

FAILURES IN CONVEYING HYGIENIC PROCEDURES DURING MILKING OF COWS

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Abstract: Milk presents very convenient environment for multiplying of microorganisms from the surroundings or from udder itself. To obtain milk correct in hygienic sense, except health milk glands, environmental factors which could contribute to additional milk contamination are important too. Failures in hygiene of milk, milkmen, milking environment or milking machines, as well as their technical accuracy, have primary importance in occurrence of udder diseases and therefore in milk quality too. In this paper, the mentioned factors were examined on the farm with free keeping of cows, where they were milked in a milking parlour. Results obtained by the observation and estimation of corresponding procedures are satisfactory on the whole, but correction of the existing failures could contribute to better health condition of udder, better production results and improvement of hygienic quality of milk.

Key words: milk, hygiene, failures, milking.

I n t r o d u c t i o n

There are many factors influencing raw milk quality including, as the most important, nutrition of cows, udder condition, milking hygiene and procedures during milk collecting. In our country, raw milk that arrives in dairy store mostly has an increased number of microorganisms, which is primarily influenced by failures in hygiene during milking and milk collecting.

Considering a large frequency and heterogeneous failures in hygienic procedures during milking of cows, the aim of this study was to determine and connect them with the quality of milk.

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Materials and Methods

Examinations were carried out on the farm where there is a representative intensive free system of keeping Holstein Friesian cows. Milking is carried out mechanically twice a day in a milking parlour type “fish-bone”, where 64 cows can be milked simultaneously in 4 working canals with 8+8 places. Examinations of hygienic status on the farm and during milking of cows were carried out by the method of Brydl et al., (1985) by evaluating certain parameters by an appropriate number of points. Modification of the number of examined parameters was applied in this methodology and a correction of points for evaluating hygienic status was done.

Conditions on the farm, concerning with hygiene of a milk gland and milking was evaluated as “good”, “medium” or “bad”, depending of the total number of collecting points.

Also, effects of disinfection of udder, milking machines and milkmen’s hands were examined, by applying Contact Slide tests. Effects of milkmen’s hand disinfection with a preparation based on iodine was also examined. The occurrence and etiological type of mastitis was discussed on a year level.

Results and Discussion

Results of examination and evaluation of hygiene of a joint milking parlour are shown in table 1.

T a b. 1. - Examination of milking parlour hygiene

Parameter	Points	Average number
Mechanical cleansing	0-15	15
Sanitary washing	0-15	15
Hygienic quality (dust)	0-15	12
Hygiene of walls	0-15	10
General hygienic impression	0-15	12
Total	0-75	64

*Legend: Estimation: good (over 60 points), medium (40-60), bad (below 40)

Mechanical cleaning of milking parlour floor is done by washing all dirt with water. Milking parlours are cleaned with hoses before and after each milking and between 2 shifts, which was evaluated with a maximum score. Sanitary washing is done daily and thorough after the end of milking. Disinfection of milking room is carried out with a preparation based on hypochlorite. Hygienic quality of air in a milking parlour is satisfactory due to a good air-ventilation system. However,

there could be noticed some dirt on the walls and the windows of milking parlour which points that hygiene of these surfaces has not been satisfactory for a long time. Taking into consideration all parameters of conducted examinations, the hygiene of a milking parlour was evaluated as good.

The results of examinations and estimation of udder and milking hygiene are given in the table 2.

T a b. 2. - Estimation of udder and milking hygiene

Parameter	Points	Average number
Washing udder before milking	0-15	10
Wiping udder with massage	0-15	10
Checking the first jets of milk	0-15	8
Disinfection of teats before milking	0-15	0
Type of disinfectant		BLINAL
Addition of emollients	0-15	0
Minimal time of contact	0-15	0
Lesions on teats	0-15	12
Washing of milking machines	0-15	15
Disinfection of milking machines	0-15	15
Type of disinfectant		BLINAL
Setting the teat cups	0-10	8
Checking the milk ejection	0-10	0
Post-milking by machine	0-15	15
Taking the teat cups off	0-5	5
Checking the end of milking	0-5	5
Way of dipping teat cups into disinfectant		Dipping and spraying
Dipping teats into disinfectant	0-15	0
Ingredient of milk or feces in the applicator	0-15	12
Type of disinfectant		BLINAL
Handling the animals	0-10	8
Total	0-220	123

