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Dr. Keshamoni Ramesh
Ph.D., Scholar, Department of
Veterinary Medicine, College of
Veterinary Science, PVNRTVU
Rajendranagar, Hyderabad,
Telangana, India

Dr. K Lakshmi
Assistant Professor, Department
of Veterinary Medicine, College
of Veterinary Science, Korutla,
Jagtiyal, Telangana, India

Dr. G Ambica
Assistant Professor, Department
of Veterinary Medicine, College
of Veterinary Science,
Rajendranagar, Hyderabad,
Telangana, India

Dr. B Swathi
Professor and University Head,
Department of Veterinary
Physiology and Biochemistry,
College of Veterinary Science,
Rajendranagar, Hyderabad,
Telangana, India

Dr. K Padmaja
Professor and Principal, Animal
Husbandry Polytechnic,
Mahaboobnagar, Telangana,
India

Dr. M Aruna
Department of Veterinary
Medicine, College of Veterinary
Science, Rajendranagar,
Hyderabad, Telangana, India

Corresponding Author:
Dr. K Lakshmi
Assistant Professor, Department
of Veterinary Medicine, College
of Veterinary Science, Korutla,
Jagtiyal, Telangana, India

Therapeutic management of sub clinical mastitis in buffaloes

Dr. Keshamoni Ramesh, Dr. K Lakshmi, Dr. G Ambica, Dr. B Swathi, Dr. K Padmaja and Dr. M Aruna

Abstract

In the present study, twenty buffaloes were randomly selected among SCM culturally positive cases and divided into two groups II and III. While, ten apparently healthy buffaloes were considered as control group I. In group II, 10 buffaloes with 18 quarters were treated with Uddocare powder orally (herbal preparation with antioxidants and immuno modulators). In group III, 10 buffaloes with 14 positive quarters were treated with topical application of a mixture of *Aloe vera* paste (herbal preparation without antioxidants and immunomodulators). Therapeutic efficacy was recorded based on qualitative changes in milk, hematology, bacteriological cure rate and milk yield. Animal wise therapeutic efficacy of group II and group III was 70.00 and 50.00 percent respectively. While, quarter wise therapeutic efficacy of group II and group III was 83.33 and 64.29 percent respectively.

Keywords: Buffaloes, subclinical mastitis, therapy, Uddocare powder and *Aloe vera* paste

Introduction

Mastitis is an important disease of dairy animals caused by several infectious and non-infectious agents and is characterized by inflammation of parenchyma of the mammary gland with physical, chemical and bacteriological changes in the milk and pathological changes in the glandular tissues (Radostits *et al.*, 2007) [6]. Mastitis effect not only the individual animal but, the whole herd or at least several animals within the herd are affected. If left untreated, the condition can lead to deterioration of animal welfare resulting in culling of affected animals, or even death. According to the severity, duration, nature of the exudates and primary cause, mastitis can occur in clinical and subclinical form in buffaloes (Sharma and Sindhu, 2007) [9]. Moreover, subclinical infected udder quarters may develop into clinical mastitis if left untreated.

Generally antibiotic therapy is implemented in treating both clinical and subclinical mastitis cases in field conditions. However, many bacterial strains are resistance to antibiotics used which is leading to serious hazard called Antimicrobial Resistance (AMR). Hence, the selection of effective therapy for subclinical mastitis depends upon the type of pathogens involved. Therefore, milk culture and antimicrobial sensitivity testing must be undertaken before developing a treatment protocol (Charaya *et al.*, 2013) [4]. However, some cases end up in failure due to resistance of the pathogen to the antibiotic, late commencement of the treatment and improper antibiotics (Shafi *et al.* 2016). Therefore, an alternate approach was attempted with the use the herbal therapy alone and in combination with antioxidants and immunomodulators instead of antibiotics in subclinical mastitis.

