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**Management of Sub Clinical Mastitis in Crossbred Cows with
Herbal Topical Gel “Mastilep”**

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Abstract

The prevention of bovine mastitis is the most important component of a mastitis control programme. A clinical trial was conducted to evaluate therapeutic efficacy of Mastilep gel (supplied by M/s Ayurved Ltd, Baddi, India) against treatment of sub clinical mastitis. The bovine cases presented to the Teaching Veterinary Clinical Complex (TVCC) and the instructional livestock farm, College of Veterinary and Animal Sciences Parbhani, India were incorporated in study. The cows were screened for mastitis with MCMT kit and the animals found positive for subclinical mastitis were grouped into 2 groups of ten animals each. Group T1 (Control Group) was given no treatment and group T2 was treated with Mastilep gel (supplied by m/s Ayurved Ltd, Baddi, India), applied topically BID for 5 days. Somatic cell count (SCC), milk fat content, milk yield was evaluated along with microbiological investigations (isolation and identification). After treatment the SCC in Mastilep gel treated group reduced significantly on 5th day. The milk yield in cows suffering from sub clinical mastitis also increased significantly without any change in Milk Fat content (%) in Mastilep treated group on day 5. Milk samples of all the affected quarters revealed predominance of *Staphylococcus*, *Streptococcus* and *Escherichia coli* as the causative agents of bovine sub clinical mastitis. On the basis of microbial investigation on day 5, 60 per cent cure rate was recorded in Mastilep Gel treated. Results of the present study indicated that Mastilep gel not only eliminated udder infection in sub clinical mastitis but was also found to be efficacious in potentiating the udder immunity. It also augments repair of mammary gland, firmness and normalize udder functioning with improved milk quality.

Keywords: Herbal, Mastitis, Mastilep, Somatic cell count, Udder

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1. Introduction

Mastitis is a multi-etiological complex disease, which occurs throughout the world wherever dairy cows are found. It is characterised by physical and chemical changes in milk and pathological change in glandular tissue. The continuous presence of the disease may be attributed to deficient management, improper milking procedures, faulty

milking equipment, inadequate housing and breeding for ever-increasing milk yield (1). Mastitis is an infectious disease and all methods of commercial milk production may provide suitable conditions for spreading mastitis organisms from cow to cow (2). Sub clinical mastitis is the most serious type as the infected animal shows no obvious symptoms and secretes apparently normal milk for a long time, during which causative organisms spread infection in herd, so it is an important feature of the epidemiology of many forms of bovine mastitis (3). A considerable amount of evidences suggests that several management and environmental factors must interact together to increase exposure of cows to mastitis organisms and reduces the cows natural resistance to disease, or aid organisms in gaining entrance through the teat canal to milk secreting tissues of the udder where they cause infection (4). The occurrence of disease is an outcome of interplay between the infectious agents and management practices stressing the defense of udder. Mastitis is expressed by tissue injury caused by tissue invasive or toxigenic organisms, which become dominant due to upset of balance in microbial population (5). Bovine Mastitis is economically the most significant disease of dairy cows and continues to be a persistent problem in the dairy industry at global level. Apart from its economic importance it is also a matter of concern as it carries public health significance (6). The recent scientific literature on mastitis is so vast that the people have concentrated on various aspects of treatment and control (7, 8). Antibiotic therapy and intramammary infusion are the most common practice for mastitis treatment, but these have got certain limitations like residual toxicity and development of resistance (9). The past decade has seen a significant increase in the use of herbal medicine due to their minimal side effects, availability and acceptability to the majority of the population. The active constituents of many drugs are found in plants or are produced as secondary metabolites (10). Traditional herbal medicines used by different communities in different region play an important role in alleviating different diseases (11). They are safe, effective and inexpensive Nature has a treasure of medicines to treat all kinds of ailments. Even WHO has emphasized on the use of medicinal plants, as they are safer and cost effective than the synthetic drugs. But there is a lack of standardization or documentation of identification characters which is the major backslaps of herbal medicines. Therefore the correct and scientific identification of these plants is quite necessary to get the full therapeutic impact of the drugs (12). India is one of the world's mega biodiversity center having more than 45000 different plant species. However, only 7000-7500 species are used for their medicinal values by traditional communities (13). Therefore, present study was conducted to evaluate the therapeutic efficacy of a herbal topical formulation Mastilep gel against subclinical mastitis in crossbred cows.

2. Material and Methods

The present study was conducted in the bovine cases presented in the Teaching Veterinary Clinical Complex (TVCC) and the instructional livestock farm College of Veterinary and Animal Sciences Parbhani, India. 41 cows were screened with MCMT kit for detection of subclinical mastitis and the cows found positive were divided into two groups of ten animals each. Control group T1 without any treatment and treatment group T2 treated with herbal topical formulation Mastilep Gel applied by gentle massaging to the cow udders twice daily after every milking for five consecutive days. History pertaining to physiological status of an individual animal e.g age, milk yield per day, lactation no, lactation stage was recorded and detailed clinical examination was conducted and colour, consistency, odour, taste of milk and clinical manifestation if any, was also recorded. Mastilep is a topical Herbal Gel (*supplied by m/s Ayurved Ltd, Baddi, India*) for the treatment of subclinical Mastitis. The product comprises of herbs viz, *Glycyrrhiza glabra*, *Curcuma longa*, *Cedrus deodara*, *Eucalyptus globulus* and many others in a fixed concentration. Milk samples were collected before and after application of herbal preparations Individual samples were collected in sterile glass vials of 100 ml capacity. The samples were immediately subjected to the detection of somatic cell count (14), estimation of milk fat using Gerber's method and microbiological investigations such as, isolation of bacterial agents (15) responsible for sub clinical and clinical mastitis and also for drug sensitivity for different organisms against isolated organisms. Therapeutic efficacy was determined on the basis of improvement in somatic cell count, milk yield, milk fat content and microbiological investigations (bacterial load in the milk) and clinical symptoms viz. udder swelling, redness etc.

