SILICONE LINER – EFFECTS ON TEAT END HYPERKERATOSIS

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Introduction

Previous research has indicated that one of the factors that cause hyperkeratosis is high vacuum (Bramley et al., 1992). Scoring systems have been developed to quantify the severity of this condition (Mein et al., 2001). Recently, a liner has been developed to minimize the effects of using a higher milking vacuum. A unique barrel design is incorporated in the liner that centers the teat during milking while distributing pressure evenly across the surface of the teat. The liner is made from 3A approved silicone material, and is compounded for a lower Shore A durometer designed for cow comfort. The physical properties of the Lauren Tri-Circle® Liner allow the liner to resist chemical and physical degradation and provide high milking performance through its useful life of 3000 milkings (Shin et al., 2005).

Materials and Methods

Between February 2006 and September 2006 liners were installed on 22 dairy farms in Pennsylvania totaling approximately 7600 cows with more than 50% of the cows being randomly scored. The cows on these dairies were scored prior to installation of the new liner and 4-6 weeks after installation and some were scored in another 4-6 weeks by an independent veterinarian. The scoring system used on these dairies was developed by "Teat Club International" which uses a four point scale (1 – 4) to determine the degree of hyperkeratosis (Mein et al., 2001). Three other dairies representing 2100 cows were scored before the installation of liners and 4-6 weeks after.[1] The installation dates for these was between February 2006 and July 2006. Sixty percent (60%) of the cows were randomly scored at these locations. The scoring system used here is slightly modified from TCI's system and uses a five point scale (0 – 4). Scoring results were analyzed as first score (prior to new liner install) and last score (2nd or 3rd score on dairy). The scores were compared by the percentage of teats scoring <=2, 3, and 4.

Results

The data collected in Pennsylvania shows a distinctive trend of improvement with hyperkeratosis at the teat end. As shown in figure 1, the percentage of teats scoring at a 1 or 2 increased by 20.6%. The percentage of 3's dropped from 24.0% to 14.0%, and the percentage of 4's dropped from 15.7% to 5.6%. The data displayed in figure 2 also shows distinct improvement at the teat end. The percent of teats scoring 0 to 2 increased by 22.4% from 61.9% to 84.3%. The percent of 3's decreased from 21.5% to 13.4% and the percentage of 4's decreased from 16.6% to 2.3%.

Discussion

The silicone compound used is different than compound used for organic rubber liners in that it resists both chemical and physical degradation (Shin et al., 2005). It differs from other silicone liners by its tear resistance properties and ability to provide consistently high milking performance. The barrel is designed to minimize effects of high vacuum at the teat in order to provide high milking performance. The liner has a high touch point pressure difference (TPPD) (Nordegren, 1980) which allows it to be used at a higher vacuum. The liner absorbs excess pressure at the teat by distributing it throughout the walls of the barrel during the rest phase of milking. These attributes are important in the liners ability to sustain performance while reducing teat-end irritation which leads to hyperkeratosis. In order to receive the full benefits of the liner, the system needs to be set up with the correct pulsator ratio, pulsator rate, milking vacuum, and have minimal vacuum drop at the claw.

Figure 1. Scoring results*-Pennsylvania

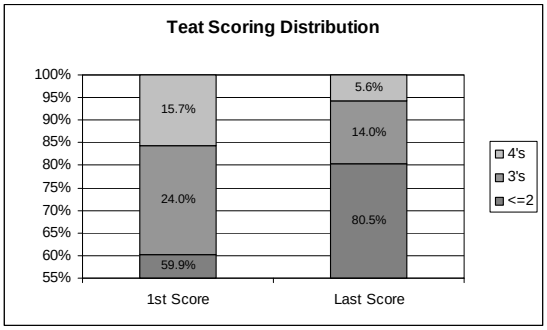
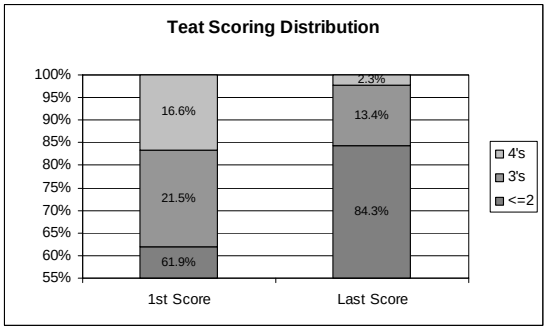


Figure 2. Scoring results-Lauren AgriSystems



* Scoring done by independent veterinarian.

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