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EFFICACY EVALUATION AV/AMP/34, MASTILEP GEL, HERBAL SPRAY (AV/AMS/15) IN SUB CLINICAL MASTITIS IN BOVINES

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Abstract: The present investigation was conducted to evaluate the efficacy of AV/AMP/34 gel, mastilep gel, herbal spray AV/AMS/15 ((M/S Ayurvet Limited, Baddi, India) in sub clinical mastitis in bovines. During the trial, total 46 cows in suffering from sub-clinical mastitis as ascertained on the basis of mastrip test, CMT, somatic cell count were selected and divided randomly into 4 groups. Treatment to the different groups given as: group T1 (n=10)- AV/AMP/34 Gel, applied twice daily on udder after milking for 5 days, group T2 (n=16)- Mastilep Gel, applied twice daily on udder after milking for 5 days, group T3 (n=10)- Herbal Spray (AV/AMS/15), applied twice daily on udder after milking for 5 days and group T4 (n=10) treated with routine antimicrobial therapy. Milk sample was collected from all the animals before initiation of treatment at day 0 and 5th, 14th, 21st post treatment. Parameters viz. SCC, Milk yield, animals recovered were recorded during the experiment. Statistical analysis of results revealed that efficacy of AV/AMP/34 Gel in treatment of subclinical mastitis was higher among the different herbal remedies followed by Mastilep gel, followed by AV/AMS/15 spray.

Keywords: Herbal gel, herbal spray, SCC, CMT, Mastistrip test



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INTRODUCTION

Mastitis, the inflammation of mammary glands in dairy animals, results in huge economic losses to the dairy industry. The current annual losses due to mastitis in India have been calculated to be Rs. 7165 crores⁽¹⁾. Mastitis is usually caused by bacterial infection although many other microorganisms including fungi, algae, mycoplasmas and viruses can cause disease. Klastrop et al.,⁽²⁾ estimated that 25% of susceptibility to infection is attributed to environmental factors, 20% to genetic factors and 50% to herd management. In general, mastitis is a complex disease dealing with, the interaction of microorganisms and the cattle anatomy and physiology, dairy husbandry and management, milking equipment and procedures and environment⁽³⁾. Because of udder, anatomical position is subject to outside influence and is prone to both inflammation and non-inflammatory conditions⁽⁴⁾. A study reported that in mastitis a heavy economic loss occurred due to reduced milk yield (up to 70%), milk discard after treatment (9%), cost of veterinary services (7%) and premature culling (14%). According to the study, the annual economic losses incurred by dairy industry in India on account of udder infection have been estimated about 6053.21 crores⁽⁵⁾. Apart from causing economic losses, this disease also poses the risk for the transmission of zoonotic diseases like tuberculosis, brucellosis, leptospirosis and streptococcal sore throat to human beings⁽⁶⁾. Till date antibiotics are the only primary agents used in the treatment and control of mastitis, but their use in mastitis therapy at large scale is not free from its hazardous effects. Intramammary infusion of antibiotics for mastitis therapy was cited as a major reason for milk contamination⁽⁷⁾, persistence of antibiotic residues in milk⁽⁸⁾ and antibiotic resistance⁽⁹⁾. For this reason, antibiotic alternative methods of mastitis treatment and control are receiving increased attention now-a-days. One such approach is based on the use of herbal medicine. AV/AMP/34 gel, mastilep gel and herbal spray (AV/AMS/15) (M/S Ayurved Limited, Baddi, India), are different herbal formulations usually applied on the udder, have been developed as an alternative method for controlling mastitis in ruminants. The herbal preparations have active ingredients including herbal extracts of *Cedrus deodara*,^(10, 11) *Curcuma longa*,^(12,13) *Glycyrrhiza glabra*^(14,15) and *Eucalyptus globulus*⁽¹⁶⁾ are included for their antibacterial, anti-inflammatory, analgesic, antihistaminic and immunomodulatory effects.

