

## THE SIZE OF THE FARM AND ITS INFLUENCE AT CLEANLINESS OF THE COWS AND MILK HYGIENE

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### ABSTRACT

For animals the sense of physical comfort is necessary (physical comfort). When animals feel physically comfortable, it means that every part of their bodies is in harmony with the surrounding area. Therefore, the farms are usually build in accordance with the number of cattle that will be hold in designed facilities, which provide a higher degree of cows cleanliness. Cleanliness of cows is important in order to produce hygienically clean milk and to achieve the cattle welfare of dairy cows too. Cleanliness of animals mostly depends on what kind of object they are placed in. Hygienically proper milk includes the number of microorganisms up to 100,000 / ml and the number of somatic cells to 400,000 / ml, which are regulated by the "Regulations on quality of fresh raw milk." For this research farms are divided into three groups according to the number of cows. The first group included the number of cows from 1 to 9, the second group included 10 to 19, and a third group 20 or more cows. The aim of this paper is to examine whether there is an influence of the size of farms (number of cows) on the subjective cow cleanliness and hygienic quality of milk.

**Key words:** cow cleanliness, somatic cells, bacteria, the number of cows

### INTRODUCTION

The main objective that has to be realize while projecting stalls for cows is to provide the appropriate accommodation, such as comfort, favourable microclimate, feeding, milking and manure evacuation (Čobić and Antov, 1996). The European Commission for Food Safety gave the corresponding recommendations for keeping dairy cows that farmers have to respect in order to achieve good production and also achieve the welfare of dairy cows (European Food Safety Agency, 2009).

Cleanliness of cows is important in order to produce hygienically proper milk and to achieve the welfare of dairy cows too. Cleanliness of animals mostly depends on what kind of object they are placed in. To produce milk of good chemical and microbiological composition, it is necessary to provide conditions for milking, and to carry out milking properly. Disinfection of teats after milking, as only protection, especially in a shorter period of time does not prevent from new cases of mastitis (Hristov and Reljic, 2004). Besides daily cleaning, it is preferably at least once a year to make a thorough cleaning of the entire barn, and then painting (Regional Office for Europe and Central Asia Food and Agriculture Organization of the United Nations, 2013).
















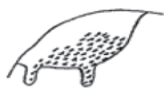




Hygienically proper milk includes the number of microorganisms up to 100,000 / ml and the number of somatic cells to 400,000 / ml, which are regulated by the "Regulations on quality of fresh raw milk." Every increase in the number of somatic cells in milk above 100,000 / ml is connected with a decrease in milk production, and it has an impact on the quality of milk products (Katic, 2007). High bacterial levels in milk, whether originating from the cow or the environment, substantially affect the quality, safety, and consumer acceptance of milk and dairy-derived products (Piepers et al, 2014). The aim of this paper is to examine whether there is an influence of the size of farms (number of cows) on the subjective cow cleanliness and hygienic quality of milk.

### MATERIALS AND METHODS

On the territory of Bosnia and Herzegovina a group of researchers in the period from 05.12.2013 to 15.03.2014 made an investigation within the project named "Evaluation of the welfare and quality of accommodation dairy cows in Bosnia and Herzegovina". This research was aimed to examine the quality of accommodation for dairy cows in Republic of Srpska, Bosnia and Herzegovina. Research was conducted on 76 farms that are owned by registered agricultural producers.

On the special scheme that was used for the evaluation of cow's hygiene, was assessed five cows on each farm. That pattern contained: the number of cows, rump appearance, appearance hooves, changes on body parts (scratches, swelling, open wounds, parts without hair), and schematic drawings of cows with ratings for thighs, legs, udder, stomach left and right side and schematic view of the back of the cow. Legs, stomach and thighs are usually the dirtiest part of the cow's body that are located in the barn while the udder is usually cleaner because it is cleaned daily because of milking. Considering with previous statements, these regions are the most critical at these farms where we specifically determined purity: thighs and legs on the left and right sides, udder and belly also within left and right side, as well as the back of the cows in particular. These marks are numbered on a scale from 1 to 4. Mark 1 means that cow is clean, grade 2 some dirty, grade 3 dirty while score 4 indicates a very dirty cow.

Marks for cow cleanliness are rated from 1 till 4 (Ruud et al, 2010)

Cow cleanliness score	1 (clean)	2 (some dirt)	3 (dirty)	4 (very dirty)
Rear				
Thigh				
Leg				
Udder				
Belly				

Schematic representation

**RESULTS AND DISCUSSION**

The results of this research show that number of cows has not significant influence on subjective cleanliness and hygiene of milk (number of somatic cells and bacteria). For this research farms are divided into three groups according to the number of cows. The first group included 1 to 9 cows, the second group included of 10 to 19 cows and the third group included 20 or more cows.