*Legend: Estimation: good (over 160 points), medium (110-160), bad (below 110)

Quality and hygiene of milking on the farm can be qualified as medium. Udder washing is performed by showers, but water pump is occasionally out of function. There are not enough cloths for udder wiping. At the checking of the first jets, milk is milked into a special basin, but the basin content is not put away into the pail but is spilt and rinsed on the cow's place. Lesions on the teats are not present

in most cases. Washing of the milking machines and disinfection are carried out correctly, as well as post-milking and checking of the end of milking. During the setting of teat cups, dirt from the floor is sometimes sucked in, but the taking of the teat cups off is carried out correctly. Animals are treated gently, although during and after the milking some animals show anxiety.

Preparation based on iodine is used for teat disinfection, immediately after the teat cups taking off, by dipping or spraying, with no further rinsing. Solution is replaced if disinfectant changes color, which shows reduced efficiency.

All the results of examination and estimation of milkmen's hygiene are shown in table 3.

T a b. 3. - Estimation of milkmen hygiene

Parameter	Points	Average number
Pre- milking hand washing	0-15	15
Post- milking hand washing	0-15	15
Pre -milking hand disinfection	0-15	0
Post- milking hand disinfection	0-15	0
Robe hygiene	0-15	10
Shoes hygiene	0-15	15
Total	0-90	55

* Legend: Estimation: good (70-90), medium (50-70), bad (below 50)

The results obtained show that pre- and post- milking hand washing is carried out regularly and thoroughly, while hand disinfection is not performed at all. The robe of milkmen is not completely clean, apart from shoes which are regularly washed. According to the total score the hygiene was qualified as "medium".

Examination and estimation results of hygienic and technical-technological characteristics of the milking machines are shown in table 4.

T a b. 4. - Hygienic and technical-technological characteristic of milking machines

Parameter	Points	Average number
Performances of the vacuum pump	0-5	5
Losses due to leakages (in the milk and the vacuum line)	0-5	5
Operation of control valves	0-10	10
Vacuum level	0-15	15
Variation of vacuum level	0-15	15
Operation of pulsators:		
- Number of cycles	0-10	10
- Proportion of cycles	0-10	10
Condition of milking units	0-10	10
Cleanness of milking machines	0-10	10
Total	0-90	90

* Legend: Estimation: good (70-90), medium (50-70), bad (below 50)

According to the estimation of all presented parameters, hygienic and technical-technological characteristics of the milking machines on the farm were evaluated as maximum.

The results of milkmen's hands, milking machines and udder disinfection examination are presented in table 5.

T a b. 5. - Microorganisms colony number per 1 cm² of udder skin surface, inner surface of teat cups and milkmen's hands surface, before and after disinfection by iodine based preparation

Statistic parameter	Teat skin		Teat cups		Hand skin	
	Before disinfection n=20	After disinfection n=20	Before disinfection n=20	After disinfection n=20	Before disinfection n=20	After disinfection n=20
X	127.80	51.05 (60,06)*	105.60	49.40 (53,22)*	49.45	21.95 (55,61)*
SD	40.39	16.23	20.71	10.85	20.29	13.45
Cv	31.60	31.79	19.61	21.96	41.03	61.27
Sx	8.66	3.48	4.44	2.32	4.35	2.88
IV	57-222	26-73	66-141	30-71	20-85	5-50

* percentage expressed effect of disinfection

According to the average total microorganisms colony number per 1cm² of udder (60.06%), teat cups (53.22%) and milkmen's hands (55.61%) surface, it is evident that iodine preparation disinfection effect is not totally satisfactory, but it contributes to the reduction of microorganisms number on the surfaces examined.

Occurrence and etiological type of mastitis data are shown in table 6.

T a b. 6.- Occurrence and etiological type of mastitis on the examined farm

Parameter	Frequency, %
Mastitis occurrences	10.20
Clinical mastitis	1.76
Subclinical mastitis	8.44
Staphylococcae	89.5*
Streptococcae	10.5*

*frequency according to the total number of cows infected by mastitis

According to data from table 6, it is deducible that percentage of mastitis infection in the stock is high, which is approximately to the data from developed countries (Radostis et al., 1994), with higher percentage of subclinical mastitis. Both clinical and subclinical mastitis considerably decrease milk production (Aleksić et al., 1994). Higher percentage of staphylococcal mastitis confirms the influence of external factors on mastitis occurrences, primarily hygiene failures, because udder skin and infected cows milk are main reservoirs of Staph. aureus, while Str. agalactiae does not survive in the environment and is easy to exterminate (Katić et al., 1996).

