

## **An investigation on somatic cell count in milk samples collected from dairy farms at Tabriz region of Iran**

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### **Abstract**

The aim of present study was somatic cell count in milk samples collected from dairy farms at Tabriz region, Northwest of Iran. Three flocks selected based on high productivity and similar characteristics (use of family labour, Holstein herds and average production between upper than 11 kg/cow/day). Milk samples obtained from three parity classes were collect individually from the cows in the second and fifth month of lactation in two seasons: autumn-winter and spring-summer. Results show higher SCC for dairy cattle with second or upper milking. Cows at fifth or upper lactation period had  $1000-5000 \times 10^3$  cells/ml commonly but at first lactation there was no any cow with  $1000-2500 \times 10^3$  cells/ml. In conclusion, incidence of high SCC rate ( $1000-5000 \times 10^3$ ) is considerably high during fifth or upper parity but 250 to  $750 \times 10^3$  SCC cows are considerably low in number compared with first parity cows. Cows at first lactation commonly had  $250-500 \times 10^3$  SCC at Tabriz regional farms.

**Key words:** Somatic Cell Count, Holstein, Parity, Dairy Cows

### **Introduction**

Somatic cell count (SCC) is a recognized indicator of cow's health and milk quality. Milk SCC reflects the level of infection and inflammation in the mammary gland of dairy cows, associated with mastitis. Milk somatic cells are primarily leukocytes, which depend on intensity of the cellular immune defence. Mastitis is one of the most common dairy cow diseases, and it can causes considerable economic losses to dairy farmers. The losses are caused by several factors, such as decreasing milk yield, marked compositional changes in milk that reduced milk quality, treatment and veterinary costs and increasing risk of early culling of cows. Somatic cell count in milk has been accepted as the world standard for mastitis diagnosis (International IDF Standard 148A, 1995). Milk from healthy udder usually has a SCC less than 200,000 cells/mL, whereas for cows with subclinical mastitis SCC is greater than 200,000 cells/mL. Milk from cows with clinical mastitis may have SCC of several million cells/ml (Smith, 1995). Somatic cell count is an indicator of milk quality and shelf-life is reduced for high-SCC milk. The processing quality and yield of some milk products is reduced when SCC increases (Barbano et al., 1991).

Rajeevie et al. (2003) conducted study on seasonal correlation of SCC, mastitis and milk composition and

finally concluded that in spring SCC has high correlation with milk composition. In the study of Koc and Kizilkaya (2009) the insignificant differences found among herds show the similarities of management, milking hygiene and farm conditions. In order to decrease SCC in milk and increase udder health, some precautions are needed to be taken like improving milking management, hygiene and farm conditions like milking the cow at uniform intervals, feeding the cows after the milking and applying a mastitis control program. Because of mentioned interests, the SCC is very significant in different region of world. In this regard, so many studies were conducted for SCC count in different countries and climates (Olivo et al., 2005; Koc, 2006; Bernadette et al., 2009). The aim of present study was to count somatic cell in milk samples collected from dairy farms at Tabriz region, Northwest of Iran.

### **Material and Methods**

The comparative study was done in farms located in the region of Tabriz, Northwest of Iran. Three flocks were selected based on high productivity and similar characteristics (use of family labour, Holstein herds and average production between upper than 11 kg/cow/day). During the autumn-winter period, the feeding strategy was based on annual and natural

pastures submitted to rotational grazing (day and night periods), with fertilization by organic manure. At milking time, the farms supplemented the cows with concentrate, on average, 3.16 kg/cow/day while on the conventional farms this was an average of 2.6 kg/cow/day. To control mastitis, ecto- and endoparasites, agro-ecological farmers utilized homeopathic and phytoterapic products, while in the conventional system, synthetic chemical products were used. In all of these three farms, manual milking was done for milk sampling before routine machinery milking.

Milk samples obtained from three age classes were collected individually from the cows in the second and fifth month of lactation, in two seasons; autumn-winter and spring-summer. SCC analysis was done electronically by flux cytometer (Bentley Somaticount 500) in the Veterinary Laboratory of Islamic Azad University.

## Results

SCC measures from different parities of dairy cows in three investigated herds are presented as table 1. Data showed higher SCC for dairy cows with second or upper milking. Cows at fifth or upper lactation period had  $1000-5000 \times 10^3$  cells/mL. At first lactation there was not any cow with  $1000-2500 \times 10^3$  cells/mL SCC.

