Indian Farmer
Volume 11, Issue 05, 2024, Pp. 155-158
Available online at: www.indianfarmer.net
ISSN: 2394-1227 (Online)

Original Article

OPEN ACCESS

Management approaches to reduce mastitis in dairy cattle

Ranjana Sinha[1], D.N Singh[1], Anandita Srivastava[2] Suchit Kumar[1] and Manmohan Kumar[1]

[1]Department of Livestock Farm Complex, Bihar Veterinary College, BASU, Patna-14
[2]Deartment of Veterinary Physiology, Bihar Veterinary College, BASU, Patna-14

**Corresponding author: ndriranjana@gmail.com*

Received:12/05/2024 *Published:15/05/2024*

Mastitis in dairy cattle is the most common and costliest disease that causes substantial economic losses to farmer by lowering production in terms of quantity and quality. Mastitis is one of the major challengeable diseases for dairy industry. India is the top milk producer in World (From 55.6 million tonnes in 1991-92 to 221.06 million tonnes in 2021-22). The total projected demand of milk by the year 2030 would be about 227.53 million tonnes. Mastitis, important challenging impediment to achieve production target, since the affected quarters may have 30 % less productivity and cow may lose about 15 % production potential (Radistitis *et al*., 2000). Mastitis is defined as inflammation of parenchyma of mammary glands and is characterized by physical, chemical, and bacteriological changes in milk and pathological changes in glandular tissues.

Mastitis are classified into two stage based on degree of severity, Sub-clinical and clinical mastitis.

Subclinical stage of mastitis *i.e* Subclinical mastitis in dairy cow is matter of great concern for farmers as its incidence of cases is more as compared to clinical form. Monitor of sub-clinical and clinical mastitis is through milk color, milk pH, electrical conductivity, Somatic Cell Count (SCC), California Mastitis Test (CMT), culture test and biomarker tests. A clinical mastitis is apparent and easily detected by visible abnormalities, such as red and swollen udder, and fever in dairy cow. The increased milk pH in the SCM may be related with high concentration of alkaline blood constituents such as sodium and bicarbonate ions which, due to inflammation of the mammary gland, increases permeability of the blood capillaries. Additionally, elevated milk pH during mastitis may be due to lower acidity which is associated with reduced lactose contents in mastitic milk. The electrical conductivity (EC) in normal milk varies between 4.0 and 5.0 mS/cm, whereas EC in the milk of infected quarters varies between 5.63 vs. 6.71 mS/cm at 25^{o}C. The EC of mastitis milk remain comparatively higher as compared to normal milk. This may be due to change in ions concentration, particularly due to inflammatory changes of mammary tissue, increase in milk sodium and chloride concentrations. CMT is considered as the gold standard named cow side test for the identification of subclinical mastitis and is positively associated with SCC. The milk SCC from healthy udders varies

between 50,000 to 100,000 cells per ml. The threshold value of SCC is less than 200,000 cells per ml. The increase in SCC during infection might be due to the fact that bacterial invasion to mammary glands attract circulating polymorph nuclear neutrophils (PMNs) which in addition increases the dead and sloughed off mammary epithelial cells leading to higher somatic cell counts in the milk. The SCC, EC and pH values are not only affected by mastitis but also by non-mastitic factors such as species, breed, parity and stage of lactation, may be the reason for variation in critical threshold value by different studies. Further, the reference test used to define SCM also varies from study to study, might be another contributing factor for variation of threshold values. The threshold values of milk also depend on the fraction of milk considered for identification of mastitis.

Managemental practices in dairy farm to reduce mastitis

1. Proper hygiene during milking:- To prevent the spread of infection, the milker's hands should be thoroughly washed with disinfectant soap before milking. The udder should be cleaned and dried before milking. Wash the dirty teats before milking. Milking animals should be dry and clean. Look for any anomalies in the udder or teats that can point to clinical mastitis. Prior to milking each animal, the foremilk may be removed and examined for anomalies. In certain places, this might be a contractual or governmental necessity for dairy cows.