MATERIALS AND METHODS

Total 46 lactating cows (preferably of same lactation period and in same stage of lactation) suffering from sub-clinical mastitis were ascertained on the basis of mastrip test, CMT, somatic cell count will be selected and divided randomly into 4 groups. Group T1 (n=10) cows were treated with AV/AMP/34 gel ((M/S Ayurved Limited, Baddi, India), applied twice daily on udder after milking for 5 days, group T2 (n=16) cows treated with Mastilep Gel (M/S Ayurved Limited, Baddi, India), applied twice daily on udder after milking for 5 days. Group T3 (n=10) cows

treated with Herbal Spray- AV/AMS/15 (*M/S Ayurved Limited, Baddi, India*), applied twice daily on udder after milking for 5 days and group T4 (n=10) cows treated with routine antimicrobial therapy (Enrofloxacin @ 7.5 mg/kg bwt LA to be repeated after 72 hrs, Phenermine hcl 8-10 ml od X 3, Isoflupridone 5ml to be repeated after 48 hrs, Tri sodium citrate 50 g po stat od X 3).

Sampling and Parameters Studied

Milk samples were collected from all the animals under experiment in 30 ml oven dried glass bottles before initiation of treatment at day 0 and 5, 14 21 post treatment⁽¹⁷⁾. California Mastitis Test (CMT) and Mastrip test were performed before treatment day 0 and after treatment on day 5, 14 and 21 for detection of sub clinical mastitis. SCC and Milk yield was recorded before treatment day 0 and after treatment on day 5, 14 and 21. Percentage of animals recovered from subclinical mastitis (SCM) per group was also recorded

Statistical analysis

The data collected was analyzed by applying standard statistical methods described by Snedecor and Cochran¹⁸.

RESULTS AND DISCUSSION

Somatic cell count ($\times 10^5$)

The function of polymorph nuclear cells in milk is to engulf and to digest the invading bacteria⁽¹⁹⁾ and most significant subclinical abnormality of the milk is the increase in somatic cell count. In group T1, SCC on day 0 was 3.21×10^5 which was significantly ($P < 0.05$) reduced to 2.05×10^5 on 5th day after AV/AMP/34 gel treatment. SCC values on 14th and 21st day post treatment were 2.3×10^5 and 2.24×10^5 respectively. In group T2, SCC on day 0 was 3.09×10^5 which was significantly ($P < 0.05$) reduced to 2.23×10^5 on 5th day after Mastilep Gel treatment. SCC values on 14th and 21st day post treatment were 2.29×10^5 and 2.27×10^5 respectively. In group T3, SCC on day 0 was 3.17×10^5 which was non-significantly reduced to 3.05×10^5 on 5th day after AV/AMS/15 spray treatment. SCC values on 14th and 21st day post treatment were 2.70×10^5 and 2.39×10^5 respectively. In group T4, SCC on day 0 was 3.19×10^5 which was significantly ($P < 0.05$) reduced to 1.7×10^5 on 5th day after AV/AMP/34 Gel treatment. SCC values on 14th and 21st day post treatment were 1.95×10^5 and 2.01×10^5 respectively. The decrease in SCC in AV/AMP/34 gel treated cows because of antioxidant and anti inflammatory properties of its constituent herbs^(20,21).

Table 1: Average values of milk SCC (X 10⁵) in different treatment groups at different intervals.

Intervals	0 day	5 th day	14 th Day	21 st day
T 1	3.21±0.19 ^a	2.05±0.11 ^b	2.3±0.21 ^b	2.24±0.16 ^b
T 2	3.09±0.17 ^a	2.23±0.09 ^b	2.29±0.15 ^b	2.27±0.13 ^b
T 3	3.17±0.11 ^a	3.05±0.21 ^a	2.70±0.21 ^a	2.39±0.24 ^a
T 4	3.19±0.20 ^a	1.7±0.17 ^b	1.95±0.13 ^b	2.01±0.14 ^b

Means bearings different superscripts differ significantly with each other in respective row (P < 0.05)

Milk Yield (L/day)