## Discussion

Studies on dairy livestock at Tabriz region were not limited to present investigation. In this regard, Beheshti et al. (2010) studied prevalence and aetiology of subclinical mastitis in ewes of the Tabriz region and concluded that subclinical mastitis seems to be deduced from the high prevalence. Soomro et al. (2000) had shown that SCC is a key factor for prediction of mammary infection or mastitis via their investigation on buffaloes and determination of high correlation between SCC and mastitis in milking buffaloes. Erdem et al. (2010) showed that in Jersey cows, stage of lactation and age are positively correlated with higher SCC. Our findings on local Holstein dairy cows in is in agreement with Erdem et al. (2010) who showed higher SCC at second to upper than fifth parity in comparison with first lactation. But in overall in present study, incidence of high SCC for fifth parity cows especially for  $<250 \times 10^3$  to  $750 \times 10^3$  SCC groups are considerably low when it compared with primiparous cows. This observation was in according to Koc (2006) investigation in Holstein-Friesian at Mediterranean regions of Turkey. In conclusion, incidence of high SCC rate ( $1000-5000 \times 10^3$ ) is considerably more for fifth or upper parity but  $<250$  to  $750 \times 10^3$  SCC considerably low in first parity cows. Cows at first lactation commonly had  $250-500 \times 10^3$  SCC at Tabriz regional farms.

**Table 1: SCC in milk taken at different lactation course (first to upper than fifth) at Tabriz regions selected three high productivity dairy farms**

S.C.C Parity	<250 $\times 10^3$	250-500 $\times 10^3$	500-750 $\times 10^3$	750-1000 $\times 10^3$	1000-2000 $\times 10^3$	2000-25000 $\times 10^3$	>5000 $\times 10^3$	Flock
First	12 (86%)	2 (14%)	-	-	-	-	-	A
	21 (84%)	1 (4%)	-	1(4%)	-	-	2(8%)	B
	26 (90%)	3(10%)	-	-	-	-	-	C
Second to fourth	19 (86%)	1 (5%)	2(9%)	-	-	-	-	A
	16 (59%)	4 (15%)	-	-	2 (7%)	4 (15%)	1 (4%)	B
	41 (84%)	5 (10%)	1 (2%)	-	1 (2%)	1 (2%)	-	C
Fifth and upper	3 (30%)	-	2 (20%)	3 (30%)	1 (10%)	-	1 (10%)	A
	5 (50%)	-	1 (10%)	-	1 (10%)	2 (20%)	1 (10%)	B
	13 (76%)	2 (12%)	-	-	1 (6%)	1 (6%)	-	C

## References

- Barbano, D.M., Rasmussen, R.R. and Lynch J.M. 1991. Influence of milk somatic cell count and milk age on cheese yield. *J Dairy Science*, 74:369–388.
- International IDF Standard 148A. 1995. Milk Enumeration of Somatic Cells. International Dairy Federation, Brussels, Belgium.
- Smith, K.L. 1995. Standards for somatic cells in milk: Physiological and regulatory. *IDF Mastitis Newsletter*, 144(21):7–9.
- Rajeevie, M., Potoenik, K. and Levstek, K.J. 2003. Correlations between Somatic CellsCount and Milk Composition with Regard to the Season. *Agriculturae Conspectus Scientificus*, 68: 221-226.
- Koc, A. and Kizilkaya, K. 2009. Some factors influencing milk somatic cell count of Holstein Friesian and Brown Swiss cows under the Mediterranean climatic conditions. *Archiv für Tierzucht*, 52: 124-133.
- Bernadette, O., Donagh, B. Berry, P. Kelly, P. William, J. Meaney, E. and O'Callaghan J. 2009. A study of the somatic cell count (SCC) of Irish milk from herd management and environmental perspectives. Moorepark Dairy Production Research Centre, Fermoy, Ireland. Project Number 5399.

- Olivo, C. J., Beck, L. I, MossateGabbi, A. SantiniCharão, P. Sobczak, M.F, Gomes L.F, Dürr, J.W and Araújo, F.R. 2005. Composition and somatic cell count of milk in conventional and agro-ecological farms: a comparative study in Depressão Central, Rio Grande doSul state, Brazil. *Livestock Research for Rural Development*, 17 (6): Article #72.
- Beheshti, R., Shaieghi, J, Eshratkhah, B, Ghiasi Ghalehkandi J. and Maheri-Sis N. 2010. Prevalence and Etiology of Subclinical Mastitis in Ewes of the Tabriz Region, Iran. *Global Veterinaria*, 4 (3): 299-302,
- Soomro, S.A., Mirbahar, K.B., Memnon, M.I, Arijio, A.G, and Soomro N.M. 2000. Relation between somatic cell count and chemical composition tests used for detection of sub-clinical mastitis in buffaloes. *Pakistan Journal of Biological Sciences*, 3(1): 142- 143.
- Erdem, H., Atasever S. and Kul E. 2010. A Study on Somatic Cell Count of Jersey Cows. *Asian Journal of Animal and Veterinary Advances*, 5: 253-259.
- Koc, A. 2006. Analysis of Repeated Milk Somatic Cell Count of Holstein-Friesian Cows Raised in Mediterranean Climatic Conditions. *Journal of Biological Sciences*, 6: 1093-1097.