2. Method of milking:- The method of milking is significant impact on incidence of mastitis. The milking machine has to work at optimal pressure and be cleaned every day. milking the damaged cow after milking the new cow. To avoid hurting the animal's udder or teat, milking should be done entirely by hand. The first calver animal was milked using the stripping procedure. Bhakat *et al.* (2017) reported that machine milking can lower intramammary infection without compromising the quality of the milk when compared to hand milking. Advances in milking machine technology have resulted in significantly improved vacuum stability and the development of installation guidelines for milking systems that minimize discomfort. According to Thompson *et al*. (1985) the most significant advancement in milking automation was the growing role of automation in the process, with the automatic detacher being the most significant development. It was also predicted that sensors would be developed, leading to further automation of not only milking tasks but also data recording and analysis management.

3. Body Condition Score:- Standardized BCS at calving can be a valid factor for choosing cows for improved udder health and increased milk output in an organized farm in tropical India. Paul and Bhakat (2018) reported that higher and lower BCS at calving significantly increase the SCC in milk. By reducing subclinical mastitis, Singh et al. (2020) found the correlation between the ideal BCS of dry and lactating cows and improved udder health maintenance. Within a single farm, disparities in the rates of IMI were identified across distinct cow families with comparable productivity, and it was observed that heritable variations in susceptibility might play a role in the development of IMI. The fact that genetics enhances production of milk prompted selection for mastitis resistance.

4. Washing of udder using disinfected (teat dip) after milking:

The most effective method is to apply teat dip solution immediately after milking to prevent entry of germ in teat canal that cause infection. Teat dipping is proposed as one of the most common investments applied in prevention and control of contagious bovine mastitis, and is an essential part of the five point plan. Dipping teats of dairy cows immediately before and after milking with an

effective germicidal preparation to reduce Teat skin colonization, contamination with mastitis-causing bacteria and minimize penetration of bacteria into the teat canal. Infections by contagious pathogens, those spread primarily from quarter to quarter and from cow to cow during the milking process, are reduced markedly by germicidal teat dips. It is widely accepted that most post milking teat dip products will reduce the new IMI rate by at least 50 to 90% (Nickerson, 2001). Animals that stopped receiving post milking teat disinfectant had increased in the incidence of *Staphylococcus aureus* 110.6%, *Corynebacterium bovis* 57.9%, and an 82% increase in the number of CNS IMI (Lam *et al*., 1997). Iodine post milking teat dip significantly reduced the combined clinical and subclinical IMI by 24% when compared with the positive control **(**Foret *et al*., 2009). The efficacies of post milking teat germicides containing 6% lactic acid New IMI with *Staph. aureus* and *Strep. agalactiae* were reduced 81.3 and 49.6%, respectively. The dip activated with lactic acid significantly reduced new *Staph. aureus* IMI by 69.3% but did not significantly reduce new *Strep. agalactiae* IMI (35.2% reduction). The udder applications with lactic acid and iodine had the highest probability ($P<0.05$) of reducing total bacterial contamination.

5. Dry cow therapy: For over fifty years, it has been known that the dry season plays a critical role in preventing mastitis in dairy cows. Udders were notably vulnerable to fresh intra-mammary infection (IMI) during the early dry period. During the first 21 days of the dry period, the rate of new infections was more than six times greater than during the previous lactation. The udders' significant susceptibility to fresh IMI close to calving has also been demonstrated by research. Physiological shifts in the mammary gland from or to a state of active milk production are probably linked to increased sensitivity to new IMI. The incidence of mastitis illness during the non-lactating phase can be decreased by using antibiotics effectively in each udder at the cow's final milking. It is the most effective treatment for subclinical and chronic mastitis, which becomes more challenging to manage during nursing. To minimize the spread of new diseases, all cows must receive 5% iodine every 24 hours after they cease to produce milk.

