Efficacy and Safety of a Lactic Acid Based Post-milking Teat Dip

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Introduction

Topical disinfection of teats with iodine, before and after milking, has been long proven efficacious at reducing new intramammary infections being an important tool for mastitis control in dairy herds. More recently, concerns of global iodine supply and higher market prices has sparked the demand for different germicidal actives in teat dips, but with equal or better efficacy than traditional iodine products. The goal of this study was to determine the clinical efficacy and safety of a lactic acid-based post-milking barrier teat dip in a commercial dairy.

Materials and Methods

Cows from two pens of an 8,000 cow California Central Valley dairy were used in a split herd non-inferiority positive-control natural exposure field trial aimed to evaluate the efficacy of a barrier lactic acid post-milking disinfectant, LF (LactiFence, DeLaval: 3.5% lactic acid; 10% emollients) compared to a barrier iodine positive-control, I2 (0.25% iodine; 5% emollients) to prevent naturally occurring new intramammary infections (IMI), based on methodology previously described (Ceballos-Marquez et al. 2012) that uses a two step process to qualify milk samples for culturing based on SCC. A new IMI in a quarter was identified when the cultured organism was not isolated in a previous sample from the same quarter. Only one new IMI per pathogen was allowed during the trial period, but a quarter could have several new IMI by different pathogens. Clinical mastitis samples were also considered new IMI, supported by bacteriology tests. Teat barrel skin condition (scale of 1-5), teat end orifice (scale of 1-4) and hyperkeratosis (scale of 1-5) were evaluated at weeks 0, 4, 8 and 12 of the study (Mein et al., 2001).

Generalized linear mixed models were used for the analysis of the incidence risk of new IMI. In order to reject inferiority the efficacy of LF in preventing new IMI could not be more than 30% less compared to I2 (Schukken et al. 2013). General linear mixed models were also used for the analysis of SCC and teat condition parameters. Sampling week and cow were included as random effects.

Results

A total of 300 cows, 150 cows per study group, were enrolled in the study on April 14, 2013 (week -2) of which 294 cows started the study on April 28th (week 0) (Table 1). Of those, 205 cows were still present at the end of the study on July 21st. Thirteen percent of the cows enrolled were in their first and 87% of the cows were in their second or greater lactation. The average DIM at enrollment was 125 DIM for both groups. A total of 5,729 quarter milk samples were collected during weeks 2 to 12. Quarter milk samples were cultured from 739 quarters (I2 = 411,
LF = 328) based on SCC thresholds. Of the cultured samples, 194 (47.2%) samples from the I2 group and 123 (37.5%) from the LF group were culture positive. A total of 65 additional samples were obtained from clinical cases. The most frequently pathogen isolated was *Staphylococcus* sp. (63%), followed by non-agalactiae *Streptococcus* (26%).

Results showed that LF was not inferior to I2 in reducing new IMI (P=0.09; OR = 0.75, 95% CI = 0.53–1.05). Incidence risks of new IMI by sampling week are shown in Table 1. The mean back-transformed LnSCC was 37,712 cells/mL (I2) and 29,665 cells/mL (LF) (P=0.85). Finally, teat condition scores were not different between both study groups, with average teat barrel skin scores of 1.08 and 1.04 (P=0.19), teat end thickness scores of 1.80 and 1.68 (P=0.12), and teat end hyperkeratosis scores of 1.63 and 1.57 (P=0.26) for I2 and LF groups, respectively.

**Table 1. New intramammary infections by study group (weeks 2 to 12)**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Week of Trial</th>
<th>2</th>
<th>4</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental Group (LF)</td>
<td>At-risk quarters for NIMI (n)</td>
<td>515</td>
<td>510</td>
<td>492</td>
<td>473</td>
<td>432</td>
<td>400</td>
<td>2822</td>
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<tr>
<td></td>
<td>New IMI (n)</td>
<td>13</td>
<td>13</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>7</td>
<td>68</td>
</tr>
<tr>
<td></td>
<td>Incidence (%)</td>
<td>2.5</td>
<td>2.6</td>
<td>2.9</td>
<td>3.0</td>
<td>3.2</td>
<td>1.8</td>
<td>2.4</td>
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<tr>
<td>Positive-Control Group (I2)</td>
<td>At-risk quarters for NIMI (n)</td>
<td>506</td>
<td>529</td>
<td>494</td>
<td>456</td>
<td>419</td>
<td>400</td>
<td>2804</td>
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<tr>
<td></td>
<td>New IMI (n)</td>
<td>28</td>
<td>15</td>
<td>20</td>
<td>16</td>
<td>11</td>
<td>5</td>
<td>95</td>
</tr>
<tr>
<td></td>
<td>Incidence (%)</td>
<td>5.5</td>
<td>2.8</td>
<td>4.1</td>
<td>3.5</td>
<td>2.6</td>
<td>1.3</td>
<td>3.4</td>
</tr>
</tbody>
</table>

**Conclusion**

The lactic acid based postmilking teat disinfectant evaluated was non-inferior to the iodine based product and is considered safe in terms of teat condition.

**References**

