



Application of Lacto-Corder in the control of production and milkability properties of dairy cows in Croatia

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Summary

Control of dairy cows production in Croatia consist of two steps: measurement of milk amount after milking and taking of milk samples for chemical analysis. This kind of control gives very few information about production. On the other hand, for several years other countries use sophisticated devices, such as Lacto-Corder, for monitoring of many parameters important for production and selection of cows. Lacto-Corder is measuring device for production control and collecting of milk samples. It is acknowledged by the International Committee for Animal Recording (ICAR). In Croatia, for the research work and investigation of use in production, first Lacto-Corder was bought. Research work was conducted on Holstein cows (n=457). Cows were in the range from first to sixth lactation. Thirteen production parameters were measured. Duration of main milking phase (tMHG) was 4.51 min. The average amount of milk in that time (MHG) was 10.18 kg. Average milking in minute (DMHG) was 2.27 kg/min. Research results have showed justifiability of using Lacto-Corder in every day production

Introduction

Milkability, as one of secondary goals, defines udders characteristics and milking flow. This characteristic is getting special importance in transfer from hand to mechanical milking. According to Politieku (1961) milkability means cow ability to be milked fast, equal and entirely with correct milking procedure. Milkability testing in cattle breeding has a following goal: to improve cow privilege for milk process during breeding-selection choice. Milking accounts for about 50 % of work during milk production and because of that from the productivity viewpoint milkability has the large economical importance. The aim of this research is to study milkability properties with sophisticated device Lacto-Corder that is used for the first time in control of milk production in the Republic of Croatia.

Material and methods

The research was conducted on 457 holstein breed cows in the range from first to sixth lactation. Measurements were made in period from 50 to 180 day of lactation with measuring device Lacto-Corder. Number of milking and production parameters were followed, but in this study the special attention was given to duration of main milking phase (tMHG), milking flow in the main milking phase (DMHG) and amount of milk in the main milking phase (MHG). The data were analyzed using the general linear model procedure of the StatSoft, Inc. Statistica (2008). Multiple comparison of average values was made using the Post Hoc Tests and Fisher LSD method, with following levels of significance (p<0.05 and p< 0.01). Fixed linear model equation was:

$$Y_{ijkl} = \mu + F_i + RL_j + SL_k + e_{ijkl}$$

Where:

- Y_{ijkl} = observed characteristic
- μ = general average
- F_i = fixed effect of *i* farm (1, 2, 3 and 4)
- SL_j = fixed effect of *j* lactation order (1, 2 and 3)
- RL_k = fixed effect of *j* lactation stage (1, 2 and 3)
- e_{ijkl} = random error

Results and discussion

For quick and efficient milking it is desirably that cows have a long and persistent plateau phase, while ascending and descending phase should be shorter as possible (Göft et al., 1994). These stages are directly related to the form of curves of milking flow and they are one of the key factors of their appearance. Main milking phase (tMHG) in holstein-friesian cows lasted on average around 4.5 minutes. Time of milking duration in studied animals can be considered as optimal because oxytocin works very shortly. During the period of time of about 10 minutes after the start of oxytocin excretion its blood concentration largely reduces and thus its effect on milk gland has also being reduced. When there is no oxytocin only the milk from the udders tank can be milked, while alveolus milk lags behind in the milk gland (Havranek and Rupic, 2003).

Table 1. Total duration time (in minutes) of individual parts of the main milking phase of holstein breed cows for all lactations.

	\bar{x}	sd	min	max
tS500 (min)	0,21	0,23	0,01	4,29
tAM (min)	0,75	0,55	0,04	4,48
tPL (min)	1,67	1,36	0,05	9,99
tAB (min)	2,14	1,27	0,05	10,97
tMHG (min)	4,51	1,88	0,61	19,37

Table 2. Total average values of milking flow in the main milking phase (DMHG), maximum milking flow (HMF) and amount of milk per milking (MHG) of holstein breed cows for all lactation

	\bar{x}	sd	min	max
DMHG (kg/min)	2,27	0,79	0,59	5,48
HMF (kg/min)	3,49	1,27	0,89	10,51
MHG (kg)	10,18	3,66	5,00	20,14

The milk flow of the main phase of mechanical milking (DMHG) of holstein cows was on average 2,27 kg/min and did not have the expected growth trend through lactations. In the first lactation its value was 2,12 kg/min. In the second lactation, contrary to expectation, the milk flow was lower (for about 0,08 kg/min). In the third and further lactations its speed was the highest (2,43 kg/min). The maximum milk flow (HMF) and the amount of milk per milking (MHG) were increased with the lactation order.

Conclusion

Studies have shown that improvement of milkability properties has a positive effect on productivity in mechanical milking, udders health and milk quality. Relevant institutions that create and implement the cattle breeding program in the Republic of Croatia should include milkability properties in cattle selection index. Further research must be focused on the study of genetic parameters for certain milk ability properties. Besides at the selection of bull's mothers, milkability properties should be taken into account when conducting the progeny test of young bulls where for the start the minimum conditions for the milk flow should be established.

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