Efficacy of Indigenous Herbal Preparation on Altered Milk pH, Somatic Cell Count and Electrolyte Profile in Subclinical Mastitis in Cows

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Abstract

Comparative efficacy of three different locally prepared indigenous herbal paste were evaluated in subclinical 24 mastitic cows with reference to restoring altered milk pH, somatic cell count and milk electrolyte profile. The study revealed that all the treatment were found effective in restoring the altered milk constituents in subclinical mastitis with increased in the milk production. T3 (oots of *Withania somnifera* (Ashwagandha), *Asparagus reacemosus* (Shatavari), *Curcuma-amada* (Ambe Haldi) and fresh leaves of *Ocimum sanctum* (Tulsi) in equal quantities) was found more effective than T5 (T3 and T4 in combination in equal quantities) and T4 (fresh roots of *Glycerrhiza glabra* (Jeshathamadh), *Nardostachys jatamansi* (Jatamansi), leaves of *Riccinus communis* (Yerand), bark of *Ficus racemosa* (Umber) and rhizome of *Curcuma longa* (Haldi) in equal quantities)

Keywords: Herbal, Milk, Somatic Cell count, Subclinical Mastitis, Electrolyte.

Introduction

Subclinical mastitis (SCM) causes a greater loss to dairy industry in term of reduction in milk production. The disease is also characterized by biochemical changes in composition of milk, resulting in decreased keeping quality of milk.

The present investigation was undertaken to study the efficacy of herbal drug in restoring altered milk pH, somatic cell count (SCC) and milk electrolyte profile in SCM in cows.

Material and Methods

24 lactating crossbred cows at mid lactation suffering from SCM, diagnosed on the basis of California Mastitis Test (CMT) and Bromothymol Blue Test (BTB) were divided into 4 equal groups. One additional group (T1) of six normal healthy lactating cows was taken for comparison. First group (T2) of six SCM cows was kept as a untreated control. Second group (T3) of SCM cows was treated with locally prepared aquatic herbal paste containing roots of *Withania somnifera* (Ashwagandha), *Asparagus reacemosus* (Shatavari), *Curcuma-amada* (Ambe Haldi) and fresh leaves of *Ocimum sanctum* (Tulsi) in equal quantities. Third group (T4) of SCM cows was treated with locally prepared herbal paste containing fresh roots of *Glycerrhiza glabra* (Jeshathamadh), *Nardostachys jatamansi* (Jatamansi), leaves of *Riccinus communis* (Yerand), bark of *Ficus racemosa* (Umber) and rhizome of *Curcuma longa* (Haldi) in equal quantities. Fifth group (T5) was treated with herbal paste used in group T3 and T4 in combination in equal quantities. The paste was prepared in fresh water and applied locally on affected udder at the interval of 12 hr for 10 days in all treated groups.

Milk sample was collected on '0' day (pretreatment) and subsequently on 6th and 10th day post treatment for estimation of pH, SCC (Schalm *et.al.* 1971), sodium and potassium (Roy and Sen, 1991) and chloride (Shoenfield, 1956). The data was statistically analyzed by applying Factorial Completely Randomized Design (FCRD) as per method described by Snedecor and Cocharan.

Results and Discussion

Results are depicted in table 1. In all treated groups CMT and BTB were found negative after 10 days indicating the recovery in the affected quarters. However, in untreated control group (T2) CMT and BTB were found positive.

Constituent of milk responsible for pH are casein citrate, phosphate and dissolved carbon dioxide and bicarbonates which are balanced with permeability of udder cells to the blood capillaries. In mastitis increased permeability of the gland to blood components viz. bicarbonate ions results higher values of pH in the milk (Rao,1990). Untreated control group (T2) showed non significant increase in pH throughout the experimental period. In cows treated with medicinal plant pastes showed

significant decrease in pH after 10 days post treatment, especially plants used in T5 group was more effective in reducing the milk pH.