Hygiene of cow milking has direct influence on the quality of milk, and indirect on udder health condition. Hygiene of milkmen, milking parlour or stable, milking machines, milk tanks and other equipment are very important (Hristov et al., 1997, 1998), and were determined by EEC Directive 89/362 as well (Nedić and Mijačević, 2002). Our examinations, carried out according to the methodology of Brydl et al. (1985), have shown that the most frequent failures come from inadequate milkmen's hygiene, hygiene of a milking parlour and preparing procedures for udder milking, apart from milking machines, which are most carefully attended. Cow milking is one of the most important and most complex technological operations in milk production (Adamović et al., 1996), but considering that milk is an ideal base for bacteria multiplying (Katić and Stojanović, 1998) to which it has been exposed during milking, keeping, processing and distribution, adequate and hygienically correct milking should prevent the contamination of milk from environmental microorganisms. Streptococcae and staphylococcae, as the most frequent causes of mastitis, are mostly transferred through milking machines (Hristov et al., 1999). Technical accuracy of milking machines can significantly influence milking efficacy and udder health, as well as economy of milk production (Adamović et al., 1996). Inadequate use of milking machines is the main factor for increasing appearance of subclinical mastitis (Hristov and Anojčić, 1998). Decreasing of new udder infections implies the disinfection of teats after each milking, maintenance of milking machines, teat cups disinfection, udder washing with warm running water and other hygienic-sanitary measures (Hristov et al., 2000), which has been confirmed by numerous examinations. Luhofer et al. (1996) have implied a program based on improvement of milking hygiene and milking machines on 261 farms with a problem of increased number of somatic cells, which resulted with decreasing of number of somatic cells in collected milk and better health condition. Matzke et al. (1992) point out to the fact that failures in milking, damage of milking machines and bad udder hygiene contribute to udder illness.

C o n c l u s i o n

Milking hygienic conditions, accuracy of milking machines, and proper handling, as well as regular washing and disinfection of milking machines, udder, milkmen's hands, and milking parlour considerably effect udder health condition of cows. Behavior of workers toward animals, personal hygiene and conveying of milk gland hygiene, as well as milking procedures are of great importance. Irresponsible behavior of workers-milkmen can immensely influence hygienic conditions of milk production, as well as increase the number of udder quarters infected by mastitis, despite adequately planned and conveyed prophylactic procedures. Milking hygiene and disinfection, as well as proper technical

functioning of milking machines, with cow treatment in a dry period and excluding of infected heads represent basic measures in contemporary programs of mastitis preventing and controlling.

According to the analyses of milking parlour, milk gland, milking and milking machines hygiene, it is evident that there are certain failures, which are possible to overcome, especially by workers' education and regular control. General opinion, based on observation of conveying hygienic measures, is nonetheless satisfactory.

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PROPUSTI U SPROVODJENJU HIGIJENSKIH MERA PRI MUŽI KRAVA

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R e z i m e

Mleko predstavlja veoma povoljnu sredinu za razmnožavanje mikroorganizama poreklom iz spoljne sredine ili iz samog vimena. Za dobijanje higijenski ispravnog mleka, osim zdrave mlečne žlezde, važni su i faktori spoljne sredine, koji mogu da doprinesu naknadnoj kontaminaciji mleka. Propusti u higijeni muže, muzača, sredine u kojoj se obavlja muža i aparata za mužu, kao i njihova tehnička ispravnost, imaju primaran značaj u nastanku oboljenja vimena a odatle i na kvalitet mleka. U ovom radu su pomenuti faktori ispitivani na farmi sa slobodnim držanjem krava, gde se muža obavlja u izmuzištu. Rezultati dobijeni posmatranjem i bodovanjem odgovarajućih postupaka su u celini zadovoljavajući, iako postoje propusti čijom bi se korekcijom moglo doprineti boljem zdravstvenom stanju vimena, boljim proizvodnim rezultatima i poboljšanju higijenske ispravnosti mleka.

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