



Efficacy Evaluation of Mastilep Gel in Subclinical Mastitis in Cattle

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Abstract — A comparative trial was designed to evaluate the efficacy of topical herbal gel- Mastilep gel (M/s Ayurved limited) against subclinical mastitis. A total of 18 cows, 6 healthy and 12 exhibiting sign of subclinical mastitis were selected for the purpose of study. The healthy cows (n=6) were allotted in to group T0 and were kept as negative control. Cows exhibiting sign of subclinical mastitis were segregated in to 2 different groups T1 and T2 having 6 cow in each. Group T1 was treated with the mastilep gel and group T2 was treated with routine antibiotic therapy for 5 days. Parameters such as Mastrip finding, Modified California Mastitis Test (MCMT), Somatic Cell Count (SCC, $\times 10^3$), and cultural examination of each group animals were recorded. Results revealed that there was significant decrease in the SCC in the mastilep treated group (T1) following the use of Mastilep gel as compared to antibiotic treated group (T2), also there was a significant increase in the milk production of mastilep treated group (T1) as compared to the control group (T0) and antibiotic treated group (T2). MCMT also reveals that there was significant decrease in the incidence of subclinical mastitis in the mastilep treated group (T1). Examination of microbial culture also showed significant reduction in the microbial load in mastilep treated group (T1) as compare to antibiotic treated group (T2).

Keywords — Mastilep Gel, MCMT, Milk Yield, SCC, Subclinical Mastitis

I. INTRODUCTION

Mastitis, one of the most costly health issues faced by dairy farms, is an inflammation of the mammary gland which, together with physical, chemical and microbiological changes, is characterized by an increase in the number of somatic cells in the milk and by pathological changes in the mammary tissue [1]. Bovine mastitis is one of the important production disease of dairy animals which directly or indirectly affect the economy of the formers and ultimately affects the economy of the country. In dairy cattle mastitis results in several economic loss from reduced milk production, treatment cost, increased labor, milk withheld, following the treatment and premature culling [2]. Mastitis has remarkably rising impact on Indian economy where over all losses due to mastitis is estimated to be Rs.7165.51 crores [3]. Mastitis is the most common multifactorial disease in the lactating cow [4]. In cows, mastitis is most frequently caused by a bacterial infection. Infections may be present in the clinical form characterized by visible abnormalities in the milk or the udder or in subclinical form characterized by inflammation of the mammary gland that does not create visible changes in the milk or the udder. Infections may not present as clinical cases during the dry period, there is a high risk that subclinical cases will become clinical after calving [5] Detection of subclinical mastitis is more

difficult, as there are no gross inflammatory changes in the udder tissue (in apparent clinical signs). The use of laboratory examination (indirect tests) such as enumeration of somatic cells or bacteriological analysis of milk samples are required for detection the SCM. Consequently, the subclinical form of mastitis in dairy cows is important because of certain salient reasons viz; it is 15 to 40 times more prevalent than the clinical form, it usually precedes the clinical form, long duration of illness, difficult to diagnose, reduced milk production and poor milk quality [6]. The reduction in the milk production alone contributes 70-80% of the economic loss incurred due to the subclinical mastitis. Decrease milk production as well as quality, contamination of milk by drugs used for treatment of the disease [7], loss of milk due to the milk withholding time, and veterinary expenses contributes the economic loss [8]. Mastitis causes milk unsuitable for human consumption or provide a mechanism for the spread of diseases like tuberculosis, Streptococcal intoxication, colibacillosis, Streptococcal sore throat and Brucellosis to human [9]. Public hazards associated with the consumption of antibiotic contaminated milk and products cause allergic responses, changes in intestinal flora and development of antibiotic resistant pathogenic bacteria [10]. Several causative agents and predisposing factors have been implicated in mastitis in dairy cows including bacterial, mycoplasmal and yeast pathogens. Bacteria such as *S. aureus*, *S. agalactiae*, *E. coli* and *Pseudomonas aeruginosa* are the most common etiological agents involved in subclinical cases of mastitis in dairy cows [11]. Increasing emergence of antibiotic resistant pathogens [12], is further suspected to complicate the effectiveness of the mastitis treatment. To prevent the public hazards associated with the consumption of antibiotic contaminated milk, increasing emergence of antibiotic resistant, Certified organic dairies are restricted from antibiotic usage and thus must use an alternative therapy. Several herbal extracts have shown in vitro antibacterial activity versus major mastitis pathogens [13]. WHO has also emphasized on the use of medicinal plant. Therefore the proposed study was to assess the efficacy of herbal product, Mastilep gel (M/s Ayurved limited) for treatment or prevention of mastitis.

