Scientific Papers. Series D. Animal Science. Vol. LXI, Number 1, 2018
ISSN 2285-5750; ISSN CD-ROM 2285-5769; ISSN Online 2393-2260; ISSN-L 2285-5750

SOMATIC CELL COUNT OF MILK IN HOLSTEIN COWS RAISED IN TURKEY CONDITIONS: A COMPARATIVE EVALUATION

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Abstract

The objective of this paper was to discuss the level of somatic cell count (SCC) of milk in Holstein cows raised in Turkey. In total, 20 investigations conducted on Holstein breed Turkey (TR) and other countries (OC) were examined by SCC and effective non-genetic factors. The data were designed from the scientific journals on animal science published in the last decade. The means of SCC for TR and OC were calculated to be 486x10^3 cells/ml and 354x10^3 cells/ml, respectively. No statistical differences were found between two averages by log10 base. While parity, farm, month and stage of lactation were the significant factors affecting SCC for TR Holsteins, parity and calving season were the main factors for OC Holsteins. The findings revealed that reducing SCC have to be seen a priority target by the farm owners to achieve more productive herds.

Key words*: cow milk, environmental factor, Holstein, somatic cell count.*

INTRODUCTION

Milk industry has become one of the most important sector within today's animal farming. Not only breeder selection studies have been carried out, but also boosting raw milk quality has been intensified throughout the world. In this sense, detecting bacterial load is admitted as the prevalent procedure, many indirect techniques have been developed to determine milk quality degree. Such as, somatic cell count (SCC) is the most reliable indicator among the indirect parameters.

In normal, somatic cells are originated from body tissues and their amounts suddenly increase during intra-mammary infection or abnormality.

Thus, limit thresholds for SCC have been declared in many countries in respect to potableness of milk by human. While this level is 400x10^3 cells/ml in the EU countries, it has formally been affirmed to be 500x10^3 cells/ml in Turkey.

Actually, many studies investigating SCC of dairy cows have been conducted in different locations of the world and also in Turkey. However, comparative studies are still needed in this subject. Revealing the quality degree of raw milk of dairy cows in Turkey conditions will be gain an important information for milk industry of the country.

The aim of the study was to compare SCC of milk collected from Holstein cows raised in Turkey conditions and other regions of the world.

MATERIALS AND METHODS

To evaluate, 20 manuscripts those published in animal science journals and informed SCC results obtained from Holstein cows were investigated. All manuscripts had been published in the last decade and 10 papers of those were carried out in Turkey (TR). Before the evaluation, SCC data were transferred to logarithm 10 base to ensure homogeneity of variance. To compare SCC levels of Holstein cows belonging to Turkey with those noted in the other countries (OC; n=10), independent t-test were applied. The statistical processes were performed using SPSS 17 for Windows.

RESULTS AND DISCUSSIONS

In the present study, SCC means of Holstein raw milk in TR and OC are given in Table 1.

As seen, a wide variation among the SCC values is attractive. Also, the SCC average of TR was found to be 1.6 times higher than those obtained in OC.

However, the threshold for SCC of bovine raw milk in Turkey has been informed as $500x10^3$ cells/ml. Thus, calculated SCC mean might be assumed nearby to that limit. Besides, obtained SCC mean in OC might not be accepted as optimum.

While EU directives has been declared the highest SCC to be $400X10^3$ cells/ml, the worrisome average for OC was also observed here.

Table 1. Some study results on SCC ($x10^3$) of Holsteins

Researchers in TR	SCC	Researchers in OC	SCC
Erdem et al., 2007	572	Gaafar et al., 2010	313*
Atasever and Erdem, 2008	1071	Sefidmugzi and R. Baghal, 2014	250
Koc, 2008	456*	Sefidmugzi and Amer, 2015	88*
Atasever and Erdem, 2009	959	Ludovico et al., 2015	637
Koc and Kizilkaya, 2009	450	Sri Balaji et al., 2016	195
Kaygisiz and Karnak, 2012	506	Weglarz et al., 2008	968*
Alic Ural, 2013	879	Salamanczyk and Gulinski, 2013	427
Yilmaz and Koc, 2013	63	Stadnik and Atasever, 2015	302
Cinar et al., 2015	274*	Stadnik and Atasever, 2017	183
Yavuz and Kaygisiz, 2015	419	Jeretina et al., 2017	172*
Overall	~565	*Overall*	~353

*: estimated value

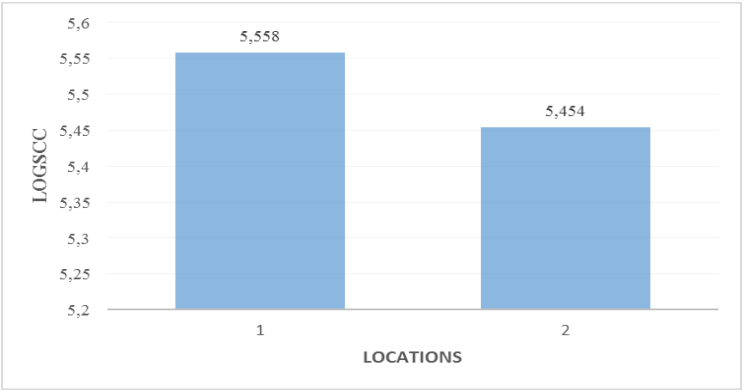

Figure 1. Change of logSCC means by locations (1=TR, 2= OC)

Distribution of environmental factors affecting SCC in both locations is presented in Table 2. While parity was the most important factor, farm, stage of lactation and month were other main factors causing high SCC for both locations.

Koc (2008) emphasized in a study that parity, herd, lactation month and milking time were significant ($P<0.05$) factors for SCC in Holsteins.

