The development of udder health of a dairy cow herd in an automated milking system

S. Pallas[1] & K. Wendt[2]

[1]Humboldt, Universität zu Berlin, Anistitut für Agrar und Stadtökologische Projekte, Philippstraße 13, Haus 10, 10115 Berlin, Germany
E-mail: solveig_pallas@hotmail.com

[2]Freie Universität Berlin, Department of Veterinary Medicine, Oertzenweg 19 b, 14129 Berlin, Germany

Summary

The influence of an improved hygiene management on udder health of cows in an automated milking system has been studied. The results are based on data, which were collected over a period of 17 months. The Farm had two groups of dairy cows which were divided according to the milking variants. The examined cows (about 50) have been milked by a one-box-robot, produced by Lely. Through the examination period, the udder health has clearly improved and stayed steady. With regard to mastitis, the predictive value of electrical conductivity as the main diagnostic parameter was compared to the appearance of clots in milk. There was no relation between both criteria. It is concluded that brilliant milking hygiene is necessary and a special udder health examination at regular intervals is needed.

Key words: *Automatic milking, udder health, management, peracetic acid.*

Introduction

The expected advantages of milking with a milking robot are the saving of working time, easement of work and improvement of udder health. The improvement of udder health occurs not offhand. With a view on the specific properties of a milking robot, it is to remark, that, if there are about 180 milkings with one milking module per day, a high mastitis risk exists. Special sources of infection are the contact points between udder and robot. At one hand there are the brushes which clean the teats before milking and on the other hand there are the teatcups. SPOHR (2001) could observe that the new-infection-rate has been decreased from 100 percent to 60 percent in herds with mastitis problems under utilisation of peracetic acid

(PAA) disinfection. That is why the influence of an improved hygiene management on udder health of cows kept in an automated milking system (AMS) was examined. The diagnostic parameters of mastitis, which are measurable in the robot are the electrical conductivity and the milking volume. A comparison between mastitis signs and conductivity deviation was carried out.

Material and methods

The herd consisted of around 50 Holstein-Friesian-cows. These were kept in a free stall barn. A one-box-robot (Lely–Astronaut) for about 60 cows worked around the clock. The cows went to the robot voluntarily. They were fed with a partial-mixed-ration. Through the investigation period (March 2000 until June 2000) the management of the AMS was more intensive. This caused especially cleaner cubicles as well as a steady and effective disinfection of the teat-cleaning-brushes with PAA-solution. In addition, a teatcup disinfection (PAA) at the beginning of June 2000 was installed. The investigation of herd's udder health took place in an interval of 4 weeks for 17 months. A special clinical examination of the udder and the bacteriological examination of quarter samples were carried out. The somatic-cell-count-data from the monthly milk recording and conductivity data were collected. For the presentation descriptive statistics were used. To verify the predication of electrical conductivity as a diagnostic parameter of mastitis special notes ("alarm") were utilized. These occur if there are to high deviations in milk conductivity (adjustment: absolute threshold, inter-quarter-ratio 15percent each).

Results and discussion

Clinical findings

Six percent to 28 percent of all quarters were found to be clinical changed (atrophic quarters from 1 to 5 percent, tough quarters from 1 to 12 percent). The cases of acute mastitis decreased per month through the examination period [arithmetic mean: 4,3 cases / month (8 / 99 to 10 / 99) decresed to 2.3 cases / month (4 / 00 to 6 / 00)].

Figure 1 shows a continual decrease of the percentage of infected quarters (from 17 percent to 3 percent). 95 percent of these quarters were infected with coagulase-negative staphylococci (CNS). Sometimes there were *Streptococci* (aesculin-negative and aesculin-positive) and seldom *Corynebacterium bovis*, *Escherichia coli* and yeasts. The sources of CNS are the environment and the udder skin. That is why a brilliant hygiene in the cow shed and an effective infection-prophylaxis is needed. This can be realised with the usage of PAA-disinfection which has been reported by other authors (Model, 1995; SPOHR, 2001). In our studies, PAA has been used successful for the disinfection of cleaning brushes and teatcups. The cleaner udders had a positive influence on the efficiency of the disinfection. These were achieved with more cubicle care. That caused that the film of dirt was low on brushes and teatcups. In this way the disinfection efficiency of PAA against pathogens could be improved.

