International Journal of Science, Environment and Technology, Vol. 5, No 6, 2016, 4427 – 4431
ISSN 2278-3687 (O)
2277-663X (P)

EFFECT OF SUBCLINICAL MASTITIS ON SOMATIC CELL COUNT AND MILK PROFILE CHANGES IN DAIRY COWS

Sri Balaji N., R. Saravanan, A. Senthilkumar and G. Srinivasan
Tamil Nadu Veterinary and Animal Sciences University,
Veterinary University Training and Research Centre, Salem – 636 001
E-mail: vetsribalaji@gmail.com (**Corresponding Author*)

Abstract: Subclinical mastitis is a major cause of economic loss in dairy herds that shows no gross inflammatory changes in udder, hence remains unnoticed unless investigated by employing laboratory tests. Often it is more prevalent than the Clinical mastitis, it usually precedes the clinical form, it reduces milk production and adversely affects milk quality. Hence the study was undertaken to evaluate the effect of subclinical mastitis in apparently healthy dairy Cows on milk quality. The elevated level of somatic cell count, chloride and milk pH were noticed in subclinical mastitis affected milk samples in compared to milk of healthy dairy cows.
Keywords: subclinical mastitis, milk quality, dairy Cows.

Introduction

Subclinical mastitis (SCM) is a major cause of economic loss in dairy herds that shows no gross inflammatory changes in udder, hence remains unnoticed unless investigated by employing laboratory tests. Often it is more prevalent than the Clinical mastitis, it usually precedes the clinical form, it reduces milk production, and adversely affects milk quality. Sub clinical mastitis causes colossal losses than clinical mastitis (Joshi and Gokhale, 2004). Since there are no visible abnormalities in the milk, subclinical mastitis requires special diagnostic tests for detection. Subclinical mastitis can be recognized indirectly by several diagnostic methods including the California mastitis test (CMT), the modified white side test, somatic cell count, pH, and catalase tests. These tests are preferred as the screening tests for subclinical mastitis as they can be used easily, yielding rapid, as well as satisfied results (Joshi and Gokhale, 2006). Somatic cell count (SCC) is the most common test to detect changes in the milk due to the inflammatory process. The greater the SCC in the milk, the higher the level of inflammation in the tissue Hence, the present study was undertaken to assess the milk profile changes during subclinical mastitis in dairy Cows.

*Received Nov 12, 2016 * Published Dec 2, 2016 * www.ijset.net*

Materials and Methods

A total of 480 milk samples were randomly collected from 120 apparently healthy dairy Cows of Salem District, Tamil Nadu. Out of these 120 dairy Cows, 60 were Jersey crossbred, 42 were Holstein- Friesian crossbred and 18 were graded Murrrah buffaloes At the time of sample milk collection, the breed of the cow, age of the cow, stage of lactation and health status of the mammary glands were recorded. Aseptic procedures for collecting quarter milk samples as described by Hogan et al. (1999) were followed. During collection of milk sample, teats were washed, dried and sterilized with cotton soaked in 70% ethyl alcohol. The first 3-4 streams of milk were discarded. 15 ml. of milk were collected from each quarter into sterile vials. The collected milk samples were immediately kept in an insulated container with ice packs and were transferred to the laboratory for somatic cell count and chemical analysis.

Somatic cell count was measured microscopically by the method of Singh and Ludri (2000). Differential cell counting was also carried out to determine the presence of different cell types like lymphocyte, neutrophils, basophils, eosinophils and monocytes. The same Somatic cell count was confirmed through PortaSCC Milk Test (PortaCheck Inc, USA). The PortaSCC milk test digital reader was used to measure the SCC in simple and easy way. The kit contains all of the materials needed to perform the SCC test including digital reader, working solutions and strips. The SCC was measured as per the detailed product directions. The SCC was also verified with direct microscope to avoid error in SCC measurement.

The pH of the milk was estimated immediately after collection with the help of Electronic pH meter. The Chloride estimation were done as per BIS: SP:18 (Part XI) 1981 respectively.

Results and Discussion

The result shown that there was a significance difference in SCC levels between subclinical mastitis infected dairy cow non infected healthy dairy cows as shown in the table 1. The mean ± SE values of SCC levels in subclinical mastitis infected dairy cows was 4.48 ± 0.26 x 10^5 cell / ml of milk and 1.94 ± 0.36 x 10^5 cell / ml of milk in case of non infected healthy dairy cows. Somatic cells are always present in milk and they increase due to mammary gland infections. When udders are healthy the somatic cell count (SCC) in milk is between 50,000 and 100,000 cells/ml (Skrzypek *et al.*, 2004). Skrzypek et al., (2004) and Harmon (2001) reported that SCC is greater than 200,000 cells/ml means; it is assumed to be a threshold distinguishing a healthy udder from a diseased udder. The mean ± SE values of SCC levels in subclinical mastitis infected Holstein Friesian crossbred cows, Jersey crossbred Cows and Graded Buffaloes were 4.37 ± 0.20, 4.25 ± 0.11 and 4.58 ± 0.25 x 10^5 cell / ml of

milk. Whereas the mean ± SE values of SCC levels in non infected healthy infected Holstein Friesian crossbred cows, Jersey crossbred Cows and Graded Buffaloes were 1.95 ± 0.11, 1.78 ± 0.53 and 2.10 ± 0.17 x 10^5 cell / ml.

