
Effect of postmilking teat disinfecting on teat skin temperature status

P. Kunc¹, I. Knížková², M. Koubková³, J. Flusser⁴ & O. Dolezal²

¹*Research Institute of Animal Production Uhřetěves,
104 00 Prague 10, Czech Republic
E-mail: kunc@vuzv.cz*

²*Research Institute of Animal Production Uhřetěves,
104 00 Prague 10, Czech Republic*

³*Czech Agricultural University,
165 21 Prague 6, Czech Republic*

⁴*Institute of Information Theory and Automation,
182 08 Prague 8, Czech Republic*

In 10 dairy cows the effect of postmilking disinfecting on teat temperature status was observed in tandem milking parlour by thermography. The teat temperatures were recorded in non-disinfected (NDT) and disinfected teats (DT). Thermograms were obtained before and after milking immediately and 1st – 5th minute after milking. The different course of the temperature changes was found out for NDT and DT. The temperature in NDT declined gradually, 5 minutes after the teat cup were removed, the teat temperature was still higher than it was prior to milking. The results showed that the teat temperature did not recovery until 5 minute. The recovery time will be longer than 5 minute. Other temperature evolution was recorded in DT. The temperature in DT decreased rapidly until 3 minute compared with NDT, the teat temperature dropped below initial value as early as 1st minute. The decline was finished in 3rd minute, than the teat temperature was increased gradually. Disinfecting evoked a significant chilling effect in the teats ($P < 0.01$, $P < 0.05$), thereby teat traumatization caused by machine milking was reduced. Used disinfectant did not evoke undesirable thermal responses in teat tissue.

Key words: *Postmilking disinfecting, machine milking, teat surface temperature, thermography.*

Summary

Introduction

Postmilking teat disinfecting is widely considered to be perhaps the most effective and important component of any program to prevent the spread of contagious mastitis pathogens in a milking herd (Pankey *et al.*, 1984). The management of teat antisepsis to maintain healthy teat skin is important for the welfare of the cow, both for cow comfort and to maximize the effectiveness of teat dips in the prevention of mastitis (Bushnell, 1985).

But machine milking may cause an increase in teat temperatures (Hamann, 1985; Caruolo *et al.*, 1989; Eichel, 1992; Kunc *et al.*, 2000a; Barth, 2000). These temperature, which cannot be detected visually, are manifested by elevated temperatures and slow recovery Kunc *et al.* (1999b) found that 3 minutes after machine milking the teat temperature was still higher than it was prior to milking.

Assessment of teats and udder before and after milking is usually based on visual observations. For such assessments, a cutimeter (Isaksson and Lind, 1992) or classification systems (Neijenhuis, 1998; Rasmussen and Larsen, 1998; Neijenhuis *et al.*, 2000) are used. But teat temperature responses on milking is the most suitable to detect by thermographic method.

There are a number of factors in machine milking that may influence the condition of teats. Literary sources emphasize the importance of the milking vacuum, and also pulsation rate, pulsation ratio and the quality of teat cups. But the state of the mammary gland and teats may be significantly influenced by milking routines including postmilking disinfecting. The majority of studies focuses on what impact disinfecting have on mastitis, irritation, bacteria, visual teat skin condition etc. (Rasmussen *et al.*, 1990; Burmeister *et al.*, 1998; Johansson *et al.*, 1998; Kruze, 1998), but their role in the onset of temperature zones on teats or the disappearance of the response as a result of machine milking is still largely unexplained (Hamann, 1992). The objective of this study was to find out the effect of postmilking disinfecting on teat temperature status.

Material and methods

Thermographic measurements (thermographic system AGA 570 DEMO) were conducted in tandem milking parlour 2 x 5 (vacuum 42.6 kPa, postmilking disinfectant – Deosan (chlorhexidine/gluconate, 4250 ppm) in 10 healthy dairy cows (Czech Spotted cattle, milk yield 6 500l).

Set of measurements was following:

- 1st day: evening milking – until 5 minutes without disinfecting;
- 2nd day: morning milking - until 5 minutes without disinfecting;
- 2nd day: evening milking – disinfecting immediately after milking;
- 3rd day morning milking – disinfecting immediately after milking.

