
Evaluation of milking routine by using LactoCorder in combination with cytobacterial analysis of the milk of Holstein Frisian

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Due to the economic conditions and an efficient and fast milking process many farmers use automatic stimulations and take-offs. In addition to these facilitations there may be a positive effect on udder health. This is caused by the fact that automatic support leads to a constant work flow in difference to the manual job that can change temporarily. In the experiment included were four farms with 60 to 240 Holstein Frisian cows with at least 8.000 kg milk output per year. All farms were free of contagious germs. Milk flow curves were registered at three times per farm by LactoCorder (n=1589). Additionally parameters of the milking routine, time “first touch until attaching the unit”, blind milking times and other parameters were identified. Foremilk samples were taken antiseptically and were analysed by Fossomatic 360 (SCC) and the samples were bacteriologically examined according to IDF-standard. The share of bimodal milk flow curves - an indication for insufficient stimulation - were different on the farms. Also the blind milking times were different, even between the farms with automatic take off. There is a significant effect of the bimodal milk flow curves, time “first touch until attaching the unit” and the blind milking time on the milk quality especially on the somatic cell count.

Key words: Milk quality, stimulation, bimodality, milking routine, somatic cell count, LactoCorder.

Economic conditions push to a drastic reduction of production costs for milk. Important in this context is an efficient and fast milking process. If all preparing transactions are achieved manually this is very time-consuming. If all preparing processes are completed by hand, must be counted on an expenditure of time by 60 seconds per cow (Worstorff, Dethlefsen, 1994). Accordingly only milking of 60 cows per working hour is possible. This expenditure of time cannot be agreed however with the

Summary

Introduction

quest for higher throughputs of cows per hour in the parlor. Therefore many farmers use automatic stimulations and take-offs. In addition to these facilitations there may be a positive effect on udder health. This is caused by the fact that automatic support leads to a constant work flow in difference to the manual job that can change temporarily.

Data acquisition

For the attempt 4 farms with 60 to 240 lactating cows (Holstein Frisian) were available. The herd average efficiency of all farms was situated over 8 000 kg milk/year. The cows were held in loose housing stables with lying box, which were cleaned twice day; feeding was made totally or partly by mixed rations; the herd management of the farms is most comparable. The operations were free of contagious streptococcus (*S. agalactiae*, *S. canis*) and the quarterly infection rate with *Staphylococcus aureus* was below 5%. The farms used milking machines of different manufacturers, design and configuration. For the investigation the milk flow curves of all cows were recorded by LactoCorder at all work stations. In addition to each measurement and to each animal a milking log was made, in that among other things the milking routine, the udder form, the blind milking times on quarterly level, the time from the first contact with the udder up to fixing milking units and the behavior of the cow was held during milking. From all lactating cows an quarters antiseptical foremilk samples were taken and analysed in the by Staatliches Medizinal-, Lebensmittel- und Veterinäruntersuchungsamt Mittelhessen means of Fossomatic 360 after IDF standard (IDF, 1981). Each farm was measured three times in the distance of three months.

Results

A complete milking routine begins with the foremilking of the first milk jets, checking of the milk and cleaning of the teats, teats crests and udder floor. By these handles at the udder the cow is already stimulated. Additionally a mechanical stimulation can be used. In this study one farm used a vibration stimulation. As parameter for a not sufficient stimulation of the cows and the associated milking readiness the bimodal milk flow curve is considered. The farms differ clearly in their proportion of bimodal milk flow curves (Figure 1).

The highest proportion (32%) could be found on the farm that uses the vibration stimulation. On this farm the cows are milked in an autotandem parlor, so that milking things were fixed directly after foremilking and udder cleaning. For these processes on the average 10 seconds were needed. On the other three farms cows were milked in group parlors. Here all details of milking routine were not completed directly one after another (like in the autotandem system), but in groups of three or five cows. By the waiting period, in which the neighbour cows are foremilked and cleaned, it lasted from the first contact of the udder up to fixing the milking units on these farms between 60 to 130 seconds. The farm with the longest time from beginning of routine up to fixing had also the highest proportion of

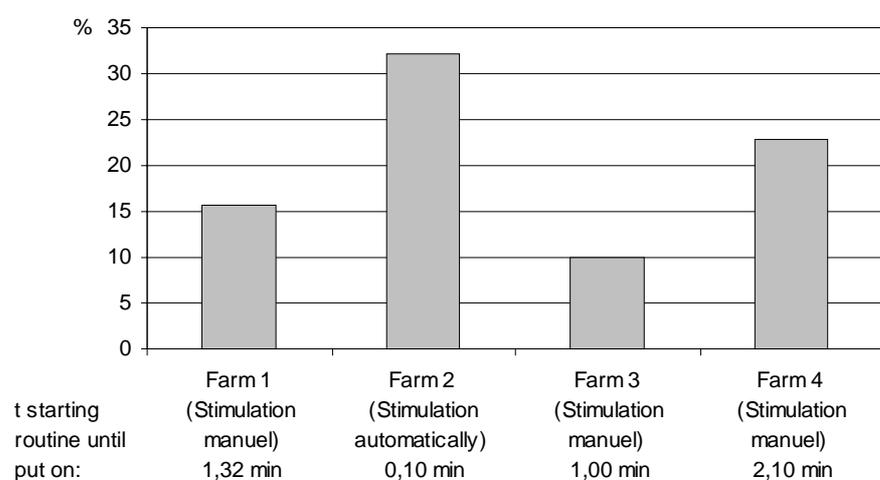


Figure 1. Share of bimodal milk flow curves in per cent (n=1590).

bimodal milk flow curves (23%). The smallest proportion of bimodal milk flow curves could be found on the farm, which manually prepared the udder and had exactly 1 minute between beginning of routine and fixing the milking unit.

