
Milking intervals and teat recovery

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The teat is an important part of the cow's defence mechanisms against intra-mammary infection (IMI) (O'Shea, 1987). Therefore the teat is also referred to as first line defence against IMI. Functioning of the teats as barrier against IMI can be negatively influenced through husbandry circumstances.

During automatic milking, because of voluntarily attendance, cows may be milked with rather short intervals. Machine milking generates a strain on the teat wall. This strain induces swelling of the teat that may influence the resistance of the teat canal to bacterial invasion during the recovery period after milking. Penetrability of teats and the teat canal diameter are recovered within 2 hrs after milking (McDonald, 1975; Schultze and Bright, 1983). Also the teat end thickness, as measured by the cutimeter, was the lowest at 2 hrs after milking (Hamann, 1987). The recovery time of the teat is important to determine a minimum milking interval. When a cow is milked when the teat tissue is not yet recovered, irreversible chronic changes of the teat tissue may occur (Hamann and Østerås, 1994).

The aim of this study was to determine if ultrasonic measurements of teat size and shapes after milking could reveal the recovery time of teats.

The ultrasonic measurements (scans) were carried out with a 200 VET scanner with a linear-array 7.5 MHz probe (Pie Medical, Maastricht, the Netherlands). The teats were immersed in water in a latex bag. Two teats of 18 Holstein-Friesian cows were scanned before milking, immediately after milking and 1 to 9 hours after milking. Teat characteristics were measured in duplicate: teat canal length, teat wall thickness, teat cistern width and teat end width. Milking interval before the measurements were made was 14 hours, machine-on time was on average 6.8 min (ranging from 4.2 to 12 min). Average milk flow rate during the morning milking was 1.9 kg/min (ranging from 0.9 to 3.1 kg/min).

Introduction

Material and method

Results

Teat recovery after milking took a considerable amount of time (Figure 1). Teat wall thickness returned to its premilking state within 6 hours. Teat end width took more than 8 hours to recover. Teat canal length did not recover within 8 hours of milking. Teat cistern width returned to its premilking state within 7 hours.

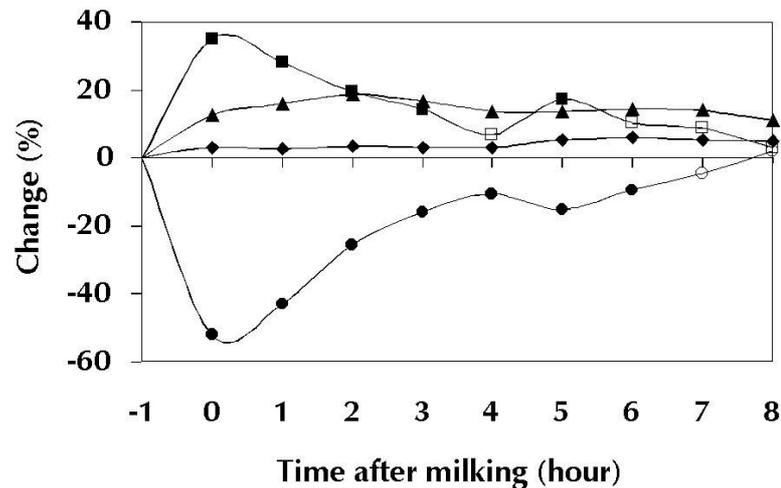


Figure 1. Relative changes (%) of teat end width (◆), teat cistern width (●), teat canal length (▲), and teat wall thickness (■) measured just after milking (0), and at each consecutive hour after milking (1 to 8) compared to the measurement before milking (-1).

Conclusion

The ultrasonic scanning technique may be a useful research tool to monitor changes in teat parameters by machine milking. The results showed that complete recovery of teats after milking takes 6 to more than 8 hours. Shorter milking intervals as can be found in automatic milking, may lead to incomplete recovery of teats. This may lead to a build up of teat damage.

References

- Hamann, J., 1987; Effect of machine milking on teat end condition - A literature review. *Bull. Int. Dairy Fed.* 215, 33-49.
- Hamann, J. & O. Østerås, 1994; Special Aspects. Teat tissue reactions to machine milking and new infection risk. *Bull. Int. Dairy Fed.* 297, 35-41.
- McDonald, J.S., 1975; Radiographic method for anatomic study of the teat canal; changes between milking periods. *Am. J. Vet. Res.* 36, 1241-1242.
- O'Shea, J., 1987; Machine milking factors affecting mastitis - A literature review. *Bull. Int. Dairy Fed.* 215, 5-32.
- Schultze, W. D., and S. C. Bright, 1983; Changes in penetrability of bovine papillary duct to endotoxin after milking. *Am. J. Vet. Res.* 44, 2373-2375.