There was significance different in milk chloride content of apparently healthy non infected cows and in milk of cows suspected for subclinical mastitis as shown in the table 2. The mean ±SE value of chloride content of apparently healthy non infected cows was 0.16 ±0.008 g %. Whereas the samples suspected for subclinical mastitis had chloride content of 0.20 ± 0.006 g %. Schalm et al., (1971) reported that bacterial infection of udder leads to opening up of the alveolar junction and increased permeability of capillaries. Sodium and Chloride which were higher in extracellular fluid poured into the lumen of alveolus.

The mean ±SE value of milk pH in apparently healthy non infected cows was 6.93 ±0.05, which is within the normal range of pH 6.4 to 6.8 as reported by Vijayakumar (2003). Whereas the samples suspected for subclinical mastitis had pH of 7.59 ± 0.027, which itself indicated the likelihood of subclinical mastitis.

Table 1: Somatic cell count in non infected and infected dairy cows

BREEDS OF CATTLE	**SCC *10^5 CELL / ML OF MILK (MEAN±** SE) **IN NON INFECTED CATTLE**	**SCC *10^5 CELL / ML OF MILK (MEAN±** SE) **IN INFECTED CATTLE**
Holstein Friesian Crossbred	1.95 ± 0.11^{a}	4.37 ± 0.20^{b}
Jersey Crossbred	1.78 ± 0.53^{a}	4.25 ± 0.11^{b}
Graded Buffalo	2.10 ± 0.17^{a}	4.58 ± 0.25^{b}
Overall	1.94 ± 0.36^{a}	4.48 ± 0.26^{b}

The least square mean values carrying the different superscript are significantly different ($p>0.05$)

Table 2: Milk pH and chloride in non infected and infected dairy cows

BREEDS OF CATTLE	NON INFECTED CATTLE		INFECTED CATTLE	
	pH	CHLORIDE (g%)	pH	CHLORIDE (g %)
Holstein Friesian Crossbred	6.49 ± 0.07[a]	0.13 ± 0.005[a]	7.48 ± 0.070 [b]	0.20 ± 0.004 [b]
Jersey Crossbred	6.59 ± 0.07[a]	0.14 ± 0.0048[b]	7.57 ± 0..039	0.20 ± 0.003 [b]
Graded Buffalo	6.81 ± 0.16[b]	0.15 ± 0.007[a]	7.62 ± 0.134 [b]	0.19 ± 0.009 [b]
Overall	6.93 ± 0.05	0.16 ± 0.008	7.59 ± 0.027 [b]	0.20 ± 0.006 [b]

The least square mean values carrying the different superscript are significantly different (p>0.05).

Conclusion

The result of the present study indicated a relatively high prevalence of subclinical mastitis in dairy cattle of the study area. Lack of maintenance of strict hygiene and poor management may be the contributory factors for subclinical mastitis. It is therefore important that farmers should adopt good management practices to prevent subclinical mastitis in dairy cows and ensure good quality of milk.

References

[1] Harmon, R. J. 2001. Somatic cell counts: A primer. In: Proc. National Mastitis Council Annual Meeting. pp. 3-9.

[2] Hogan, J. S., R. N. Gonzalez, R. J. Harmon, S. C. Nickerson, S. P. Oliver, J. W. Pankey, and K. L. Smith. 1999. Laboratory Handbook on Bovine Mastitis. Madison, WI: National Mastitis Council.

[3] IS (Indian Standard). 1981. IS: SP 18, Part XI, Dairy Products, Bureau of Indian Standards (BIS), Manak Bhavan, New Delhi.

[4] Joshi, S and Gokhale, S. (2004). Status of mastitis as an emerging disease in improved and periurban dairy farms in India. 23rd World Buiatrics Congress Quebec city, Canada.

[5] Joshi, S. and S. Gokhale (2006). Status of mastitis as an emerging disease in improved and periurban dairy farms in India. BAIF Development Research Foundation and Research Station, Uruli Kanchan, Pune, Maharashtra. Ann. N. Y. Acad. Sci., 1081: 74-83.

[6] Schalm, O.W. et al.(1971). Bovine Mastitis. Lea and Febiger, Philadelphia. pp. 102-103.

[7] Singh, M and R.S. Ludri (2001). Somatic cell counts in Murrah buffaloes during different stages of lactation, parity and season. Asian-Australasian Journal of Animal Sciences, 41(2): 189-192.

[8] Skrzypek, R., Wtowski, J., Fahr, R.D.: Factors affecting somatic cell count in cow bulk tank milk - a case study from Poland. J. Vet. Med. A, Physiol. Pathol. Clin. Med., 2004.

[9] Vijaykumar, K, (2003). Tests for detection of mastitis. In: Proceeding Indian Veterinary Congress X Annual 4 th Round Table on mastitis 14-15 April, College of Veterinary Science and Animal Husbandry, C.S.K.H.P.K.V, Palampur (H.P.). Pp.137-145.