

PERFORMANCE OF A SILICONE LINER

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Introduction

The use of silicone in milking machine liners is becoming more prevalent in the dairy industry. The objective of this study was to determine the performance characteristics of a silicone liner in the process of being developed. Liners change in performance with age (2). The liner is characterized by newer silicone or silicone-like compounds using FDA approved ingredients for food contact. The liner shape is different than previous offerings, being round with external ribs in the normal open milking position and triangular in shape as it collapses on the teat. The liner is equipped with a patent pending non-clogging vent located in the short milk tube of the liner.

Materials and Methods

The tests were conducted on two breeds of dairy cows (Holsteins and Jerseys) at the Lauren AgriSystems research facility near Berlin, Ohio. There was an average of 338 Holstein cows in the trial and 240 Jerseys. Milking was done in a double 12 Germaina® parlor equipped with S.A.E. Afikim® electronic meters. The operating vacuum at the pump was maintained at 13.9 inHg. (inches of mercury) or 47.1 kPa at a pulsator rate of 60 pulses per minute and a pulsator ratio of 65:35, milk to rest. Data were collected for over 3000 milkings with the silicone liner.

Data were collected on a daily basis for machine-on-time, yield, average flow and peak flow rate. Surfaces of the liner were observed under a scanning electron microscope (Hitachi® Model 2600 N) for roughness or cracks, at intervals of 500 milkings (1). The liners were measured for their Critical Collapsing Pressure Difference (CCPD) and their Touch Point Pressure Difference (TPPD) in a new and used condition with a Dwyer® mercury column (3). Data were analyzed using standard statistical analysis methods.

Results and Discussion

Performance characteristics are presented in Tables 1 and 2. The silicone liner is able to be used 2.5 times longer than a conventional liner. This result in lower cost per milking and fewer liner changes, which saves labor. The interior barrel surface of the liner remained in a smooth condition after 3000 milkings. Scanning electron micrographs will be presented. The CCPD of four liners averaged 2.0 inHg (6.77 kPa) when new and 1.4 inHg (4.74kPa) after being used 3000 milkings. The TPPD of four new liners averaged 9.9 inHg (33.52 kPa) and 7.6 inHg (25.73kPa) after being used 3000 milkings.

Conclusions

1. This silicone liner performed as well or better than a typical conventional liner in contrast to some other silicone liners, which often milk slower.
2. The silicone liner maintained a much smoother interior surface than a conventional liner.
3. Teat condition remained the same or improved while using the silicone liner and the cows were reported by the milkers to be more comfortable with the silicone liners than with a conventional liner.

Table 1. Milking performance of a silicone liner after 1000 milkings with two breeds.

	Holsteins (N= 337)				Jerseys (N= 230)			
	Avg ¹ . Flow	Peak ² Flow	Yield ³	Milking Time ⁴	Avg ¹ . Flow	Peak ² Flow	Yield ³	Milking Time ⁴
Lb	5.88	9.56	28.07	4.71	5.07	8.24	21.78	4.27
Kg	2.67	4.34	12.73	4.71	2.30	3.74	9.88	4.27
S E	0.111	0.185	0.665	0.085	0.107	0.233	0.576	0.089

Table 2. Milking performance of a silicone liner after 3000 milkings with two breeds.

	Holsteins (N= 339)				Jerseys (N= 249)			
	Avg ¹ . Flow	Peak ² Flow	Yield ³	Milking Time ⁴	Avg ¹ . Flow	Peak ² Flow	Yield ³	Milking Time ⁴
Lb	6.14	9.86	29.69	4.87	4.97	7.68	21.19	4.26
Kg	2.79	4.47	13.47	4.87	2.25	3.48	9.61	4.26
S E	0.103	0.198	0.603	0.078	0.099	0.167	0.527	0.777

¹Per minute

²Per minute

³Yield per milking

⁴ Minutes per milking

References

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