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Review Article

FIELD LEVEL DEMONSTRATION OF SCREENING SUBCLINICAL MASTITIS AND ITS EFFECTIVENESS ON CLEAN MILK PRODUCTION IN ERODE DISTRICT OF TAMILNADU

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Introduction

Mastitis is a multi-etiological and complex disease, which is defined as inflammation of parenchyma of mammary glands. It is characterized by physical, chemical and, usually, bacteriological changes in milk, and pathological changes in glandular tissues (Radostis *et al*., 2000). The occurrence of disease is an outcome of interplay between three major factors: infectious agents, host resistance, and environmental factors (Gera and Guha, 2011). Mastitis is a global problem as it adversely affects animal health, quality of milk and the economics of milk production, affecting every country, including developed ones and causes huge financial losses (Sharma *et al*., 2007).

Clinical and sub-clinical mastitis are the two major forms of the disease. Clinical mastitis results in alterations of milk composition and appearance, decreased milk production, and the presence of the cardinal signs of inflammation (pain, swelling and redness, with or without heat in infected mammary quarters). It is readily apparent and easily detected. In contrast, detection of mammary quarters with sub-clinical mastitis is more difficult because signs are not readily apparent (Kivaria, 2006) and, because of the lack of any overt manifestation, its diagnosis is a challenge in dairy animal management and in veterinary practice.

The sub-clinical form is 15 to 40 times more prevalent than the clinical form, and usually precedes the clinical form and is of long duration (Seegers *et al*., 2003). It is important to emphasise that the sub-clinically affected animals remain a continuing source of infection for herd mates (Islam *et al.,* 2011). There are different levels for detection of mastitis: an individual cow level in the herd, and a more large-scale testing for bulk milk (Kivaria, 2006). Regarding the individual cow level, the sub-clinical form of the disease can be detected by bacteriological examination and somatic cell counts (SCC) (Muhammad *et al.,* 2010). SCC has been accepted as the best index to use to predict udder infection in cows, and has been

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used extensively as an indicator since the 1960s (Kivaria, 2006). Under field conditions, determination of SCC in milk is usually done using the California Mastitis Test (CMT); in fact, CMT scores are directly related to average SCC (Radostis *et al.,* 2000). CMT has the advantage of being very inexpensive and is a test with real-time results for selection of the quarters for subsequent bacteriological examination (Kivaria, 2006). CMT is a simple but very useful technique for detecting subclinical mastitis on-farm, providing an immediate result and can be used by any member of farm staff.

The objective of this study was to conduct field level demonstration (FLD) on screening of subclinical mastitis with California mastitis test (CMT), to evaluate the usefulness of the California mastitis test (CMT) to detect an intramammary infection caused by a major mastitis pathogen in lactating cows, to train the dairy farmers to adopt the technology in the farm level and to regularly screen their dairy cows for sub-clinical mastitis, to prevent the occurrence of mastitis by treating the sub-clinical mastitis infected animals at initial stages to save the udder tissues, prevent the drop in milk production and to avoid treatment costs.

Materials and Methods:

Fifty different small dairy farms of Erode District were selected. Training given to the fifty selected dairy farmers about the clean milk production and the managemental practices to prevent the occurrence of mastitis – the causes, clinical signs, effect on udder tissues and milk production, other ill effects.

Field level demonstration (FLD) and hands on training on clean milk production *viz*., cleaning of dairy cattle, disinfection and sanitation of shed, milking methods, cleaning of udder, wiping of udder, California mastitis test-mastitis detection and teat dipping were conducted. Inputs like mastitis detection California mastitis test kit, pre and post milking teat dip container, pre milking teat dip ($KMnO_4$) and post milking teat dip solution (LactiFence, DeLaval) were distributed to all the beneficiaries.

A total of 250 crossbred dairy cows of different age groups (3 to 8 years), parities (1 to 5), stage of lactation (early, mid and late), milking (both hand and machine) were selected for this mastitis detection study. A total of 1000 milk samples were collected from quarters of 250 apparently healthy cows at 50 different small dairy farms of Erode District.

Milk samples were collected aseptically by using the standard milk sampling techniques (Oliver *et al*., 2005). The teats were cleaned and wiped with $KMnO_4$ solution before taking the samples. The samples were collected from all four quarters. The first three to five squirts

of milk were discarded from all four quarters and the samples were collected from all four quarters and tested on spot by CMT (DeLaval) (Schalm *et al*., 1971).

The CMT were performed, from each quarter 3 ml of milk sample was taken in the CMT paddle and equal quantity of CMT reagent (DeLaval) was added in each cup, rotated the CMT Paddle in a anticlockwise motion for few seconds to thoroughly mix the contents and the result was interpreted in 30 seconds with the CMT score as N (Negative, No infection, No thickening of the mixture, 0-200,000 cells/ml), 1 (Trace mastitis, Distinct slime but without gel formation, 200,000 – 5 million cells/ml) or 2 (Clinical mastitis, Immediate formation of gel which moves as a mass during swirling, more than 5 million cells/ ml). If the animal is positive for mastitis then one ml of milk sample from the affected quarter has to be taken in sterile test tube and sent to the lab for antibiotic sensitivity test. Farmers advised to wash the udder with $KMnO_4$ solution and dip the teat with post milking teat dip solution immediately after milking and suitable remedies were suggested to solve the problems based on the results. After one month of training and field level demonstration the same herd of animal tested with CMT kit. The reaction was then visually scored as N, 1 or 2 according to the CMT score.

Result and Discussion:

Table 1: Results of CMT test conducted in dairy farms of Erode District

	Total animals	**Total test**	**Negative**	**Subclinical Mastitis**	**Clinical Mastitis**
Before training and FLD	250	1000	616 (61.6%)	328 (32.8%)	56 (5.6%)
After one month of training and FLD	250	1000	898 (89.8%)	68 (6.8%)	34 (3.4%)

Table 1 indicates that the overall knowledge level of the dairy farmers has increased after the training on clean milk production and field level demonstration on screening of mastitis with CMT kit. In this study there was reduction in the occurrence of subclinical mastitis (32.8% to 6.8%) and clinical mastitis (5.6% to 3.4%), after adoption of mastitis detection, prevention and control techniques. This indicates that the mastitis prevention and control technology in dairy cattle was highly effective and the field level demonstration (FLD) methodologies in dairy farms were highly useful. Most of Canadian dairy farms adopted important mastitis-prevention practices, such as post-milking teat disinfection and drying off all cows with antibiotics (Riekerink *et al*., 2010).

CONCLUSION

The training and FLD involving dairy farmers was conducted to reduce the incidence of mastitis in dairy cattle. The dairy farmers were trained on mastitis detection and inputs required for the diagnosis were given to them. There was reduction in the occurrence of subclinical mastitis (32.8% to 6.8%) and clinical mastitis (5.6% to 3.4%) after imparting knowledge and skills on the mastitis detection and control techniques. Later the dairy farmers have conducted CMT test in their own dairy farms in regular one month interval. Hence the result of the Field level Demonstration(FLD) of screening for sub clinical and clinical mastitis with california mastitis test enlightened the farmers on the effect of the screening, early detection and treatment of sub clinical and clinical mastitis.

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