**Table 1, Descriptive analysis for subjectively cleanliness related to cows number**

Statistical parameters	$\bar{X}$	S	Sx	CV	min	Max
<b>First Group</b>	2.10	0.56	0.12	26.67	1.2	3.4
<b>Second Group</b>	2.08	0.76	0.14	36.54	1	3.6
<b>Third Group</b>	1.97	0.68	0.20	34.51	1.2	3.2
<b>Average</b>	2.05	0.67	0.15	32.57	1.13	3.4

Average amount of subjectively cleanliness for first cows group was 2.10. The smallest average value of subjectively cleanliness for first group was 1.2 whereas the largest average value was 3.4. Average amount of subjectively cleanliness for second cows group was 2.08. The smallest average value of subjectively cleanliness for second group was 1 whereas the largest average value was 3.6. Average amount of subjectively cleanliness for third cows group was 1.97. The smallest average value of subjectively cleanliness for third group was 1.2 whereas the largest average value was 3.2. Average amount of coefficient of variation for all cows groups was 32.57.

**Table 2, F test for subjectively cleanliness in comparison with number of cows.**

Number of heads	$\bar{X}$	F calculated	F tabularly	
			0.05	0.01
First group	2.10	0.15	3.15	4.98
Second group	2.08			
Third group	1.97			

Average mark of subjectively cleanliness for 1st group of cows is 2,10 for 2nd 2,08 and for third group 1,97. Calculated value of F test is not statistically significant in terms of subjectively cleanliness of cows.

Average number of somatic cells for first group of cows was 233,794. The smallest average number of somatic cells in milk for first group of cows was 11,101 whereas the biggest number of somatic cells was 1044,003. Average number of somatic cells for second group of cows was 155,304. The smallest average number of somatic cells in milk for second group of cows was 7,781 whereas the biggest number of somatic cells was 895,689.

**Table 3, Descriptive analysis for number of somatic cells related to number of cows**

Statistical parameters	$\bar{x}$	<i>S</i>	<i>Sx</i>	<i>CV</i>	<i>min</i>	<i>Max</i>
<b>First Group</b>	233,794	287,210	61,233	122,85	11,101	1044,003
<b>Second Group</b>	155,304	190,572	36,014	122,70	7,781	895,689
<b>Third Group</b>	160,588	133,886	38,649	83,37	28,488	436,160
<b>Average</b>	183,229	203,890	45,299	109,64	15,790	791,951

Average number of somatic cells for third group of cows was 160,588. The smallest average number of somatic cells in milk for first group of cows was 28,488 whereas the biggest number of somatic cells was 436,160. Average amount of somatic cells for all cows groups was 109,64.

**Table 4, F test for number of somatic cells related to number of cows**

Number of heads	$\bar{x}$	F calculated	F tabularly	
			0,05	0,01
First group	233,794	0.85	3.15	4.98
Second group	155,304			
Third group	160,588			

Average number of somatic cells in milk for 1st group of cows is 233,794 for second group 155,304 and for third group 160,588. Calculated F test is not statistically significant for number of cows when we talk about number of somatic cells in milk.

**Table 5, Descriptive analysis for number of bacteria in comparison with number of cows**

Statistical parameters	$\bar{x}$	<i>S</i>	<i>Sx</i>	<i>CV</i>	<i>min</i>	<i>Max</i>
<b>First Group</b>	58,602	69,897	14,902	119,28	7,351	319,976
<b>Second Group</b>	81,824	205,033	38,747	250,58	4,076	1099,015
<b>Third Group</b>	32,704	25,201	7,275	77,05	9,606	100,466
<b>Average</b>	57,710	100,044	20,308	148,97	7,011	506,486

Average number of bacteria for first group of cows was 58,602. The smallest average number of bacteria in milk for first group of cows was 7,351 whereas the biggest average number of bacteria was 319,976. Average number of bacteria for second group of cows was 81,824. The smallest average number of bacteria in milk for second group of cows was 4,076 whereas the biggest average number of bacteria was 1099,015. Average number of bacteria for third group of cows was 32,704. The smallest average number of bacteria in milk for third group of cows was 9,606 whereas the biggest average number of bacteria was 100,466. Average amount of bacteria for all cows groups was 148,97.

**Table 6, F test for number of bacteria in comparison with number of cows**

Number of heads	$\bar{x}$	F calculated	F tabularly	
			0,05	0,01
First group	58602.14	0.50	3.15	4.98
Second group	81824.27			
Third group	32704.71			

Average number of bacteria in milk for 1st group of cows amounts 58602.14 for 2<sup>nd</sup> group is 81824.27 and for third group is 32704.71. Calculated value of F test is not statistically significant if we talk about number of bacteria in milk.

### CONCLUSION

In recent times dairy cows are selected by level of production. In that way it is necessary to provide adequate housing conditions. Good conditions will have positive effects on their health, and good quality of milk too.

The results that we have obtained show that the number of cows has no influence on subjective cleanliness of cows. It has been observed that in all three types of farms have approximately the same rank of cow`s hygiene. Results also showed that there is no significant influence of the number of cows on the hygienic quality of milk. Properly managing as well as cleaning stalls and cows guarantees a high quality of milk.

### ANNOTATION

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