



Early Detection of Mastitis Using SFMT in Dairy Animals

G S Haritha¹, R Kasi Viswanath² and G M V Prasada Rao³

Krishi Vigyan Kendra, Kalikiri, Chittoor District
Acharya N G Ranga Agricultural University, Guntur, Andhra Pradesh

ABSTRACT

Bovine mastitis is a dairy cattle disease with high economic impact. Subclinical mastitis (SCM) contributes to most of the financial losses. A total of 229 milk samples were subjected to surf field mastitis (SFMT) test and Tanuchek SCC kit to quantify their efficacy in detecting sub clinical mastitis in dairy cows, of which 41 samples were found to be positive with SFMT and 20 samples positive with Tanuchek SCC kit. The study concluded that SFMT was significantly ($p < 0.05$) more sensitive than Tanuchek SCC kit.

Key Words: Animals, Dairy, Mastitis, Milk, Somatic cell, Sub clinical, Tanuchek.

INTRODUCTION

Livestock plays vital roles in generating income, creating job opportunities, ensuring food security, providing services, contributing to asset, social, cultural and environmental values, and sustain livelihoods. Despite high livestock population and existing favourable environmental conditions, the contribution of the livestock subsector to the Indian economy is below the potential. This is associated with a number of complex and inter-related factors such as inadequate feed and nutrition, widespread diseases, poor genetic potential of local breeds, market problem, and inefficiency of livestock development (Solmon *et al*, 2003). Mastitis is one of the major and expensive diseases in terms of production losses in dairy production. It severely reduces milk yield, profit margins, and quality of milk and milk products in all dairy producing countries of the world. Mastitis can be classified as either clinical or subclinical. Clinical mastitis is characterized by sudden onset, alterations of milk composition and appearance, decreased milk production, and the presence of the cardinal signs of inflammation in infected mammary quarters. In

contrast, in subclinical mastitis no visible signs are seen either on the udder or in the milk, but the milk production decreases and the somatic cell count increases (Abebe *et al*, 2016). Subclinical mastitis is, considered as the most economically important type of mastitis because of its higher prevalence and long term devastating effects as compared to clinical mastitis. Singh *et al* (2018) evaluated the effect of a combination of povidone iodine and glycerin in the ratio of 3:1 and a commercially available product filmadine (vansun) and reported that both the above mentioned treatments were found to be equally effective against prevention of clinical and subclinical mastitis as compared to non-treated group of animals. Therefore, the post teat dip treatment improved quality and composition of milk along with reduction in chances of clinical and subclinical mastitis. The main objective of this study was early detection of mastitis to reduce the milk losses and the costs of treatment by early interventional treatment; followed by fortnightly diagnosis at field level by farmers and clean milk production practices, thereby preventing the incidence of clinical mastitis.

Subject matter specialist (Veterinary), Krishi Vigyan Kendra, Kalikiri, Chittoor District

Acharya N G Ranga Agricultural University, Guntur, Andhra Pradesh

ICAR-ATARI, Zone X, Hyderabad

1drgsharitha@gmail.com

MATERIALS AND METHODS

A total of 229 milk samples were collected from four villages for assessment. The milk samples were collected from the milk collection centres in a sterile tube. The milk samples were subjected to Surf Field Mastitis test (SFMT). The principle of the test is that when detergent is added into milk sample, it causes rupture of somatic cells, releases DNA and other cell contents. DNA is acidic in nature, while detergent contains alkyl-aryl sulfonate, which is basic in nature. Combination of DNA and detergent resulted into a gel. Consistency of gel depends upon the number of somatic cells. Higher the number of cells, thicker gel formation. Preparation of 3% Surf solution (pH = 10.3) was prepared by dissolving 3 grams of commonly available Surf Excel in 100 ml of Distilled water. This test solution is stable for six months at room temperature. Equal quantity of 3% reagent and milk were mixed in a sterile tube. The mixture is swirled for about 1 minute and then poured into a petri plate. After a few seconds, visual examination for the presence of floccules or gel formation indicates the positive results for intra mammary infection. While absence of any floccules or gel formation in the sample, was considered negative. The changes in consistency of milk indicated mastitis, while no change in consistency of milk indicated healthy samples. The mastitis was graded into further four categories based on the severity of disease from lower to higher intensity as, +(moderate), ++(severe), +++(more severe), ++++(very severe). The percentage of prevalence was calculated by using the following formula as- $\text{Prevalence (\%)} = \frac{\text{No. of samples positive}}{\text{No. of samples tested}} \times 100$ (Ghulam Muhammad *et al*, 2010 and Ranjeet *et al*, 2018). Tanuchek SCC was done using commercially available kits from TANUVAS, Chennai as per the manufacturers' procedure (TRPVB, TANUVAS, Chennai).

