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ANALYSIS OF SOMATIC CELL COUNT IN MILK OF COWS CHRONICALLY INFECTED WITH COXIELLA BURNETII

MIODRAG RADINOVIĆ, STANKO BOBOŠ,
MARIJA PAJIĆ, IVANA DAVIDOV[1]

SUMMARY: Various infectious agents who are present in the animals can directly- existence of changes in the mammary gland, or indirectly-increased number of leukocytes in the systemic circulation, leading to an increase in the number of somatic cells in milk. Q fever is a rickettsial disease that is most common in home and abroad. Infected cows usually suffer asymptomatic, and clinically observable changes can be abortions, reduced fertility, low vital offspring, mastitis, ceratoconuctivitis, bronchopneumonia. The influence of infection with Coxiella burnetii on the movement of somatic cells in the infected cow was tested on a group of Holstein-Friesian cows. For most cows we observed an increase in the number of somatic cells. Somatic cells in milk samples ranged from 103 000 to 2 000 000 per ml of milk. Average somatic cell count in all milk samples was 853 000.

***Key words**: Coxiella burnetii, milk, somatic cell.*

INTRODUCTION

The number of somatic cells in milk is an indicator of the health status of mammary gland. Disorders of secretion caused by the influence of different causes lead to an increase in the number of somatic cells, and their increase with high confidence indicates the effect of unfavorable factors on the mammary gland. What is the significance of the increased number of somatic cells to assess the general health of animals when we know that somatic cells in the highest percentage are leukocytes. General health disorders caused by the action of agents that are not connected to the mammary gland may be the reason for the increase in the number of somatic cells. Infection with Coxiella burnetii in cows often runs innaparent, and the animals remain in production, not exhibiting any clinical symptoms. Clinical manifestations of the disease is mainly related to disturbances in reproduction, but symptoms can occur in other organ systems (Rodolakis et al., 2007). Q fever is manifested only in cattle abortions, and in case of chronic diseases cause is primarily excreted in milk and can be isolated from mammary

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Original scientific paper / *Originalni naučni rad*
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gland. In these animals secretion disorder is present to a greater or lesser extent (Guateo et al., 2006, Vidic et al., 2008).

MATERIALS AND METHODS

On the dairy farm of Holstein-Friesian cattle in ten animals were serologically confirmed Q fever using the micro-CF test, antigen Coxiella burnetii phase II was used, strain Nine Mile. Positive finding was considered a finding of specific antibodies in the serum dilution 1:4 and more. From infected cows cumulative milk samples were taken for the control of somatic cells. Cows were free of clinical symptoms including abortions, in good body condition and milk production was below the average herd production. The milk samples were taken at intervals of 42 days during the morning milking of cows. Milk was sampled by Vaikato attaches to the milking units during sampling, to obtain the average and homogeneous sample. After sampling, in each sample was added sodium azide as a preservative, and then homogenize the sample by mixing so the preservative is equally distributed, to prevent the collapse of somatic cells. After sampling the samples were transported to the laboratory at the temperature of the refrigerator. Laboratory analysis of samples was performed in the laboratory for the control of raw milk dairies "Subotica" on fosomatic device by flow citometry.

RESULTS AND DISCUSSION

By summary analysis of cumulative milk samples for somatic cells, we found in the majority of cows increased number of somatic cells above the hygienic standards of milk. Table 1 shows the results of somatic cells count for three consecutive milk sampling.

Table 1. Somatic cell count in cumulative milk samples
Tabela 1. Broj somatskih ćelija u zbirnim uzrocima mleka

	first sampling *prvo uzorkovanje*	second sampling *drugo uzorkovanje*	third sampling *treće uzorkovanje*
SCC x 10^3	526	1024	147
	1795	103	361
	900	2000	2277
	588	1193	1004
	169	836	419
	685	236	1092
	743	1236	113
	1485	1048	
	130	981	
	1240		
average / *prosek*	826	961	773