To compare SCC means by locations, all SCC data were transferred to logarithm 10 base (logSCC) before the analysis. According to final results, no significant difference was found between two locations of this study (Figure 1).

However, the findings clearly reflected that Holstein cows had high SCC not only in TR but also in OC.

In this context, giving more effort to reduce high SCC would be regarded in Holstein herds. Due to high association of management practices with milk SCC (Sefidmazgi and Amer, 2015), ensuring hygiene and applying precisely milking procedure should firstly be paid attention in the farms.

Table 2. Distribution of effective factors on SCC in TR (n=10) and OC (n=10) Holsteins (%)

Factors	TR	OC
Parity	23.07	27.77
Farm	15.38	11.11
Stage of lactation	15.38	11.11
Month	15.38	11.11
Milking time	11.38	-
Season	7.69	5.55
Calving season	7.69	11.11
Test day	3.84	5.55
Lactation length	-	5.55
Milk yield	-	5.55
Year	-	5.55

CONCLUSIONS

The SCC levels of Holstein cows raised in Turkey conditions were compared with those raised in the other countries. It was revealed that SCC means of Holstein herds in the both locations were relatively high according to EU directives.

In conclusion, taking substantial precautions to minimize non-genetic factors have to be seen as an imperative process by dairy farmers.

REFERENCES

Aliç Ural D., 2013. The Relationships Among Some Udder Traits and Somatic Cell Count in Holstein-Friesian Cows. Kafkas Univ. Vet. Fak. Derg., 19 (4), 601-606.

Atasever S., Erdem H., 2009. Association between subclinical mastitis markers and Body Condition Scores of Holstein cows in the Black Sea region, Turkey. J. Anim. Vet. Adv., 8(3), 476-480.

Atasever S., Erdem H., 2009. Estimation of milk yield and financial losses related to somatic cell count in Holstein cows raised in Turkey. J. Anim. Vet. Adv, 8(8), 1491-1494.

Cinar M., Serbester U., Ceyhan A., Gorgulu M., 2015. Effect of Somatic Cell Count on Milk Yield and Composition of First and Second Lactation Dairy Cows, Italian J. Anim. Sci., 14:1, 3646.

Erdem H., Atasever S., Kul E., 2007. Some environmental factors affecting somatic cell count of Holstein cows. J. Appl. Anim. Res., 32, 173-176.

Gaafar H.M.A., Basiuoni M.I., Ali M.F.E., Shitta A.A., Shamas A.Sh.E., 2010. Effect of zinc methionine supplementation on somatic cell count in milk and mastitis in Friesian cows. Arch. Zootech., 13, 36-46.

Jeretina J., Skorjanc D., Babnik D., 2017. A new somatic cell count index to more accurately predict milk yield losses. Arch. Anim. Breed., 60, 373–383.

Kaygisiz A., Karnak I., 2012. Evaluation of Somatic Cell Count in Raw Milk Samples Collected from Dairy Farms in Kahramanmaras Province for EU Norms and Subclinical Mastitis. KSU J. Nat. Sci., 15, 9-15.

Koc A., 2008. A Study of Somatic Cell Counts in the Milk of Holstein-Friesian Cows Managed in Mediterranean Climatic Conditions. Turk. Vet. J. Anim. Sci., 32 (1), 13-18.

Koc A., Kizilkaya K., 2009. Some factors influencing milk somatic cell count of Holstein Friesian and Brown Swiss cows under the Mediterranean climatic conditions. Arch. Tierz., 52 (2), 124-133

Ludovico A., Maion V.B., Bronkhorst D.E., de Santana E.H.W., 2015. Losses in milk production and quality due to milk somatic cell count and heat stress of Holsteins cows in temperate climate. Ciências Agrárias, 36 (5), 3455-3470.

Salamonczyk E., Gulinski P., 2013. Somatic cell level in dairy cows' milk during extended lactation. Ann. Anim. Sci., 13 (4), 859–868.

Sefidmazgi A.S., Amer P.R., 2015. Milk losses and quality payment associated with somatic cell counts under different management systems in an arid climate. Can. J. Anim. Sci., 95, 351-360.

Sefidmazgi A.S., Bagha F.R., 2014. Effects of herd management practices on somatic cell counts in an arid climate. R. Bras. Zootec., 43(9), 499-504.

Sri Balaji N., Saravanan R., Senthilkumar A., Srinivasan G., 2016. Effect of subclinical mastitis on somatic cell count and milk profile changes in dairy cows. Int. J. Sci. Envir., 5(6), 4427- 4431.

Stadnik L., Atasever S., 2015. Influence of some environmental factors on body condition score and somatic cell count in Czech Holstein cows. Indian J. Anim. Res., 49(6), 774-777.

Stadnik L., Atasever S., 2017. Influence of somatic cell count and body condition score on reproduction traits and milk composition of Czech Holstein cows. Indian J. Anim. Res., 51(4), 771-776.

Węglarz A., Gardzina-Mytar E., Zapletal P., Makulska J., Frelich J., 2008. Effect of the parity, lactation stage and season of feeding on the somatic cell count in cow milk. J. Agrobiol., 25(2), 209-214.

Yavuz S., Kaygisiz A., 2015. The Relationship Between Some Body and Udder Measurements with Somatic Cell Count in Holstein Cows. KSU J. Nat. Sci., 18(3), 9-18. (in Turkish).

Yilmaz H., Koc A., 2013. A research on milk yield, persistency, milk constituents and somatic cell count of Red Holstein cows raised under Mediterranean climatic conditions. Bulg. J. Agr. Sci., 19, 1401-1407.