6. Antibiotic Therapy of Clinical Mastitis: When treating clinical mastitis with antibiotics, the affected quarter must be identified, treatment must be started promptly, all prescribed medications must be given, treatment records must be kept, treated cows must be identified, and milk must be tested for antibiotic residues before being added to the bulk tank. The limited effectiveness of antibiotic treatment against certain mastitis bacteria has raised concerns and remains so today. This is because to the pathobiologic conditions of the diseased mammary gland, pharmacologic and pharmacokinetic restrictions, and bacterial variables. Although it seems that many of these parameters cannot be altered by humans to increase treatment efficacy, there are certain areas where improvement in the choice of suitable antibiotics for therapy might be achieved.

7. Maintenance of hygiene: Poor hygiene was important because it disrupts the mammary epithelium, which reduces milk quality and increases the risk of SCC counts, which result in low returns. Increased SCC as a result of inadequate hygiene procedures was crucial as it disturbs the mammary epithelium and lowers milk quality, both of which result in reduced returns. Bhakat et al. (2017) discovered that the majority of farmers in hot, humid tropics who had more than three cows (50%) also kept their animals, shed, and milkman dirty, which made their cows susceptible to sub-clinical mastitis.

CONCLUSION

Strategies to control mastitis in dairy cattle is very important in term of production and health. Role of udder, teat conformation of animal, scientific management of milking procedure, automatic milking procedure, BCS and hygiene considered to control mastitis. Early detection of sub-clinical mastitis can be helpful in diagnosis of the infection and causative agent and also help for implementation of effective managemental interventions to reduce the economic loss. There has been progress in use of therapeutic and prophylactic antibiotic treatment. Therefore need to spread awareness programme among the farmer about mastitis prevention measure, clean milk production and balanced ration for their animals.

REFERENCES

Bhakat C, Chatterjee A, Mandal D.K, Karunakaran M, Mandal A, Garai S, Dutta T.K. 2017. Milking management practices and IMI in Jersey crossbred cows in changing scenario. *Ind. J. Anim. Sci.*,87(4):95–100.

Foret C.J., C. Carbellini, S. Young, and P. Janowicz. 2005. Efficacy of two iodine teat dips based on reduction of naturally occurring new intramammary infections. J. Dairy Sci. 88:426-432.

Lam, T.J.G.M., J.H. van Vliet, Y.H. Schukken, F.J. Grommers, A. van Velden-Russcher, H.W. Barkema, and A. Brand. 1997. The effect of discontinuation of postmilking teat disinfection in low somatic cell count herds. II. Dynamics of intramammary infections. Vet. Quarterly. 19:47–53.

Nickerson, S.C. 2001: Choosing the best teat dip for mastitis control and milk quality. NMC-PDPW Milk Quality Conference Proceedings, pp 43.

Paul A, Bhakat C. 2018. Studies on the Associations among some Management Factors, Body Condition Score and Udder Health Status in Jersey Crossbred Cows. MV. Sc Thesis Submitted to NDRI, Karnal, Haryana, India. 1–93.

Radostits O.M, Gay C.C, Blood D.C, Hinchcliff K.W. 2000. *Veterinary Medicine. A Textbook of the Diseases of Cattle, Sheep, Pigs, Goats and Horses.* 9th ed. Philadelphia USA: W. B. Saunders Co; 603–612.

Singh A.K, Bhakat C, Mandal D.K, Mandal A, Rai S, Chatterjee A, Ghosh M.K. 2020. Effect of reducing energy intake during the dry period on milk production, udder health, and body condition score of Jersey crossbred cows in the tropical lower Gangetic region. *Trop. Anim. Health Prod.,* 52(4):1759–1767.

Thompson P.D. 1981. Milking machines the past 25 years. *J. Dairy Sci.* 64(6):1344–1357