The major economic losses due to subclinical mastitis have been attributed with the loss of milk yield. Number of alveoli, alveolar diameter and secretory alveolar cell population significantly decreased in mastitic cattle⁽²²⁾. In a study by Tesfaye⁽²³⁾ overall financial loss for each cow per lactation was 984.64 Eth Birr (US\$78.65) and losses in large farms (1,882.40 Eth Birr or US\$150.35) were over 3.5 times the loss in small-size farms. In the present investigation milk-yield of all the animals under investigation was recorded before treatment day 0 and after treatment on day 5th, 14th and 21st. In group T1, milk yield (L/day) on day 0 was 5.05 L/day which was non significantly increased by 13% (5.71 L/day) on day 5th post AV/AMP/34 Gel treatment. Over all a significant (P < 0.05) 20.79 % (6.10 L/day) increase in milk yield was recorded on day 21st. In group T2, milk yield (L/day) on day 0 was 5.27 L/day which was non significantly increased by 11.19 % (5.86 L/day) on day 5th post Mastilep Gel treatment. Over all a significant (P < 0.05) 21.25 % (6.39 L/day) increase in milk yield was recorded on day 21st. In group T3, milk yield (L/day) on day 0 was 5.19 L/day which was non significantly increased by 1.15 % (5.86 L/day) on day 5th post AV/AMS/15 spray treatment. Over all a non-significant (P < 0.05) 4.25 % (6.39 L/day) increase in milk yield was recorded on day 21st. In group T4, milk yield (L/day) on day 0 was 5.41 L/day which was significantly (P < 0.05) increased by 12.56 % (6.09 L/day) on day 5th post antibiotic treatment. Over all a significant (P < 0.05) 14.97 % (6.22 L/day) increase in milk yield was recorded on day 21st. Overall increase in milk yield was high in AV/AMP/34 gel and Mastilep gel treated cows.

Table 2: Milk yield (L/day) of different treatment group cows at day 0, 5, 14 and 21

Groups	T1	T2	T3	T4
Day				
Day 0	5.05 ±0.13 ^a	5.27 ±0.17 ^a	5.19 ±0.11 ^a	5.41 ±0.24 ^a

Day 5	5.71±0.16 ^a	5.86 ±0.14 ^{ab}	5.25 ±0.13 ^a	6.09 ±0.13 ^b
Day 14	5.90 ±0.21 ^a	6.03 ±0.21 ^b	5.4 ±0.19 ^a	6.17 ±0.19 ^b
Day 21	6.10 ±0.27 ^b	6.39 ±0.19 ^b	5.41 ±0.25 ^a	6.22 ±0.21 ^b

Means bearings different superscripts differ significantly with each other in respective row (P < 0.05)

CMT and Mastrip test

California mastitis test (CMT) used to detect an intramammary infection caused by a major mastitis pathogen in early lactation cows⁽²⁴⁾. According to CMT test, among different treatment group only 1 cattle in group T1 (n=10), 3 in group T2 (n=16) and 4 in group T3 (n=10) were found positive for subclinical/clinical mastitis during the experimental schedule on day 5th. No animal in group T4 (n=10) was found positive for mastitis according to California mastitis test. Mastrip test was observed –ve in all the groups from day 0 to day 21st of study, except in T3 group two cows were found +ve for mastitis.

Table 3: Detection of subclinical mastitis in different treatment group cows on basis of CMT

Day	T1 (n=10)	T2 (n=16)	T3 (n=10)	T4 (n=10)
Day 0	All cows +ve	All cows +ve	All cows +ve	All cows +ve
Day 5	1 +ve	3 +ve	4 +ve	-ve
Day 14	-ve	-ve	-ve	-ve
Day 21	-ve	-ve	-ve	-ve

Percentage recovery of affected animals

100 % recovery was recorded in cows treated with antibiotics. Percentage recovery was 81 % in cows treated with AV/AMP/34 gel, 82.25 % in cows treated with Mastilep gel and 60 % in cows treated with AV/AMS/15 spray treatment. Recovery from clinical and subclinical mastitis in herbal treatment group could be attributed to the immunostimulatory and healing inducing effects of constituents herbs^(25,26).

CONCLUSION

Efficacy of AV/AMP/34 Gel in treatment of subclinical mastitis was higher among the different herbal remedies followed by Mastilep gel, followed by AV/AMS/15 spray. Increase in Milk yield (%) was more in Mastilep gel and AV/AMP/34 gel treated cows on day 21st.

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