Thermograms of the teats were obtained in following intervals:

- premilking immediately;
- postmilking immediately;
- 1st minute postmilking;
- 2nd minute postmilking;
- 3rd minute postmilking;
- 4th minute postmilking;
- 5th minute postmilking.

The special computer program IRwin 5.3.1 was used for evaluation of thermograms and data analyses.

The changes of teat temperatures between non-disinfected (NDT) and disinfected teats (DT) are detailed in figure1. This diagram shows the course of teat temperature with and without disinfectant until 5th minutes. The increased teat temperature was recorded immediately after milking. That supports the findings of Hamann (1985), Eichel (1992), Kunc *et al.* (1999a) and Barth (2000) in dairy cows. But the different course resp. the differences between teat temperature with and without disinfecting were found out. The temperature in NDT declined about 0.56 ± 0.64 °C, in DT about 2.06 ± 0.78 °C until 1st minute after milking. The difference between decline of NDT and DT was significant ($P<0.01$). The temperature in NDT declined about 0.08 ± 0.44 °C, in DT about 0.67 ± 0.51 °C between 1st and 2nd minute, the difference between decline of NDT and DT was significant again ($P<0.01$). The temperature in NDT declined about 0.04 ± 0.45 °C, in DT about 0.4 ± 0.61 °C between 2nd and 3rd minute, the difference between decline of

Results and discussion

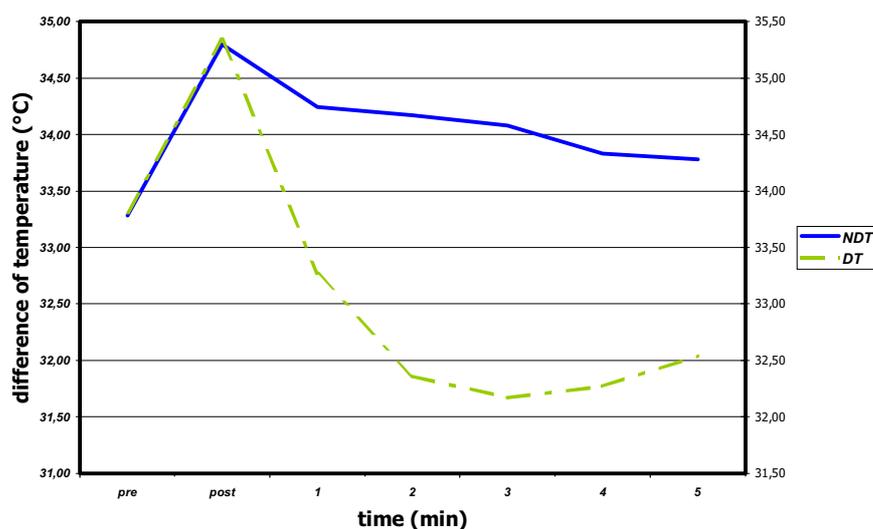


Figure 1. The course of temperature changes of teats

NDT and DT was significant ($P < 0.05$). The temperature in NDT declined about 0.28 ± 0.46 °C, but in DT increased insignificantly about 0.07 ± 0.42 °C between 3rd and 4th minute, the difference between decline of NDT and DT was significant ($P < 0.01$). The temperature in NDT declined about 0.06 ± 0.58 °C, in DT an insignificant increase about 0.27 ± 0.55 °C was recorded between 2nd and 3rd minute, the difference between decline of NDT and DT was significant ($P < 0.01$).

The different course was found out for NDT and DT. The temperature in NDT declined gradually, 5 minutes after the teat cup were removed, the teat temperature was still higher than it was prior to milking. Kunc *et al* (1999a,b) found, that teat surface temperature did not recovery to initial value before milking until 2 resp. 3 minute. The results of this experiment showed, that teat temperature did not recovery until 5 minute. The recovery time will be longer than 5 minute. Other temperature evolution was recorded in DT. The temperature in DT decreased rapidly until 3 minute compared with NDT, teat temperature dropped below initial value as early as 1st minute. The decline was finished in 3rd minute, than teat temperature was increased gradually. Disinfecting evoked a significant chilling effect in the teats, thereby it reduced teat traumatization caused by machine milking. Used disinfectant did not evoke undesirable temperature responses in teat tissue.

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