In the first sampling of ten cows that were in control, in only two the number of somatic cells was in the range of milk hygienic standards. In the second sampling of the nine cows in the control in two somatic cell count was within the limits of hygiene standards, and the third sampling of seven cows in the three somatic cell count was within the limits of hygiene. Of the total number of samples in 40% somatic cell count was over one million, which is a very high value. In 25% of samples somatic cell count was in the range of hygienic standards. In the same period the number of somatic cells in herd milk sample did not exceed 300,000 per ml. Infected animals accounted 5% of the herd. Infection of cows with Coxiella burnetii affects the appearance of disorders of milk secretion (Vidic et al., 1999), and mastitis was one of the possible symptoms of this infection (Šeguljev et al., 1994). In chronically infected cows the mammary gland and associated lymph nodes are predilective place for Coxiella burnetii and it can be isolated primarily from the udder and milk (Vidic et al., 2005). Number of somatic cells in milk varied in cows in the experiment from 103 000 to 2 000 000 per ml, and the average number of somatic cells in all samples was 853 000 per ml. The increase in the number of somatic cells in infected cows indicated Vidic et al., 1990, where most of the cows had somatic cells in milk above the limits of hygiene. On the association between infection with Coxiella burnetii and the existence of subclinical mastitis in cows indicated Barlow et al. 2008 who found in infected cattle movement in the number of somatic cells from 229 000 to 762 000 per ml. Along with changes in number of somatic cells changes in share of different cell types also occur. So share of polymorphonuclear cells is increasing up to 85% of all somatic cells in case of subclinical mastitis (Boboš and Vidić, 2005).

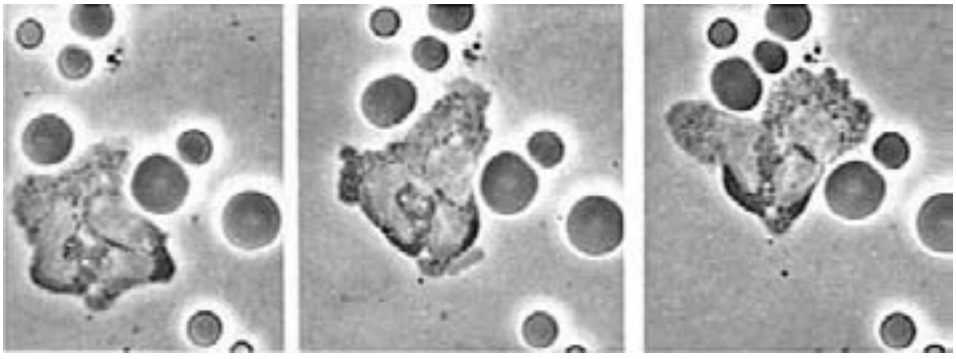

Figure 1. Wiew of milk cells with microscope (12000:1)
Active movement of cells among the fatty drops during time. First picture shows beging of watcing and every other is two minutes after.
Slika 1. Prikaz ćelija mleka pomoću mikroskopa (12000:1)
Aktivno kretanje ćelija medju masnim kapljicama. Prva slika prikazuje početak posmatranja a svaka sledeća je u razmaku od dva minuta.

CONCLUSION

Chronically infected animals used in production can produce milk with changed chemical composition and hygienic quality. Permanent increase in the number of somatic cells in cows with no clinical symptoms related to the mammary gland or other

organs needs to emphasize the need for further research in order to exclude chronic infection. Infection of cows with Coxiella burnetii may cause the increase of somatic cells in milk and this possibility deserves special attention of veterinarians who deal with medical conditions dairy herds.

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ANALIZA BROJA SOMATSKIH ĆELIJA U MLEKU KRAVA HRONIČNO INFICIRANIH SA COXIELLA BURNETII

MIODRAG RADINOVIĆ, STANKO BOBOŠ,
IVANA DAVIDOV, MARIJA PAJIĆ

Izvod

Različiti infektivni agensi prisutni u organizmu životinje mogu na direktan-postojanje promena na mlečnoj žlezdi, ili indirektan način-porast broja leukocita u sistemskoj cirkulaciji, dovesti do porasta broja somatskih ćelija u mleku. Q groznica je bolest koja se od svih koksieloza najčešće javlja u svetu i kod nas. Inficirane krave najčešće boluju

asimptomatski a od klinički uočljivih promena mogu postojati pobačaji, smanjena plodnost, slabo vitalan podmladak, mastitisi, keratokonjuktivitis, bronhopneumonije. Uticaj infekcije sa Coxiella burbetii na kretanje broja somatskih ćelija kod inficiranih krava ispitan je na grupi krava holštajn-frizijske rase. Kod većine krava zapaženo je povećanje broja somatskih ćelija. Broj somatskih ćelija u uzorcima mleka kretao se od 103 000 do 2 000 000 u ml mleka. Prosečan broj somatskih ćelija u svim uzorcima mleka bio je 853 000.

Ključne reči: Coxiella burnetii, mleko, somatske ćelije.

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