Statistical analysis

The data was analysed according to the methods described by Snedecor and Cochran (16).

3. Results and Discussion

Ten cows with sub clinical mastitis were treated with application of topical herbal Mastilep Gel twice daily after each milking for five consecutive days.

Prevalence: In the present investigation sub clinical Mastitis (SCM) was recorded in 23 cows among 41 screened cows, indicating overall prevalence rate as 56.1 percent. The incidence rates of sub clinical mastitis reported from different states of India by various workers were 48.7 % (17), 53.54 % (18), 56.76 % (19).

Somatic cell count: Somatic cell count in milk is an indication of the presence of udder infection. Determination of somatic cell count is reliable tool for diagnosis of sub clinical mastitis and the increase in SCC was found to be

directly proportional to the severity of infection (14). Somatic cell counts of affected quarters in the present study were higher than threshold (3, 50,000 cells/ ml of milk) for subclinical mastitis and were identified to be affected with sub-clinical mastitis (20). The SCC ($\times 10^5$ cells/ml) of control group T1 was 6.01 ± 4.03 and treatment group T2 was 6.29 ± 3.33 at day 0, which was somewhat towards the higher side of subclinical mastitis (transitory phase). The increased SCC could be attributed to damage to alveolar tissue of mammary gland (16) and the increase was found to be directly proportional to the severity of infection (14). The SCC was significantly ($P < 0.01$) reduced ($4.01 \times 10^5 \pm 2.06$) in treatment group T2 on 5th day post treatment with Mastilep gel as compared to untreated control, where rise in SCC (6.69 ± 3.52 on day 5 and 7.16 ± 0.32 on day 10) was observed.

Milk Fat and Milk Yield

The milk fat percentage in the affected animal was 3.1 ± 0.6 percent in both the groups at day 0. The change in the consistency of milk from normal to watery might have affected the average fat percentage (21). Significant increase ($P < 0.01$) in milk fat percentage (3.2 ± 0.91) was observed in treated group T2 on 10th day post treatment with Mastilep gel as compared to further reduction in milk fat of untreated control (3.0 ± 0.59). Before treatment the average milk yield (lit/day) was 9.1 ± 1.57 in control group T1 and 9.2 ± 0.32 in T2. Average milk yield increased significantly ($P < 0.01$) from 9.2 ± 0.32 lit/day to 9.4 ± 0.26 on 5th day and 9.5 ± 1.82 lit/day on 10th day post treatment with Mastilep gel in treatment group T2 indicating 3.26 % increase in milk yield, as compared to further reduction in milk yield of untreated control (9.0 ± 2.05 on day 5 and 8.95 ± 1.38 on day 10) indicating a decrease of 1.64 %. These results are in corroboration with earlier results reported earlier (21).

Microbiology

Milk samples of all the affected quarters were found positive bacteriologically in both the groups at day 0. At day 5, out of 10 positive milk samples, six were found negative, giving 60% cure rate in Mastilep gel treated group T2 as compared to untreated control group. On continuation of treatment for further 5 days to the same animals, bacteriological study revealed two more milk sample free from bacterial colonies giving the overall cure rate as 80% (8 out of 10) on 10th day of treatment with Mastilep gel. The different isolates included *Staphylococcus aureus* (70%), *Staphylococcus aureus* and *Streptococcus agalactiae* (10%), *Staphylococcus aureus* and *Escherichia coli* (5%), *Staphylococcus aureus* and *Bacillus cereus* (5%), *Bacillus cereus* (5%) and *Escherichia coli* (5%) were also isolated in the present study. This is in agreement to the earlier reports (22, 23, 24, 25, 26).

Table 1. Effect on different parameters post treatment with Mastilep gel

Parameters	Group	Day 0	Day 5	Day 10
SCC ($\times 10^5$ cells/ml)	T1	6.01 ± 4.03^a	6.69 ± 3.52^{ab}	7.16 ± 0.32^{ac}
	T2	6.29 ± 3.33^a	4.01 ± 2.06^b	4.01 ± 2.01^b
Milk yield (lit/day)	T1	9.1 ± 1.57^a	9.0 ± 2.05^{ab}	8.95 ± 1.38^{ac}
	T2	9.2 ± 0.32^a	9.4 ± 0.26^b	9.5 ± 1.82^c
Milk Fat %	T1	3.1 ± 0.62^a	3.0 ± 1.14^{ab}	3.0 ± 0.59^{ac}
	T2	3.1 ± 0.69^a	3.1 ± 0.71^a	3.2 ± 0.91^b
Microbiology samples	T1	0	0	0
	T2	0	6 (60 %)	8 (80 %)

Values with different superscripts in a row differ significantly at $P < 0.01$

The results of the present study may be attributed to the pharmacological activities of the constituent herbs of Mastilep gel. The constituent herbal ingredients of Mastilep Gel viz. *Cedrus deodara* (27), *Curcuma longa* (28, 29), *Glycyrrhiza glabra* (30) and *Eucalyptus globules* (31) are well proven in alternative medicine for their antibacterial, anti-inflammatory, analgesic and anti-histaminic and immunomodulatory properties. The efficacy of the herbal gel in treatment of subclinical mastitis is because of the synergistic action of all the ingredient herbs.

4. Conclusion

From the results of the present study it can be concluded that the initial level of SCC, milk yield, milk fat content were effectively brought to the normalcy after topical application of Mastilep gel. Observations of this experiment substantiate the use of Mastilep gel treatment as radical therapy in curing subclinical mastitis.

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