

Economic Empowerment of Dairy Farmers Through Technology Based Prevention and Control of Sub- Clinical Mastitis in Dairy Cows in Coimbatore District, Tamil Nadu

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Abstract: In the present study, a total of 240 dairy farmers were selected from the database of the Centre and through the Department of Animal Husbandry of the block. One village was selected from each block of Coimbatore district and a total of 12 villages from all 12 blocks of Coimbatore district and 12 capacity building programmes comprising of training programmes and demonstrations on detection of sub – clinical Mastitis using California Mastitis Test Kit, udder disinfection using Potassium permanganate spray and clean milk production were conducted in the dairy farm of a progressive farmer with a minimum of 5 lactating dairy cows. After the conduct of capacity building programmes, follow-up activities were carried out in all the 12 blocks of Coimbatore district. During the capacity building programmes, out of 71 dairy cows screened in 12 blocks of Coimbatore district, 35 cows (49.30%) showed positive for sub- clinical Mastitis. During the follow up, in 12 blocks, out of 63 dairy cows screened for sub – clinical mastitis 07 cows (11.11%) showed positive for sub – clinical mastitis. The present study indicated that the incidence of sub – clinical mastitis was reduced from 49.30 per cent to 11.11 per cent after the capacity building programmes conducted. Udder disinfection with Potassium permanganate spray daily post milking had a protective effect and the incidence of Mastitis was low in farms spraying Potassium permanganate daily. The study results indicates that, there will be a 10 per cent increase in milk yield per cow in the absence of sub-clinical mastitis, which increases the income of the farmers through adoption of appropriate scientific technologies in prevention and control of Mastitis in dairy cows at sub –clinical stage.

Key words: Sub- clinical Mastitis, California Mastitis Test, Dairy Cows

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I. Introduction

Mastitis is characterized by physical, chemical and bacteriological changes in the milk and pathological changes in the glandular tissue of the udder (Sharma, 2007). It is also defined as inflammation of mammary gland parenchyma, which is caused by bacteria and its toxin (Sharma *et al.*, 2006). Sub - clinical infections are those for which no visible changes occur in the appearance of milk or the udder, but milk production decreases, somatic cell count increases, pathogens are present in the secretion and the milk composition is altered. Clinical Mastitis is recognized by abnormal milk, varying degrees of mammary gland inflammation (redness, heat, swelling and pain) and with or without illness of the cow (Batavani *et.al.* 2007).

Somatic cells are indicators of both resistance and susceptibility of cows to Mastitis and can be used to monitor the level or occurrence of sub - clinical Mastitis in herds or individual cows. Somatic cell count is a useful predictor of intramammary infection and therefore, an important component of milk in assessment of aspects of quality, hygiene and Mastitis control. (Sharma *et al.* 2011).The California Mastitis Test (CMT) is a simple cow-side indicator of the somatic cell count of milk. It operates by disrupting the cell membrane of any cells present in the milk sample, allowing the DNA in those cells to react with the test reagent, forming a gel (David White *et.al.* 2005). It provides a useful technique for detecting sub-clinical cases of Mastitis. Since there is no gross swelling of quarters or abnormality of milk, sub-clinical Mastitis is recognized by laboratory examination of milk or animal-side tests. The common farmers were not so much familiar with simple cow – side tests such as California Mastitis Test (Bachaya *et al.* 2011).

Mastitis has been and continues to be recognized as one of the major economically important disease problems concerning the dairy industry. It is a disease of economic importance confronting the dairy farmer. Mastitis causes heavy economic losses to the dairy industry worldwide. Mastitis is a global problem as it

adversely affects animal health, quality of milk and economics of milk production. It is always better to prevent Mastitis rather than treating it which involves huge cost. Regular screening of cows for sub-clinical Mastitis is better to prevent and combat Mastitis at an early stage.

This study aims at identifying Mastitis at sub-clinical stage thereby preventing the occurrence of clinical Mastitis and increasing the income generation of the rural dairy farmers through scientific dairy farming.