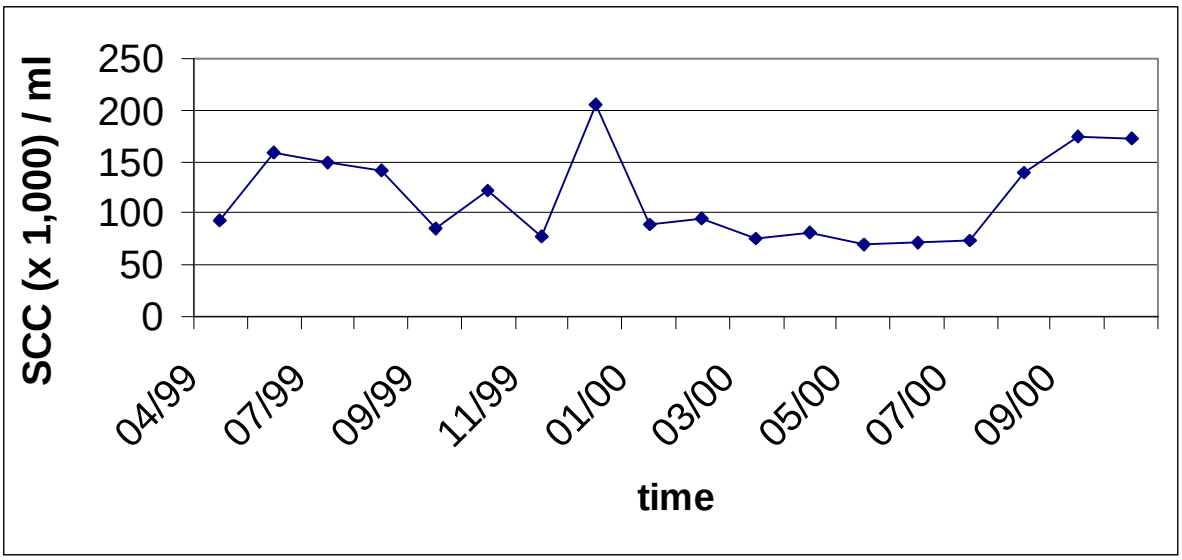

Figure 1. Percentage of infected quarters.

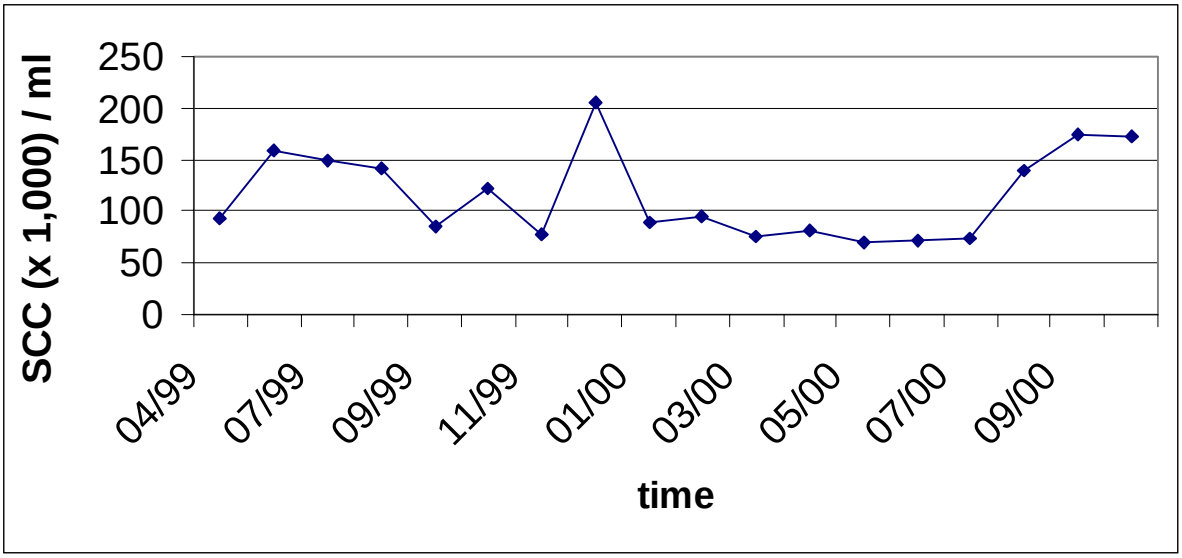

Figure 2. Development of somatic cell count over the time.

Figure 2 shows the development of the arithmetic mean of herd's somatic cell count (monthly milk recording). At the beginning there was a continual decrease of the value. Then a stabilisation of somatic cell count mean at the level below 100 000 cells / ml was observed. The reason for this can be the improved milking- and cubicle hygiene.

Investigation of the electrical conductivity

It has to be considered that the electrical conductivity is a variable for the measuring of deviations in the permeability of the blood-udder-barrier but not for findings of clots in the milk. The electrical conductivity is only an additive diagnostic parameter. In spite of this a comparison between conductivity "alarm" and clots in milk was carried out. In a milking robot there is no possibility to observe the first squirts of milk. Clots were assessed as a visible sign of acute mastitis. There were 4 true positive (6.8 percent), 27 false negative and 55 false positive results. It can be concluded that there is only a loose relation between both parameters. Similar facts are reported by Schwarzer, 2000; Trilk and Münch, 2001. With this comparison it could be seen that at this time there are no reliable udder health information.

Conclusion

The safeguarding of udder health can not be achieved in an AMS without effective prophylactic measures. From this point of view the important measures are the disinfection of teat-cleaning-brushes and teatcups with PAA as well as the spray-dipping with jodophors. The best possible cleanliness of udders is the precondition for a very low brush- and teatcup-contamination. This is the base for an effective disinfection. The uncertainties in the robot mastitis diagnostics are the cause for the necessity for an additional udder health monitoring. It has to include the clinical and bacteriological examination of the herd in regular intervals. Out of the available somatic cell counts of the herd, a detection of cows with high mastitis risk (> 300 000 cells / ml) must be done and measures have to be met. The saving of working time, easement of work and improvement of udder health are advantages which not offhand occur but also require a straight daily management.

References

Model, I. 1995; Pures Wasser tötet keine Keime. dlz – Agrarmagazin 11, 114 – 118.

Schwarzer, K. 2000; Auswirkungen eines Melkroboters auf die Eutergesundheit und die Milchhygiene. Thesis, München, Germany, p 101.

Spohr, M. 2001; Melkzeugzwischendesinfektion: Einsatzkriterien und Erfahrungen in Baden-Württemberg, lecture, conference Kesla Chemie GmbH – Pharma Wolfen, March 2001, Greppin, Germany

Trilk, J. und Münch, K. 2001; Nutzung der elektrischen Leitfähigkeit zur Rohmilch- und Eutergesundheitskontrolle bei automatischen Melksystemen, lecture, colloquium, April 2001, Groß Kreutz, Germany.