II. MATERIAL AND METHOD

The proposed trial was carried out at organized cattle form at Simarda, Anand, Gujarat for a period of 5 days to evaluate the efficacy of Mastilep gel against subclinical mastitis. A total of 18 cows, 6 healthy and 12 exhibiting sign of subclinical mastitis were selected. The healthy cows (n=6) were allotted in to group T0 and were kept as

negative control. Cows exhibiting sign of subclinical mastitis were segregated in to 2 different groups T1 and T2 having 6 cow in each. All the groups were offered common feed, fodder and adlibbed water throughout the experiment. Group T1 was treated with the Mastilep gel and group T2 was treated with routine antibiotic therapy for 5 days. Parameters such as Milk yield, Mastrip finding, Modified California Mastitis Test (MCMT), Somatic Cell Count (SCC, $\times 10^3$), and cultural examination of each group animals were recorded. Therapeutic efficacy of Mastilep gel was comparatively determined on the basis of improvement in the somatic cell count, milk yield, cultural characteristics and mastrip finding.

Table 1. Experimental design

S.N.	Group	No. of animal	Type of animals	Treatment
1	T0	6	Cows without SCM (healthy animals)	No treatment
2	T1	6	Cows with SCM	Application of Mastilep gel by gentle massaging of udder, BID for 5 days.
3	T2	6	Cows with SCM	Treated with routine antibiotic therapy for 5 days.

III. RESULTS AND DISCUSSIONS

A. Milk Yield

Data shows that there was significant increase in the average milk production of Mastilep treated group (T1) throughout the treatment period, from day 0-21st as compared to control group (T0) and antibiotic treated group (T2). The % increase in the milk production in the Mastilep treated group (T1) at 5th, 14th and 21st was 0.25, 8.61 and 13.11% respectively. Whereas there was a significant decrease in the milk production of antibiotic treated group and control group. It was 16.17 % decrease in the milk production in antibiotic treated group (T2) and 3.96 % in control group (T0) after 21st day of treatment (table 2). Increase in the milk production is may be due to anti-inflammatory and antimicrobial property of the ingredients (*Cedrus deodara*, *Curcuma longa* and *Eucalyptus globules*)^[17,18] of Mastilep gel which leads to quick recovery of mammary glands from the infection and inflammation, consequent upon which mammary glands becomes healthy and more milk produced by the gland.

Table 2. Milk Yield

S.N.	Group	Treatment	Milk yield (litres)			
			Day 0	Day 5	Day 14	Day 21
1	T0	No Treatment	8.33	8.82	8.90	8.00
2	T1	Application of Mastilep gel	7.78	7.80	8.45	8.80
3	T2	Treated with routine antibiotic	10.26	9.56	8.61	8.60

B. Somatic Cell Count ($\times 10^3$)

The increased somatic cell count (SCC) represents the response of udder tissue to the presence of pathogens

causing the inflammation of udder called mastitis. Mastitis represented by increased SCC significantly reduces milk synthesis and therefore milk production [16]. The SCC could be considered as a main trait of udder health and milk quality. In general it is accepted that SCC is a gold standard at diagnostics of any form of mastitis in udder .

Table 3. Somatic cell count

Day of treatment	Somatic Cell Count ($\times 10^3$)		
	Group T0	Group T1	Group T2
0	95.50	1008.60	1308.8
5	98.00	721.67	1578.7
14	128.67	596.33	2154.3
21	855.83	867.00	910.83

According to data mentioned in to the above table, there was a significant decrease in the somatic cell count of mastilep treated group (T1) animal as compared to antibiotic treated group (T2) during the period of 5th and day 14th of the trial (table3). Due to antimicrobial property of Mastilep gel it may be a decline in the pathogenic microbes and constituent upon which decreased SSC results.

C. Modified California Mastitis test (MCMT)

Data shows that in the healthy group (T0), the Modified California Mastitis Test was negative for all the animals on 0 days, 5th day and 14th day and positive for one animal on 21st day. In the Mastrip gel treated group (T1), MCMT was positive for all the animal on day 0 and on the 5th, 14th and 21st day following treatment, MCMT was negative for subclinical mastitis in four animals and positive in two animals. In the antibiotic treated group T3 MCMT was positive for the subclinical mastitis for all the 6 animals on day 0, it was again positive for all the 6 animals following the treatment on 5th and 14th day. On 21st day of antibiotic treatment the MCMT was negative for sub clinical mastitis in 3 animals and positive in rest of the 3 animals (table 4). The results clearly indicate a pattern of decline in case of subclinical mastitis following the treatment with Mastilep gel.

Table 4. MCMT

Days of experiment	Modified California Mastitis Test (MCMT)					
	Group T0		Group T1		Group T3	
	Positive	Negative	Positive	Negative	Positive	Negative
0	0	6	6	0	6	0
5	0	6	4	2	6	0
14	0	6	4	2	6	0
21	1	5	4	2	3	3

IV. CONCLUSION

Efficacy of herbal gel- Mastilep, in the treatment of mastitis was good among the control and antibiotic treated group. Also the increase in the milk yield was more in the Mastilep gel treated group. Therefore application of the herbal-gel Mastilep may be recommended for the treatment and control of sub clinical mastitis in bovine.



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