SCC plays a protective role against infection in bovine mammary gland as a normal part of defense mechanism. SCC below 5 x 105 cells/ml considered to be normal (Youl and Nicholls, 1987). Increase in SCC indicates inflammatory reaction of udder tissues. In T1 group SCC was in the range of 3.25 ±0.31 to 3.4±0.14 x10^5 cells/ml. In treated groups, SCC before treatment were significantly higher over normal healthy control. This increase of SCC indicated inflammatory reaction and might be due to shift of leucocytes to the udder after entry of infection in the mammary gland and as a protective mechanism against infection (Mercus et al., 1994). It was restored to normal after 10 days treatment with herbal paste in all treated groups. Superiority in reduction in SCC was 67.58 % in animals under group T3 followed by group T5 (58.41 %) and group T4 (47.46 %) within 10 days of treatment.

Major electrolytes in milk are sodium, potassium and chlorides. Sodium and chlorides are increase in mastitis whereas potassium decreases. These imbalance results into decrease in quality and taste of milk. Bacterial infection of the udder results into damage to the ductal and secretary epithelium which leads increase permeability of the blood capillaries, thus Na+ and Cl- pour into the lumen of the alveolus and in order to maintain osmolarity, K+ level decrease proportionately (Wheelock *et al.*, 1996 and Singh *et al.,* 1998). All the herbal treatment given under experiment were found to be effective in restoring the milk sodium, potassium and chloride concentration. However T5 treatment was more effective (11.06 %) followed by T4 (9.53 %) and T3 (8.42%) in reducing the increased sodium concentration, whereas T4 group was found to be superior (37.42 %) in reducing the increased chloride content and increased milk potassium (15.0 %) level followed by T5 and T3 group over pretreatment values.

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Table 1 : Average changes in milk pH, SCC, Sodium, Potassium and Chloride in normal and Subclinical mastitis cows at different intervals

Parameters	Intervals (days)	Groups				
		T1	T2	T3	T4	T5
Milk pH	0	6.45±0.01	6.69a±0.03	6.69a±0.01	6.70a±0.01	6.73a±0.02
	6th	6.45±0.02	6.68a±0.02	6.61*ab±0.02	6.59*ab±0.02	6.57'ab±0.02
	10th	6.47±0.02	6.70a±0.01	6.59*ab±0.02	6.53*abc±0.02	6.53'abc±0.01
SSC (x 103)	0	3.4±0.14	11.78a±3.46	17.46a±4.34	9.63ac±1.16	11.54a±2.17
	6th	3.39±0.26 (43.36)	13.43a±3.48 (34.58)	9.89*±2.68 (40.55)	6.3b±0.8	6.86b±0.44
	10th	3.25±0.31	14.84a±4.66 (67.58)	5.66*b±1.14 (47.46)	5.06b±0.56 (58.41)	4.8*b±0.52
Sodium(mg/dl)	0	57.19±0.36	69.36a±1.93	67.83a±1.10	66.98ab±0.59	69.65ad±1.30
	6th	57.30±0.15	69.07a±1.69 (5.12)	64.36ab±0.98 (6.75)	62.46ab±0.28 (6.17)	65.35a±1.25
	10th	57.61±0.24 (8.42)	70.97a±1.91 (9.53)	62.12*ab±0.96 (11.06)	60.6'b±0.76	61.94'b±0.33
Potassium (mg/ dl)	0	138.88±3.21	132.78±1.89	128.34a±2.76	123.79ab±5.12	128.76a±1.80
	6th	136.16±2.5 (3.86)	130.69±0.52 (5.87)	133.3±2.24 (5.55)	131.06*±3.95	135.91±2.34
	10th	136.02±3.65 (7.93)	130.06±2.77 (15.00)	138.52'b±1.10 (10.68)	142.36±3.71	142.51'b±1.65
Chloride (mg/dl)	0	105.30±2.47	169.56a±3.92	182.26ab±3.33	181.26ab±4.6	175.72ab±3.61
	6th	104.62±1.45 (21.69)	171.36±4.39 (26.39)	142.56*ab±2.57 25.56	133.42*abc±2.36	130.8*abc± 2.24
	10th (34.09)	104.62±1.31 (37.42)	176.9±5.94 (37.13)	119.98*ab±2.27	113.42*b±0.74	110.46*bc±1.66