Materials and Methods

Two herbal preparations have been chosen for the present therapeutic trial on sub clinical mastitis in buffaloes. The buffaloes affected with subclinical mastitis were divided into two groups i.e., group II and III for the purpose of trial, each containing 10 buffaloes, group II and group III with 18 and 14 quarters were affected with have subclinical mastitis respectively. The group II buffaloes were treated with 'Uddocare powder' (herbal preparation with antioxidants and immunomodulators) @ 30g twice daily for 7 days per orally (Fig. 1). While, group III buffaloes were treated with *Aloe vera* paste (herbal preparation without antioxidants and immunomodulators) prepared from *Aloe vera* leaves 200g, turmeric powder 10g, castor oil 10 ml and one lemon applied externally over the affected udder thrice daily for 7 days (Fig. 2). Before each application, the udder was washed well with water and the milk from all quarters

was stripped completely. The apparently healthy buffaloes were taken as group I (healthy control). Milk samples were collected for diagnostic tests and for cultural examination

before and after treatment. The animal was considered as free from the disease when milk samples showed a negative reaction for CMT, SCC along with culturally negative results.

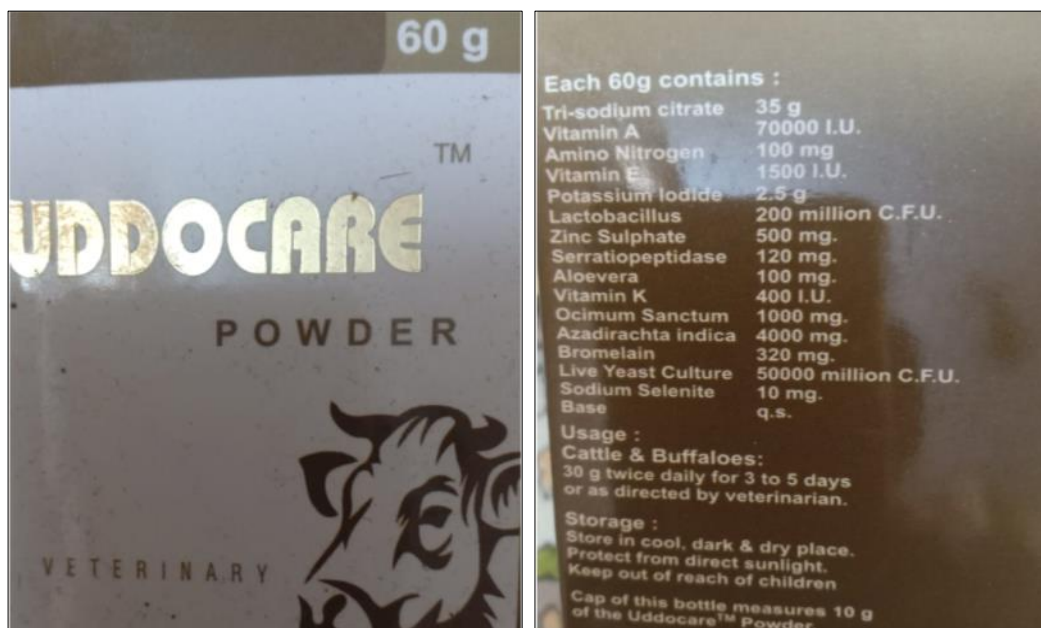


Fig 1: Uddocare powder



Fig 2: Preparation of *Aloe vera* paste for topical application

Results and Discussion

The CMT grades in SCM affected quarter milk samples of group II and group III buffaloes before and after therapy were presented in Table-1. Out of 18 quarters of group II buffaloes, 2, 6 and 10 quarters with trace, weak positive and distinct positive reaction on CMT was observed before treatment. On day 7 (after treatment) 2, 5 and 8 quarters were recovered based on CMT indicating 100, 83.33 and 80.00 per cent efficacy. Out of 14 quarters of group III buffaloes, 1, 5 and 8 quarters with trace, weak positive and distinct positive reaction on CMT was observed before treatment. On day 7 (after treatment) 1, 1 and 4 quarters were recovered based on CMT indicating 100, 80.00 and 50.00 percent efficacy. The mean milk SCC values of group II and III on day 0 was $3.61 \pm 0.37 \times 10^5$ and $3.24 \pm 0.28 \times 10^5$ cells/ml respectively, that was significantly ($P < 0.05$) high as compared to healthy

