

THE EFFECT OF LINER BARREL SHAPE ON TEAT END CONDITION

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Teat end condition (TEC) can be influenced by many factors present in a cow's environment. Weather, genetics, prep procedures, system settings, and teat dips have been shown to have significant effects on TEC. The milking liner is another variable known to have an effect on TEC (1). Basic differentiations in liner designs can be made by characterizing the shape of the barrel. For the purpose of this study, liners were classified by the shape of their barrels: round, triangle, square, and tri-circle. Each of these shapes can be defined in their open positions as: round – a circular barrel wall with no interruptions, triangle – a three sided barrel with no interruptions, square – a four sided barrel with no interruptions, and tri-circle – a three sided barrel with three interruptions. The objective of this study was to compare a large collection of teat condition scores (TCS) characterized by the barrel shape of the liner in use when teats were scored.

Materials and Methods

TCS collected in an online database developed and maintained by Lauren AgriSystems, Ltd., were used in the analysis (2). In order for scores to be included, certain criteria had to be met: a minimum of 20% of the herd or 80 cows (if herd size was less than 400) had to be scored, the barrel shape of the liner currently in use had to be recorded, and scoring had to be performed by an individual who passed a qualifying exam. There were 278 dairies that met the requirements in the database. On average, 40% of the milking cows on each dairy were randomly scored. If a dairy had a score entered while using two different barrel shapes, the most recent data for each barrel shape was used. All four teats of the cows were scored using a system developed by Teat Club International (no ring, smooth or slightly rough ring, rough, very rough) (3). In this study TEC was scored using a numerical system from 1 to 4 (1 = no ring, 4 = very rough ring).

Results

The results of the study can be seen in figure 1. The graph shows the percentage of teats scored at a certain level based on the barrel shape of the liner in use when the TCS were collected. A comparison between tri-circle and round (best and worst performers) shows a 30% difference in teats scored 3's and a 20% difference the teats scored 4's. A noticeable difference can also be observed in the number of teats scored as 4's where the tri-circle barrel has at least three times less than the other barrel shapes.

Discussion

The influence of liner barrel shape is evident from the data presented in the graph. One conclusion that can be made is that liners with multi-sided barrels had considerably better TCS than liners with round barrels. An obvious difference can be seen by looking at scores from round barrel liners and comparing them to the triangle, square, and tri-circle barrel shapes. The

importance of this correlation has been shown through research that indicates cows with rough, calloused teat ends are at increased risk of clinical mastitis than cows with smooth teat ends (4). Field observations would also be in agreement with these findings. The difference in TCS between barrel shapes should encourage someone looking to improve teat ends to use a liner with a multi-sided barrel.

Figure 1. Teat Scores by Liner Barrel Shape

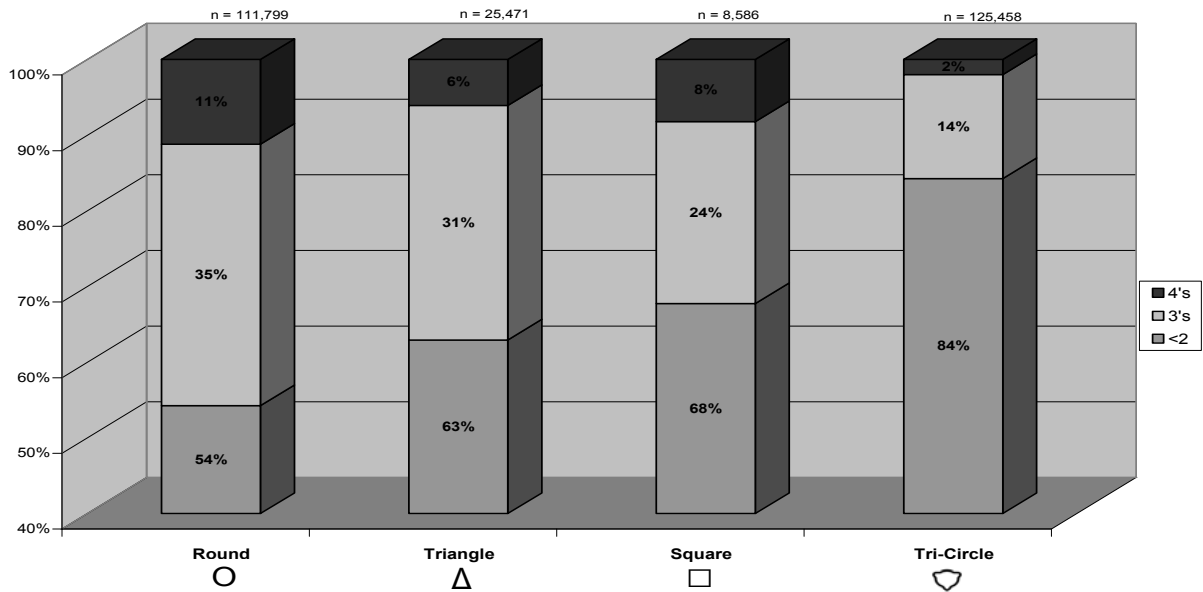


Figure 2. Additional information on herds milked with each barrel shape.

Barrel Shape	# of Dairies	Avg. Herd Size	Milking Frequency		Avg. System Vacuum (inHg)
			2X	3X	
round	193	580	86	106	13.3
triangle	35	728	12	23	13.1
square	18	477	5	13	13.3
tri-circle	194	652	68	124	14.2

References

- Schukken, Y.H., L.G. Petersson, and B.J. Rauch. 2006. Liners and teat end health. Proc. 45th Annual Meeting of National Mastitis Council, p. 183.
- National Teat Health Database (2007-2008) [On-line database]. Available: <http://www.teathealth.com> [2008, October 20].
- Mein, G.A., G. Neijenhuis, W.F. Morgan, D.J. Reinemann, J.E. Hillerton, J.R. Baines, I. Ohnstad, M.D. Rasmussen, L. Timms, J.S. Britt, R. Farnsworth, N. Cook, and T. Hemling. 2001. Evaluation of bovine teat condition in commercial dairy herds: 1. non-infectious factors. Proc. NMC and AABP meeting, Vancouver, Canada, p. 347.
- Neijenhuis, F., H.W. Barkema, H. Hogeveen, and J.P.T.M Noordhuizen. 2001. Relationship between teat-end callosity and occurrence of clinical mastitis. J. Dairy Sci. 84:2664-2672.