First time test was done at Krishi Vigyan Kendra and fortnightly tests were done by the farmers at field itself. Method demonstration and reagent was provided by the Krishi Vigyan Kendra for testing the samples at fortnightly intervals. In case of

positive samples, antibiotic therapy along with anti inflammatory and anti histamines were facilitated for treatment of positive animals. Further, the livestock farmers were also trained in clean milk production practices i.e., pre and post udder wash. Pre udder wash with potassium permanganate and post udder wash with 1% iodine glycerine solution. Few samples were also tested with Tanuchek SCC kit (Nithya *et al*, 2017).

RESULTS AND DISCUSSION

Out of 229 milk samples, 41 samples tested positive with SFMT and 20 samples were positive with Tanuchek SCC kit. Majority of the positive animals were Jersey cross at 3-4 calving of age. Among the 41 samples, 9 animals had previous history of mastitis in a time period of 3 months from the time of collection of sample (Figure 1). SFMT was significantly ($p < 0.05$) more sensitive than Tanuchek SCC kit. The findings were similar to the finding of Ghulam Muhammad *et al* (2010) who reported 24.5 per cent cows reacted positive to SFMT. Fortnightly testing of samples with SFMT and with Tanuchek SCC (Figure 2) were done by the farmers at their field which made them easy to identify the animals predisposed for mastitis. SFMT positive animals were immediately treated with suitable antibiotic and anistamine along with anti-inflammatory drugs. Further, farmers used potassium permanganate and 1% povidone iodine with 10% glycerine solution as pre and post wash respectively. Further, cleaning of udder with dry clean cloth and full hand milking method proven to decrease in incidence of mastitis in 63 per cent animals. Mahantesh *et al* (2014) reported that the prevalence of bovine mastitis indicated that preparation of teats and udder for milking is poorly practiced, hence preventive measures like washing of teats with clean water and drying completely before milking, dipping the teats with any sanitizing solution after milking as to be followed which not only helps to reduce infection of individual cow but also controls the spread of pathogenic bacteria to other animals and humans. In this study, pre and post

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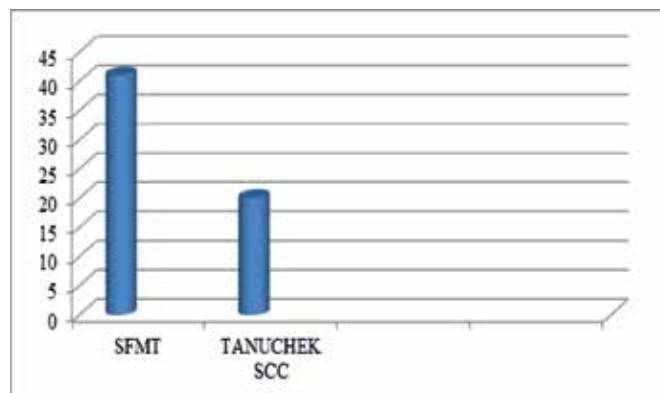


Figure.1 Analysis of milk samples using SFMT and TANUCHEK SCC.

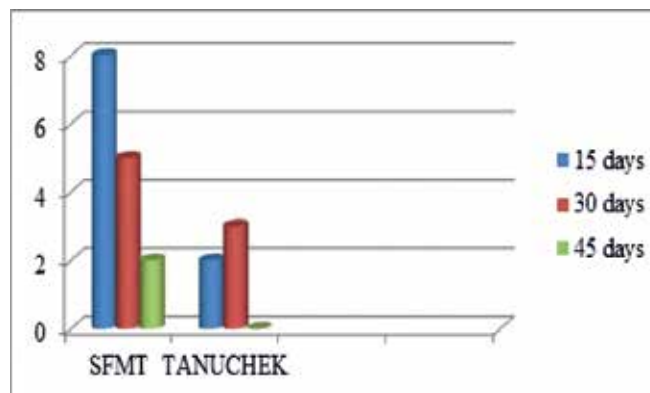


Figure.2 Post evaluation of milk samples (Earlier positive with SFMT and TANUCHEK SCC)

milking teat disinfection have been recommended as important procedures to prevent prevalence and incidence of mastitis. Farmers, therefore, need to be educated and encouraged to practice good farming, animal health management practices and clean milking practices at all times, regular screening for early detection, and appropriate treatment of subclinical cases, will reduce udder contamination.

On the basis of similar diagnostic efficiency of SFMT to CMT in terms of sensitivity with inexpensive and ready availability of SFMT reagent, it is suggested that SFMT can be used as a cheaper, user-friendly alternative animal-side subclinical mastitis diagnostic test.

CONCLUSION

Sub-clinical Mastitis usually goes unnoticed. It is important to screen a particular dairy herd for this disease at regular intervals, so as to adopt an effective treatment. This would also prevent serious economic loss. Therefore, this study recommends that regular screening of sub-clinical mastitis reduces the prevalence and is easily applicable and cost effective tests for regular screening. The most effective way to control sub-clinical mastitis is to take preventive measures such as milkman's cleanliness, regular cleaning of the udder and floor, dry cow therapy especially in high yielding dairy cows.

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