tbody>
</table>

Reference

Hansen, S., 2002: Influence of environmental and pulsation factors on teat skin condition and teat tissue with regard to mastitis, Dissertation, Hanover, Germany