control ($0.92 \pm 0.01 \times 10^5$ cells/ml). These values decreased significantly ($P < 0.05$) to 1.05 ± 0.08 and $1.10 \pm 0.09 \times 10^5$ cells/ml respectively on day 7 as compared to that of day 0. The mean milk pH values of group II and III on day 0 was 7.00 ± 0.05 and 6.92 ± 0.04 respectively, that was significantly ($P < 0.05$) high as compared to healthy control (6.73 ± 0.02). These values decreased significantly ($P < 0.05$) to 6.66 ± 0.02 and 6.82 ± 0.03 , respectively on day 7 as compared to that of day 0. The mean milk fat values of group II and III on day 0 was 6.64 ± 0.19 and 6.67 ± 0.28 percentage respectively, which decreased non-significantly as compared to healthy control (7.61 ± 0.22 percentage). These values increased non-significantly to 7.38 ± 0.27 and 7.36 ± 0.20 percentage, respectively on day 7 as compared to that of day 0 (Table-2). Out of 10 buffaloes of group II, 70.00 per cent (7/10) of buffaloes treated with Uddocare powder orally were

bacteriologically negative on day 7 post treatment. While in group III, 50.00 per cent (5/10) of buffaloes treated with topical *Aloe vera* paste were bacteriologically negative on day 7 post treatment. Out of 18 quarters of group II, 83.33 per cent (15/18) of quarters were bacteriologically negative on day 7 post treatment. While in group III, 64.29 per cent (9/14) of buffaloes were bacteriologically negative on day 7 post treatment (Table-3 and 4).

The mean milk yield of buffaloes per day under groups II and III recorded before treatment and after treatment were taken for calculating the difference in milk yield and also to study the therapeutic efficacy of sub clinical mastitis. The mean milk yield of buffaloes under group II and group III on 0th day recorded as 6.05 ± 0.17 and 6.38 ± 0.17 , respectively which decreased significantly ($P < 0.01$) when compared with healthy control group (7.17 ± 0.12). On 7th day, after treatment the mean milk yield of buffaloes under group II increased significantly ($P < 0.01$) to 7.13 ± 0.20 and in group III mean milk yield increased significantly ($P < 0.05$) to 6.80 ± 0.17 . In the present investigation, improvement in the milk yield of group II was 11.78 percent and group III was 10.66 percent (Figure-3).

In the present investigation, though there was improvement in both the groups, (Group II and III) it was observed that, the treatment given to group II was more effective and showed earlier improvement in CMT, SCC, milk pH, milk fat, and milk yield on day 7 post therapy and therapeutic efficacy was significant ($P < 0.05$) which could be attributed to the addition of antioxidants and immunomodulators to the herbal preparation. It was evident from this study that, recovery rate shown by subclinical mastitis quarters in group II was effective when compared with Group III.

Oral administration of tri-sodium citrate and levamisole HCl are possible substitutes of antibiotic therapy for SCM in dairy buffaloes. Tri-sodium citrate neutralize pH of milk, trace mineral like Zn reduce further penetration of microorganism as well as maintain thickness of keratin ratio layer of teat orifice and uptake system significantly contribute to the virulence of many pathogenic bacteria (Sarfaraz *et al.* 2009) [7]. *Ocimum sanctum* (Tulasi) is an important plant species used in the treatment of various animal diseases with immune modulatory and anti-inflammatory properties attributed to its active constituents such as volatile oil (eugenol, 80%), flavonoids, and triterpene (Bone *et al.* 1991) [12]. *Aloe vera* is an important plant species used in the treatment of various animal diseases which has broad-spectrum antimicrobial, anti-inflammatory and immune modulatory activities. The antimicrobial activity of *Aloe vera* is attributed to the anthraquinones, flavanoids, tannins, saponins, p-coumaric acid, ascorbic acid, pyro catechol and cinnamic acid. The anti-inflammatory activity of *Aloe vera* is reported to be due to bradykinase which decreases vascular permeability, neutrophil migration, and leukocyte adhesion and reduces edema formation (Balakrishnan *et al.* 2017) [11]. Curcuma Longa can be used for treating SCM affected bovines as an alternative medicine for their antimicrobial, anti-inflammatory, analgesic, anti-histamine and immunomodulatory properties (Sharma, 2008) [10]. Curcuma longa (Turmeric powder) used in the present study has antiseptic properties. The active principle of Curcuma longa was reported to inhibit NF- κ B which in turn decreases TNF- α , superoxides, COX-2, iNOS and NO. It inhibits LOX pathway and decreases the formation of leukotrienes (Mooventhan *et al.*, 2016) [5].

