Efficiency of Mastiguard in prophylactic treatment of subclinical mastitis in dairy cattle in Tiruppur district, Tamil Nadu

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ABSTRACT

Mastiguard is a product of Tamil Nadu Veterinary and Animal Sciences University (TANUVAS) having TANUCHEK SCC kit and teat protect spray. Subclinical mastitis is the most prevalent and economically destructive disease in dairy cattle throughout the country. Prophylactic control of subclinical mastitis is the most important and effective management tool to reduce the incidence of mastitis in dairy cattle. The present study was conducted to evaluate the efficacy of Mastiguard for prophylactic control of subclinical mastitis in dairy cattle of Tiruppur district, Tamil Nadu. Out of 100 cows screened, 42 animals were found to having subclinical mastitis. These 42 subclinical mastitis cows were given application of teat protect spray for 6 weeks daily two times after milking. TANUVAS Mastiguard containing TANUCHEK SCC kit was used for somatic cell count and teat protect spray was mainly used for preventing intra-mammary infection. The somatic cell count, milk yield and milk pH were recorded. The somatic cell count was reduced after the application of teat protect spray. The TANUVAS Mastiguard was found to be an easily identified and efficacious in reducing the incidence of subclinical mastitis under field condition. The TANUVAS teat protect application for subclinical mastitis gave good results and increased one litre milk per day in a cow which could be due to the action of constituent ingredients present in the preparation.

Keywords: Dairy cattle; subclinical mastitis; Mastiguard; TANUCHEK SCC kit; teat protect spray

INTRODUCTION

Mastitis is defined as inflammation of parenchyma of mammary glands and is characterized by physical, chemical and usually bacteriological changes in milk and pathological changes in glandular tissues (Radostits et al 2000).

Mastitis is a common problem in crossbred cows which affects the quality of milk. Teat and udder hygiene plays an important role in prevention of mastitis since pathogens invade the udder through teat orifice.

Once the milking is over, the teat orifice remains open for 20-30 minutes by which organisms may enter and cause mastitis. Mastitis is categorized as clinical and subclinical mastitis based on signs and changes in milk quality and quantity of affected cows. Subclinical mastitis is the most prevalent and economically destructive disease in dairy cattle throughout the country. In India, about 70 per cent economic loss has been attributed to subclinical mastitis alone (https://www.dairyknowledge.in/article/sub-clinical-mastitis-scm). Subclinical mastitis in dairy cattle is a major and silent problem that causes higher economic losses to the farmers. It adversely affects the animal health, quality of milk and economics of milk production. The prevalence of subclinical mastitis in cows increases with increased milk production, unhygienic management practices and increasing number of lactations. There are no visible changes in the udder or milk but it reduces milk production and adversely affects milk quality.

The main features of clinical mastitis are edema, udder inflammation with constant and steady pain and change in colour and consistency of milk, whereas, only quality and quantity are reduced with no visible changes in udder observed which make them complex in detection.

Diagnostic test for subclinical mastitis

Clinical mastitis can be detected by the farmers but subclinical mastitis can only be detected by the measurement of inflammatory components and pathogens in the milk. Since somatic cell count (SCC) in milk has been shown to be an excellent marker for subclinical mastitis, it can be used to detect the subclinical mastitis.

SCC used to detect abnormal changes are mainly due to the inflammatory process (Sudhan and Sharma 2010). Somatic cell count can also be defined as when milk is normal but there may be a decrease in production and may have SCC level of 2,00,000 cells/ml or greater. Herd screening for SCM infection should be done regularly to prevent milk production loss (Halasa et al 2009).

Inflammation of mammary gland is directly accompanied with an increase in SCC in milk. Durr et al (2008) and Sinha et al (2014) reported that SCC is a significant marker for subclinical mastitis and signifies a direct test for detection of subclinical mastitis.

MATERIAL and METHODS

The present study was carried out by ICAR – Krishi Vigyan Kendra, Tiruppur, Tamil Nadu to assess the efficiency of Mastiguard in prophylactic treatment of subclinical mastitis in dairy cattle. One hundred lactating crossbred dairy cattle (Jersey or Holstein Freisian crossbred) with average body weight 350 to 400 kg were randomly identified for the study. All the selected animals were in mid-lactation between second and third calving with a milk yield of average 10 to 15 l/day/cow.

TANUVAS Mastiguard: TANUVAS Mastiguard is a combination of teat protect and TANUCHECK SCC kit, novel products of Translational Research Platform for Veterinary Biologicals, TANUVAS. It is a combined mastitis screening and teat protection package (a healthy productive udder is possible by an admixture of a healthy mammary tissue and hygiene).

The milk in the udder always contains low level of SCC to keep the mammary tissue healthy. The SCC level increases in response to an infection of the udder. The SCC level <2 lakhs cells/ml of milk indicates a normal healthy udder tissue. To have a productive udder that lasts for the whole season, it is necessary to screen the milk on a regular basis for changes in the SCC (TANUCHEK SCC kit) which reflects the udder health status and minimizes the chances of bacteria and other agents from infecting the udder tissue.

TANUCHECK SCC kit: It is an on-farm test for quick determination of the somatic cell count which increases in milk samples upon infection of the udder. The specific substrate used changes to blue colour by the membrane bound enzyme from the cells. The milk samples from each quarter need to be tested once in a week.

