

Effect of some selected factors udder health condition and milk technological value of high-yielding cows from a commercial farm

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ABSTRACT: The performed investigations focused on the impact of the share of HF cattle genes, consecutive lactation, lactation phase, season of year and applied disinfectants for after-milking teat bath on somatic cell count in milk. In addition, proportions of genetic variants of four milk proteins as well as milk technological quality were estimated.

INTRODUCTION

Recent years have brought about a considerable shift of emphasis in dairy cattle rearing as farmers began to pay more and more attention to economical aspects of milk production. The most important factors guaranteeing producers high milk prices include: its high hygiene value and very good technological quality as a raw material for dairy industry.

MATERIAL AND METHODS

Investigations were carried out on a commercial farm on 35 cows of black and white breed with over 85% upgrade of HF breed genes and average milk, fat and protein yields of: 8339, 356 and 283 kg, respectively.

Cows on the farm on which experiments were conducted were kept in a stanchion system. Animals were milked twice daily in their stands with an Alfa Laval pipeline milking machine using Duovac apparatuses.

Feeding was based on a monodiet. The experiment lasted from November 1999 to November 2000. The experimental population of cows was divided randomly into two groups depending on the applied disinfectant for a post-milking teat bath: Dipal and Hydrasoft.

Dipal is a post-milking disinfectant developed on the basis of iodine. Its antibacterial action is associated with properties of iodine compounds. The agent dries rapidly on the teat and forms a layer impenetrable for microorganisms.

Hydrosoft is a hydrated gel and its activity is based on its physical properties (osmosis). Its main component is a gliceropolyacrylic gel and its antibacterial action consists in depriving microorganisms, which come into contact with it, of water and, in so doing, destroying them. Due to its strong water binding capacity, the preparation is characterised by considerable moisturising properties.

Milk was sampled once a month during official milk recording. The monthly results of milk recording also provided such information as: daily milk yields, concentrations of fat, protein and somatic cell count. In addition, the following milk technological parameters were determined: freshness – by resazurine method, casein content – by Walker's method. In addition, clotting quality was assessed in fermentation and rennin samples.

In the milk of each cow, genetic variants of four protein polymorphic fractions (CSN1S1, CSN2, CSN3 and LGB) were determined. Electrophoresis was performed on starch gel using the Smith's method modified by Michalak (1969).

In the performed experiments, impact significance of the following factors was analysed:

- Disinfecting agent (Dipal, Hydrasoft),
- HF gene breed upgrade ($\leq 90\%$, $> 90\%$),
- time of analysis: autumn (September, October, November), winter (December, January, February), spring (March, April, May) and summer (June, July, August),
- udder health condition on the basis of somatic cell count in milk (group I $< 200,000$; group II - 201,000 – 400,000; group III – 401,000 – 500,000, group IV 501,000 – 1,000,000, group V $> 1,000,000$),
- lactations (1, 2, 3, 4, 5, 6),
- lactation phase (first 100 days of milking, second 100 days and third 100 days)
- The performed statistical calculations employed the SAS program (1991) (MEANS and GLM procedures).

RESULTS

When the effect of the two applied post-milking teat disinfectants on daily milk yield and udder health condition was assessed, no significant differences in milk yield (Hydrasoft – 26.9 kg and Dipal – 27.9 kg) and somatic cell count (11.77 and 11.36, respectively) were recorded. Somatic cell count was found to increase both with the increase of HF breed gene upgrade and with consecutive lactations. Somatic cell count in the group where Hydrasoft was applied was 10.90 in the first lactation and 12.77 – in the third. A similar tendency, with the exception of the first lactation, was observed in the group of cows where Dipal was applied. Lactation phase was found to have a highly significant influence on logarithmic somatic cell count in milk. As the length of lactation increased, so did the proportion of cell elements in the milk of experimental animals (first 100 days – 10.79, second 100 days – 11.77 and the third 100 days – 12.15). The season of the year also had a highly significant impact on somatic cell count. In spring and winter, somatic cell count in milk was the lowest (10.56 and 11.30), while in summer and autumn – the highest (12.35 and 11.95). The examined

population of cows was characterised by the following share of genetic variants of milk protein fractions: CSN1S1 BB – 100%, CSN2 AA – 94.3%, AB – 5.7% and CSN3 AA – 71.4%, AB – 28.6%, LGB AA – 14.3%, AB – 34.3% and BB – 51.4%. Milk technological quality assessment revealed that over 80% of samples obtained the best result in tests for freshness. Mean casein content in milk of the experimental cows was 2.76%, while that of crude protein - 3.65%. When milk was assessed on the basis of fermentation samples, it was found that 13.79% of clots were uniform and 22.99% showed some cracks in clots (most desirable, from the point of view of technological processing). When rennin was applied, the proportion of clots with desirable properties amounted to 65.48% of all samples.

CONCLUSIONS

1. The assessment of the health condition of the milk gland on the basis of somatic cell count in milk did not show any significant differences between groups of cows in which two different disinfectants for post-milking teat bath were applied.
2. Somatic cell count in milk was found to be affected by: HF upgrade, consecutive lactations, phase of lactation and season of the year.
3. The proportion of milk protein genetic variants is characteristic for the population of black and white cattle with a high Holstein-Friesian upgrade.
4. Milk technological quality, assessed on the basis of: freshness, casein content and clotting quality in fermentation and rennin samples was good.