Table 1: CMT grades in group II and group III sub clinical mastitis affected buffaloes

S. No.	CMT grade	Group II			Group III		
		Affected quarter on CMT (0 th day)	Recovered quarter on CMT (7 th day)	Percentage efficacy	Affected quarter on CMT (0 th day)	Recovered quarter on CMT (7 th day)	Percentage efficacy
1.	T (trace)	2	2	100	1	1	100
2.	+ (weak positive)	6	5	83.33	5	4	80.00
3.	++ (Distinct positive)	10	8	80.00	8	4	50.00

Table 2: Somatic cell count, milk pH and milk fat values in healthy control and subclinical mastitis affected buffaloes

S. No.	Parameter	Healthy control (Group I)	Group II		Group III	
		0 th day	Before treatment (0 th day)	After treatment (7 th day)	Before treatment (0 th day)	After treatment (7 th day)
1.	SCC	0.92 ± 0.01	3.61 ± 0.37	$1.05 \pm 0.08^*$	3.24 ± 0.28	$1.10 \pm 0.09^*$
2.	pH	6.73 ± 0.02	7.00 ± 0.05	$6.66 \pm 0.02^*$	6.92 ± 0.04	$6.82 \pm 0.03^*$
3.	Fat	7.61 ± 0.22	6.64 ± 0.19	7.38 ± 0.27	6.67 ± 0.28	7.36 ± 0.20

* Significant at ($P > 0.05$)

Table 3: Bacteriological cure rates observed in group II and group III buffaloes (animal-wise)

S. No.	Group	No. of buffaloes treated	Animal wise cure rate (Day 7)	Percentage of recovery
1	II	10	7	70.00
2	III	10	5	50.00

Table 4: Bacteriological cure rates observed in group II and group III buffaloes (quarter-wise)

S. No.	Group	No. of quarters treated	Quarters wise cure rate (Day 7)	Percentage of recovery
1	II	18	15	83.33
2	III	14	09	64.29

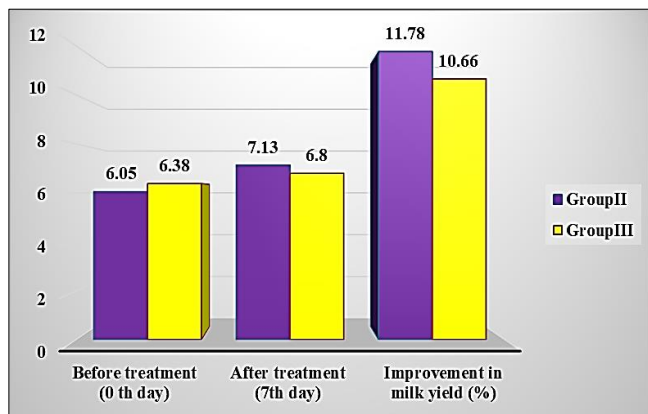


Fig 3: Percentage of improvement in milk yield in group II and group III after treatment

Summary

In the present study, it can be concluded that, subclinical mastitis was a hidden problem in buffaloes causing considerable loss to the dairy farmers. Treatment with Uddocare powder orally (herbal preparation along with antioxidants and immunomodulators) was superior than *Aloe vera* paste topically (herbal preparation without antioxidants and immunomodulators) by enhancing udder's natural defence mechanism, early restoration of milk yield and quick recovery.

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