Evaluation of somatic cell count under automatic milking conditions

K. Barth

Institute of Physiology, FML, TU Weihenstephan,
Weihenstephaner Berg 3, D – 85354 Freising., Germany
E-mail: Kerstin.Barth@t-online.de

Summary

Investigations under standardised conditions (6 cows, milked and sampled for 16 days with varied milking interval, MI) showed, that increasing MI of 4, 8 and 12 hours lead to decreasing somatic cell count (SCC) of 499, 360 and 297 cells per ml (P≤ 0,016), respectively. In contrast to our study, some authors observed increasing SCC with MI if cows were sampled in automatic milking systems. Further investigations in herds milked automatically confirmed both observations. SCC increased with increasing MI per herd, as determined by the management program. By contrast SCC decreased if it is evaluated per cow. The relationship between subclinical mastitis, lowered milk yield and yield based MI explains the differences.

Key words: *Milking interval, somatic cell count, mastitis detection.*

Introduction

Milk recording under robotic milking conditions collects milk samples after different MI. It is known that this must be taken into account for the evaluation of some milk constituents. SCC of milk is an established parameter to supervise udder health, its analysis in monthly recorded milk samples is common practice. Thus the affection of SCC by MI gains new importance.

Material and methods

Investigations were carried out under standardised conventional as well as under robotic milking conditions.

6 cows were milked and sampled in a stanchion barn over a period of 16 days in two trials (8 days each). MI were 4:8:12 and 8:4:12 hours, respectively. Quarter milk samples were analysed for SCC. Methods of milking and sampling are already described elsewhere [1].

Quarter milk samples gained during robotic milking were not available. Therefore, a herd of 47 cows, usually milked by an automatic system, was sampled in a herringbone parlour three times over a period of 14 days [2]. The MI between the last robotic milking and the parlour milking was noticed. Based on this value the three days of sampling were ranked per cow into shorter, intermediate and longer MI. This allowed the direct comparison within cow and quarter. Robotic milking was continuously supervised during these days, and real MI determined as well as the MI of the management program (= minimum of time between two milkings).

Evaluation of cyto-bacteriological analyses followed the standards recommended by DVG [3]. Statistical analysis was based on SPSS 10.0 for Windows.

Results and discussion

Investigations under standardised conditions showed that increasing MI cause decreasing SCC (Figure 1) and confirm observations by other authors [4, 5].

These results are in contrast to the information gained from the herd milked automatically. Fixed MI and real conditions are shown in table 1.

SCC tends to increase with longer MI if SCC data are evaluated according to the MI as determined by the management program (Figure 2). This corresponds to studies by other authors [6].

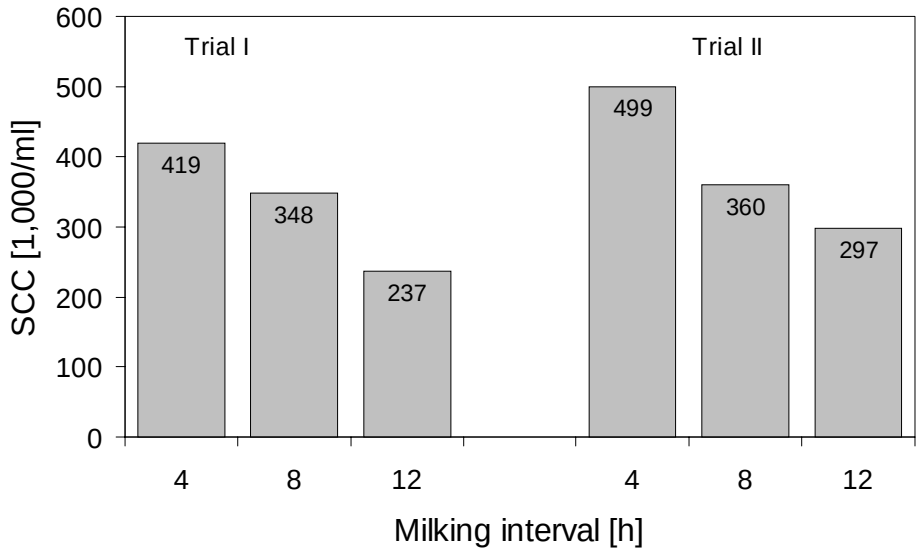

Figure 1. Somatic cell count (SCC) after varied milking intervals (delogarithmic means of 24 quarters of 6 cows, P≤ 0.016).