II. Materials And Methods

Selection of animals and study area

One village was selected from each block of Coimbatore district and a total of 12 villages from all 12 blocks of Coimbatore district were covered under the project. 20 dairy farmers in each block participated in the training programme and a total of 240 dairy farmers in all 12 blocks of Coimbatore district were covered under the project. The capacity building programmes included training and demonstrations (detailed action plan enclosed).

Demonstration on 'Screening for Sub-clinical Mastitis' in dairy cows was done using the California Mastitis Test (CMT) Kit and a CMT Kit was provided to the progressive dairy farmer after demonstration. Lecture on 'Mastitis' included causes, clinical signs, effect on udder tissues and milk production and other ill effects and another lecture on 'Scientific Management Practices in Dairy Farming' to prevent the occurrence of Mastitis were given during the training programme. Pamphlet on 'Mastitis – Its Prevention and Control' in tamil was provided to all the 240 dairy farmers.

Demonstration on screening for sub-clinical Mastitis using CMT kit

Screening for sub - clinical Mastitis was done using California Mastitis Test Kit supplied by De Laval Private Limited. Milk samples were collected from all the four quarters of lactating dairy cows. The teats were washed properly and first two streams of milk were discarded. Immediately after collection, the samples were subjected to California Mastitis Test. In this test, milk samples from each quarter were collected in a clean CMT paddle. The CMT paddle had four shallow cups marked A, B, C, and D to help identify the individual quarter from which the milk was obtained. About two ml of milk was stripped from each quarter. An equal amount of CMT solution was added to each cup in the paddle. The CMT paddle was rotated in a circular motion to thoroughly mix the contents. The results were read quickly. Visible reaction disintegrated after about 20 seconds. The reaction was scored visually. Positive reactions were indicated by a gelatinous mass that collected near the center of the well as it was swirled. More the gel formation, higher the score. When milk from sub - clinically affected Mastitic quarters was mixed with anionic detergent solutions such as CMT or SFMT reagent, a chemical reaction caused the gel formation (Schalm *et al.* 1971).

Reading and Interpretation of CMT Scores

CMT score	Somatic Cell Range	Changes	Interpretation
N Negative	1,00,000	No infection. No thickening of the mixture.	Healthy Quarter
T Trace	3,00,000	Possible infection. Slight thickening of the mixture. Trace reaction disappeared with continued rotation of the paddle.	Sub-clinical Mastitis
1 Weak Positive	9,00,000	Infected. Distinct thickening of the mixture, but no tendency to form a gel. If CMT paddle was rotated more than 20 seconds, thickening disappeared.	Sub-clinical Mastitis
2 Distinct Positive	2.7 million Somatic Cell Count	Infected. Immediate thickening of the mixture, with a slight gel formation. As the mixture was swirled, it moved towards the center of the cup, exposing the bottom of the outer edge. When motion stopped, mixture leveled out and covered the bottom of the cup.	Serious Mastitis Infection
3 Strong Positive	8.1 million Somatic Cell Count	Infected. Gel was formed and surface of the mixture became elevated like a fried egg. Central peak remained projected even after the CMT paddle rotation was stopped.	Serious Mastitis Infection

Demonstration on udder disinfection and Clean Milk Production (CMP)

Udder disinfection demonstration was carried out using Potassium permanganate 0.1 % spray. Demonstration on udder hygiene using potassium permanganate spray / teat dip to prevent Mastitis was done during the training programme. Demonstration on udder hygiene using potassium permanganate spray / teat dip to prevent Mastitis was done during the training programme. Lecture on clean milk production techniques to improve the quality of milk was given during the training programme. A Kit containing Potassium permanganate 5 g sachet and a sprayer for udder disinfection and for maintaining udder hygiene was provided to

all the 240 farmers participated in the training programme. Intra-mammary infusions for positive animals were provided during the training programme. After the conduct of training camps, follow - up activities were carried out in all the 12 blocks of Coimbatore district.

Statistical Analyses

The data collected were statistically analyzed for the frequency and percentage.