Teat protect spray: It is a unique germicidal teat protective spray for mastitis. This gel works by preventing common mastitis causing bacteria from entering the teat canal and provides extended anti-microbial protection. It is for spray on the teats after each milking daily. It promotes udder health and hygiene. It is highly effective against both gram-positive and gram-negative bacteria. It reduces SCC with 30 per cent increase in milk yield. It also heals teat ulcers and cracks.

All the selected cattle were screened by TANUCHEK SCC kit. Out of 100 animals, 42 animals were found positive for subclinical mastitis (treatment group). Remaining 58 animals were free from sub-clinical mastitis and taken as a control (non-treatment group). The treatment group animals were subjected to teat protect spray which was sprayed on all four teats daily two times immediately after milking for a period of 6 weeks. Milk yield was recorded daily in all the selected animals.

Milk samples were collected from all the animals of control as well as treatment group for somatic cell count and estimation of milk pH. Immediately after collection of samples, SCC was checked with TANUCHECK kit. This kit contains substrate and enhancer. For each sample, one microfuge was taken and added with 1 drop of substrate and 3 drops of enhancer. After mixing the solution, by tapping the microfuge, one drop of milk sample was added. Colour development was observed after 20 to 30 minutes for positive samples. The number of SCC was checked with the colour comparison chart provided with the kit. The milk pH was measured by using readymade available pH papers. In all the control as well as treatment group animals, daily milk yield was also recorded for 6 weeks.

Table 1. Influence of teat protect spray on milk yield, somatic cell count and pH of milk

Dairy cattle group	Interval	Average daily milk yield (l)	pH of milk	Somatic cell count (lakh cells/ml)
Control group	0 week	13.7	6.5	1.06 ± 0.12
	I week	13.7	6.5	1.07 ± 0.21
	II week	13.6	6.5	1.02 ± 0.18
	III week	13.6	6.5	1.05 ± 0.19
	IV week	13.6	6.5	1.06 ± 0.15
	V week	13.5	6.5	1.05 ± 0.16
	VI week	13.5	6.5	1.06 ± 0.21
Treatment group (teat protect application)	Before treatment (0 week)	12.3	6.8	3.42 ± 0.29
	I week	12.5	6.8	3.12 ± 0.16
	II week	13.1	6.7	2.55 ± 0.26
	III week	13.2	6.6	2.12 ± 0.26
	IV week	13.5	6.6	1.82 ± 0.19
	V week	13.5	6.5	1.32 ± 0.17
	VI week	13.6	6.5	0.82 ± 0.25

RESULTS and DISCUSSION

The average daily milk yield, milk pH and somatic cell count in control and treatment groups of dairy cows are presented in Table 1. The average milk yield in control group (healthy cows) was 13.7 l/day at day 0, whereas, 12.3 l/day in treatment group indicating decreasing pattern in subclinical mastitis group. After 6 weeks treatment, the average milk yield was 13.6 l/ day in treatment group.

In normal healthy cows control group, milk pH was 6.5 during the study period. In subclinical mastitis group, the mean pH before treatment was 6.8 and it was reduced after application of teat protect spray. The milk pH of treatment group came down to normal 6.5 after 6 weeks. This indicates the effectiveness of teat protect spray in restoring normal pH and further maintaining it within the range. The results corrobate the findings of Sharma et al (2000) and Senthilkumar and Chandrasekar (2021).

The milk constituents responsible for pH are casein, citrate, phosphate, dissolved CO_2 and bicarbonates which are balanced with permeability of udder cells to mammary blood capillaries. In mastitis due to mammary gland infection, increased permeability of the udder tissue to blood components viz bicarbonate ions result in higher value of pH.

In normal healthy cows group, the mean somatic cell count (SCC) at 0, I , II, III, IV, V and VI week was 1.06 ± 0.12, 1.07 ± 0.21, 1.02 ± 0.18, 1.05 ± 0.19, 1.06 ± 0.15, 1.05 ± 0.16 and 1.06 ± 0.21 lakhs/ml milk respectively. In subclinical mastitis treatment group, mean SCC before spraying of teat protect spray was 3.42 ± 0.29 lakhs/ml milk. After application of spray, SCC was reduced to 0.82 ± 0.25 lakhs/ml milk after six weeks. These findings are in accordance with the findings of Sharma et al (2000) and Senthilkumar and Chandrasekar (2021). The increase in SCC in subclinical mastitis might be due to shift of leukocytes to udder as a protective mechanism against infection (Kehril and Shuster 1994). Ramya and Madhanmohan (2021) reported that the sensitivity, specificity and diagnostic accuracy of TANUCHECK kit were good and easy to be used in diseased cows.

Plates 1-4 depict the demonstrations being given to the farmers by the scientists of Krishi Vigyan Kendra on the use of TANUCHECK SCC kit, somatic cell count estimation in milk and use of teat protect spray.

CONCLUSION

TANUCHEK SCC kit helps in the detection of subclinical mastitis under field condition. The TANUVAS teat protect application for subclinical mastitis gave good results and increased about one litre of milk per day in cows which could be due to the action of constituent ingredients present in the preparation. The present study findings indicated that

Plate 1. Scientists demonstrating the use of TANUCHEK SCC kit

Plate 2. Scientists deomonstarting the somatic cell count estimation in milk

Plate 3. Scientist demonstrating the use of teat protect spray in HF crossbred subclinical mastitis cow

Plat e 4. Scientist demonstrating the use of teat protect spray in Jersey crossbred subclinical mastitis cow

TANUVAS Mastiguard helps in controlling the incidence of subclinical mastitis and reducing the milk SCC and pH of subclinical mastitis in dairy cows under field condition.

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