Table 1. Determined and real milking intervals in a herd milked automatic automatically.

Milking interval [h]				
Defined	Real (mean)	s	Milkings	Cows
< 6	7.3	1.9	1 030	7
< 7	8.4	1.8	659	5
< 8	9.9	2.2	870	8
< 9	11.4	2.6	555	6
< 10	11.6	2.5	256	3
< 11	12.3	2.4	327	4
≤ 12	13.6	2.7	750	11

The comparison between SCC of sampling days within each udder quarter revealed that SCC is really lower after longer MI (Figure 3). The calculated differences between MI classes were highly significant ($P < 0.001$). Thus, the reported increase of SCC has to be caused by the defined MI.

Management programs usually calculate MI based on the expected milk yield. Higher milk yields lead to shorter MI, and low yielding cows are not milked as often as they visit the milking robot. Lower milk yields may be caused by stage of lactation as well as udder disease. A lowered milk

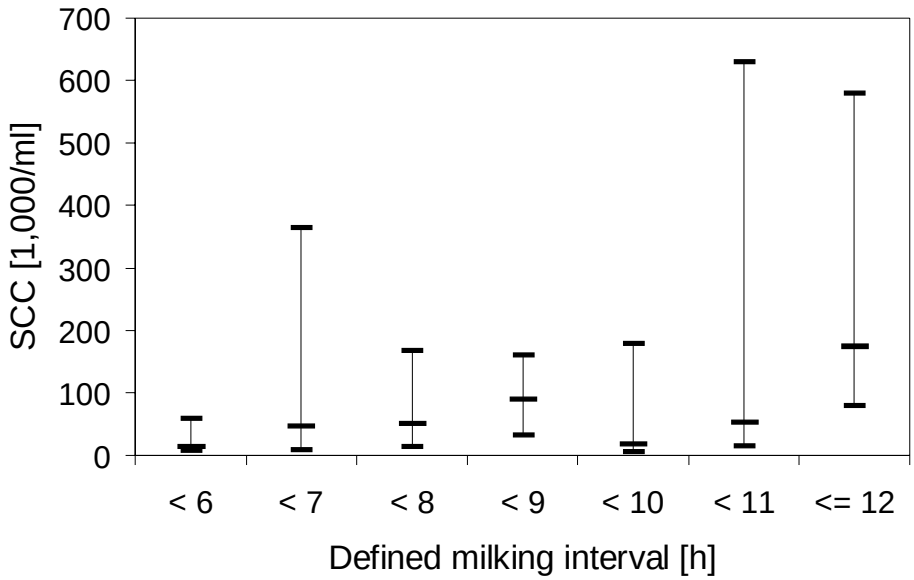

Figure 2. SCC quartiles according to the milking interval as determined by the management program (176 quarters of 44 cows).