III. Results And Discussion

NABARD sponsored FSPF project camp was conducted in all the 12 blocks of Coimbatore district and a total number of 240 dairy farmers participated and benefitted under the project. During the camp, out of 71 dairy cows screened in 12 blocks of Coimbatore district, 35 cows (49.30%) showed positive for sub- clinical Mastitis with 24 cows (68.57%) having single quarter involvement, 08 cows (22.86%) having two quarter involvement, 02 cows (5.71%) having three quarter involvement and 01 (2.86%) having four quarter involvement (Table1).

Out of 284 quarters screened from 71 dairy cows, 49 (17.25%) quarters showed positive for sub – clinical Mastitis. Out of 49 positive quarters, 13 (26.53%) left hind quarters, 14 (28.57%) right hind quarters, 19 (38.78%) left forequarters and 03 (6.12%) right hind quarters showed positive for sub – clinical involvement (Table 3).

During the follow up (Table 1), in 12 blocks, out of 63 dairy cows screened for sub – clinical mastitis 07 cows (11.11%) showed positive for sub – clinical mastitis with 04 cows (6.35%) having single quarter involvement and 03 cows (4.76%) having two quarter involvement. The present study indicated that the incidence of sub – clinical mastitis was reduced from 49.30 per cent to 11.11 per cent after the NABARD sponsored FSPF camps conducted (Table 1,2). Udder disinfection with Potassium permanganate spray daily post milking had a protective effect and the incidence of Mastitis was low in farms spraying Potassium permanganate daily (Table 1).

Karimuribo *et al.* (2008) reported that the prevalence of sub - clinical mastitis in dairy cows were 75.9 per cent when assessed by the CMT and 43.8 per cent when assessed by culture. Also higher incidence of sub-clinical Mastitis (75.3%) has been reported from India by Devi *et al.* (1997).

Table 1: Incidence Of Sub-Clinical Mastitis In Dairy Cows During The Camp And Follow-Up

S.No	Details of animals screened	During the camp	During follow - up
1.	Total number of Blocks covered	12	12
2.	Total number of Villages Covered	12	12
3.	Total number of farmers participated	240	
4.	Total number of dairy cows screened for sub-clinical mastitis using CMT Kit	71	63
5.	Total number of cows positive for sub – clinical mastitis	35 (49.30%)	07 (11.11%)
6.	Total number of cows negative for sub – clinical mastitis	36 (50.70%)	56 (88.89%)
7.	Total number of positive cows with single quarter involvement	24 (68.57%)	04 (6.35%)
8.	Total number of positive cows with two quarters involvement	08 (22.86%)	03 (4.76%)
9.	Total number of positive cows with three quarters involvement	02 (5.71%)	-
10.	Total number of positive cows with four quarters involvement	01 (2.86%)	-

Argaw and Tolosa (2008) reported the prevalence of sub - clinical mastitis as 89.54 per cent in cows and 63.1 per cent quarters were recorded and the resulting quarter infection rate was 56.70 per cent in Ethiopia which is higher than others. In the sub-clinical mastitis, the most important factor affecting somatic cell count in milk is mammary gland infection (Eberhart *et al.* 1979). Prevalence of clinical and sub - clinical mastitis was higher in hind quarters than forequarters and among hind quarters, left hind quarters were more susceptible than the right (Khan and Muhammad, 2005).

IV. Conclusion

The California Mastitis Test is a very simple cow side test which can be used by the farmers at field level to screen dairy cows for the prevalence of sub- clinical mastitis. Udder disinfection with Potassium permanganate spray daily post milking had a protective effect and the incidence of Mastitis was low in farms spraying Potassium permanganate daily. In sub- clinical mastitis there is 10 per cent loss in milk yield. The incidence of sub – clinical mastitis was reduced from 49.30 per cent to 11.11 per cent after the NABARD sponsored FSPF camps conducted. This indicates that, there will be a 10 per cent increase in milk yield per cow in the absence of sub-clinical mastitis, which increases the income of the dairy farmers The findings further insist that more attention on future research and widespread awareness should be focused on prevention and control of Mastitis in dairy cows at sub – clinical stages for improved and clean milk production throughout the State.

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