The bimodal process of the milk flow curve highly significant correlates with the time of the first contact up to fixing with $r = 0.166$ (Table 1). Exactly the same negative high significant correlation exists for stimulation and to the milk flow before stimulation. No connection between the behavior during milking and bimodal milk flow curves could be found, however a

Table 1. Correlation of bimodality with selected parameters.

	Milking place	MF before stimulation	Stimulation	t until attaching	Fit of the unit	Behaviour	Post milking	Somatic cell count	Microbiology
Bimodality	-0,042**	-0,076**	-0,062**	0,166**	-0,188**	-0,026	-0,086**	0,102**	0,045**
	Lactation	Stadium of lactation	Milk yield	HMF	tMHG	tPL	tAB	tBMG	DMHG
Bimodality	-0,081**	0,142**	-0,182**	0,182**	-0,158**	-0,299**	-0,058**	-0,026**	-0,061**

strong correlation between stepping during milking and bimodality. Assertion for the fact is that animals, which are exposed to stress and therefore step during milking, keep the milk and thus have a bimodal curve. Bimodal curves are very strongly correlated with the parameters of milking. A bad beginning of milking affects thus the entire milking process negatively. The time for the main milk flow (tMHG), the plateau phase (tPL) and phase of descent (tAB) is reduced. Also milk quantity and bimodality are high significantly correlated. Further lactation and stadium of lactation have a high-significant influence on bimodality of the milk flow curve.

The effects of the bimodality on udder health can be detected by means of antiseptical quarter foremilk samples. Parameter for udder health is among other things the number of cells, whereby a cow is considered as udder healthy, if it has a cell content less than 100 000 cells/ml on all four quarters (Deutsche Veterinärmedizinische Gesellschaft, 1994). A cell content between 100 000 and 200 000 is already considered as health and also quality impairing; higher cell contents must be defined as pathological. Of the animals, which had a one peak milk flow curve, 35% were udder healthy. If one regards against it the cows with bimodal curve due to stimulation lacking, then here the proportion of healthy animals (29%) is smaller.

These results are acknowledged by the highly significant correlation ($r = 0.102$) of the bimodal curves and the cell numbers. For further analysis the data were calculated over the analysis of variance. In figure 2 the effects from stimulation and time to fixing are represented on the cell content of the milk. For this the time up to fixing was divided in classes. The smallest

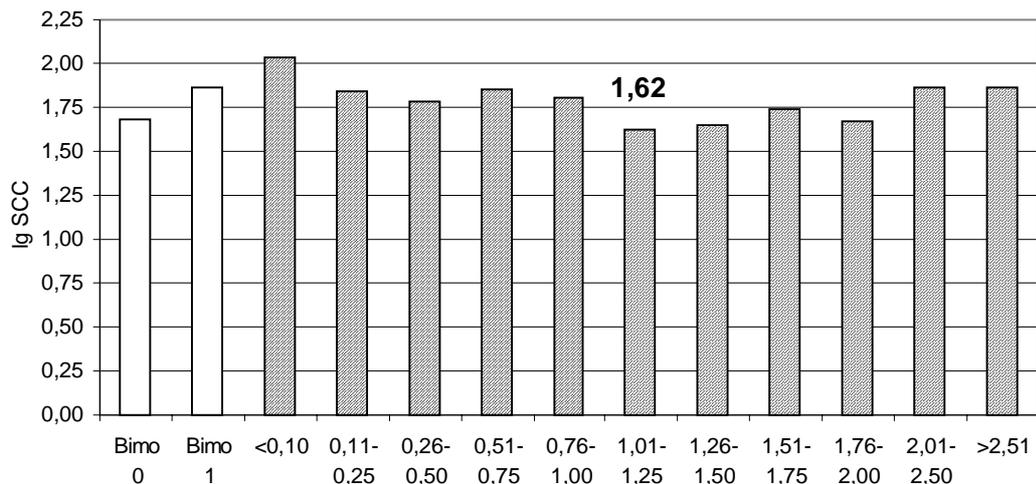


Figure 2 Effects of Stimulation and time "first touch until attaching the unit" on SCC.

cell content was found with a time from the first contact to fixing between one minute and 1.25 minutes. If the time up to fixing is too short or longer than 2 minutes, this affects the udder health negatively. A constant milking routine, with a time of one minute between first contact of the udder and fixing of the milking unit, affects udder health thus positively. In this minute however the udder does not have to be continuously stimulated or touched.

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