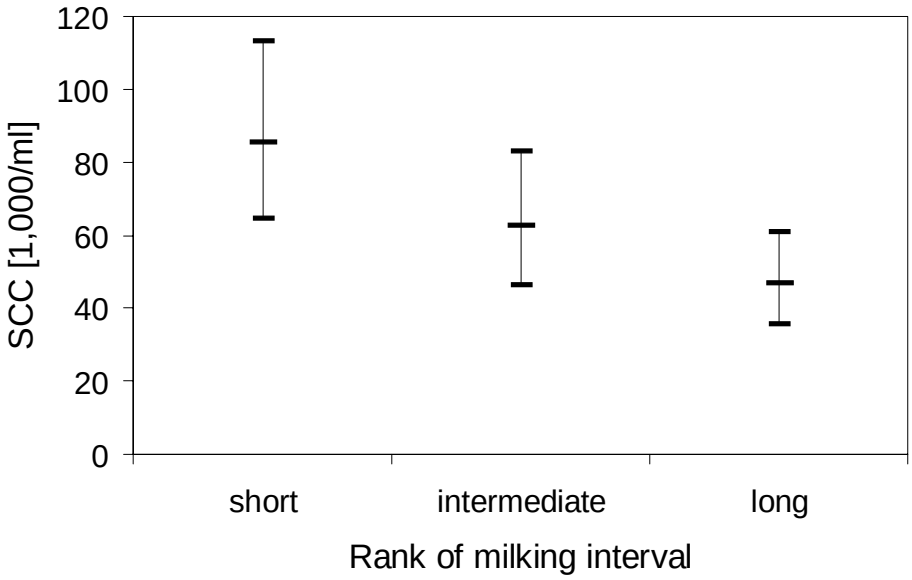

Figure 3. Mean and 95% interval of confidence of SCC for ranked milking intervals before quarter milk sampling in a milking parlour (176 quarters of 44 cows).

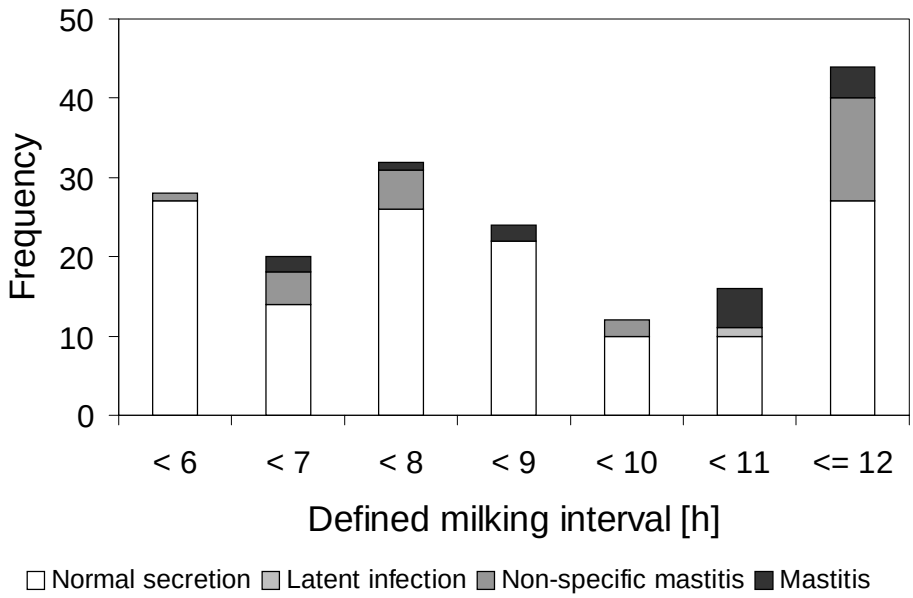

Figure 4. Frequencies of quarter health status according to the milking interval determined by the management program.

yield is often a side effect of subclinical mastitis. Therefore, cows with subclinical mastitis (and higher SCC compared to healthy cows in the same herd) were milked in longer intervals. Figure 4 shows the distribution of healthy and disturbed quarters based on the defined MI classes. Obviously, the major part of mastitis quarters was milked after more than 10 hours.

Conclusions

Increasing MI causes decreasing SCC readings. The reported increase of SCC connected with wider MI under robotic milking conditions is no contradiction. Mastitis is often accompanied by a lowered milk yield. Therefore, mastitis cows usually get longer MI from the management program. This gives the impression that SCC increases with MI. Scientific investigations concerning udder health in herds milked automatically should take into account that correct data must be based on MI within cow or quarter to avoid false conclusions.

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