

RESEARCH PAPER

Effect of different treatments of mastitis in cow and biochemical changes in their milk

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ABSTRACT

In the present investigation, effect of different treatment of mastitis in cow was studied on various milk parameters through administration of three medicines viz., Antibiotic therapy, Tri-sodium citrate @ 30 mg/kg B.W. (total dose to less than 12 g) and 5:1 combination ratio of Sulpham-ethoxy-pyridazine (SMPd) and Trimethoprim (TMP) for the seven consecutive days. Various physical, clinical and chemical tests were employed to screen out the cows suffering from mastitis. The antibiotic therapy was given to the 1st group of cows for 7 consecutive days. Tri-sodium citrate @ 30 mg/kg B.W. was given to the 2nd group of cows. While the 3rd group of cows received the intravenous injection of combination of sulphamethoxypyridazine (SMPd) and Trimethoprim (TMP) for 7 days. The changes in milk also observed such as pH, fat %, chloride content, sp.g., S.N.F.%, T.S. %, Ash % and percentage of lactose. The mean pH of cow's milk after the administration of antibiotic therapy, tri-sodium citrate, and SMPd + TMP was noted 7.118, 6.6125 and 7.3667, respectively. The mean fat percentages of cow's milk recorded after the above noted administration for 7 consecutive days were 3.3125, 4.0375 and 2.8832, respectively in increasing order due to the effect of suitable medicine that was Tri-sodium citrate among the administered medicine.

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Mythical elixir of life, commonly known as milk, is produced by domestic mammalian animals. Milk is the most balanced and perfect diet for human nutrition because it supplies all the essential constituents needed. The national economy of some Scandinavian countries and landless labourers in poor countries like India depends upon milk production of their livestock but some of the disease like mastitis has decreased the production. Mastitis has always been economically devastating disease hampering desired progress in Indian dairy industry. The overall national economic loss in India due to mastitis was the tune of Rs. 16072 million in which subclinical Rs. 6038.7 million and Rs. 4831 million in cattle and buffalo, respectively (Singh and Singh, 1994). Cost mainly arises from decreased milk production and quality, the therapeutic intervention, loss of antibiotics contaminated milk and extra labour. The mastitis also effects the productivity of milk upto 30% and production upto 15 per cent. The incidence level of clinical and sub clinical mastitis in various parts of the country ranged from 11.51% to 23.55%, 3.94 to 17.25% and 1.99 to 12.28% in crossbreed cows, indigenous cows and buffaloes, respectively. Keeping in view the economic losses in livestock sector due to mastitis, the present study was under taken to search the most suitable medicine to

cure mastitis in cow.

MATERIALS AND METHODS

The present investigation was carried out on 70 milch cows being maintained at Dairy Farm of C.S. Azad University of Agriculture and Technology, Kanpur lying at the longitude and latitude range of 79.30°E to 48.35°N East 25.8°N to 28.5°N North, respectively. Twelve cows were screened out into three groups, each having four in number on the basis of clinical examination of the udder and certain field tests to detect the mastitis for treatments. The 1st group of animals received the antibiotic therapy viz., enrofloxacin 5 mg/kg B.W. once a day by intramuscular injection for seven days and the fresh Tri-sodium citrate @ 30 mg/kg body weight (total dose not less than 12 g) was administered orally to each animal in group 2nd after dissolving it in convenient volume of distilled water approximately 250 ml while the animal of group 3rd were treated with the 5 : 1 combination ratio of sulphamethoxypyridazine (SMPd) and Trimethoprim (TMP) by intravenous injection for seven days.

Collection and analysis of milk samples: The individual quarters were examined for mastitis by sodium lauryl sulphate as a animal-side-test and 15-20 ml of quarter foremilk samples were collected in sterilized and labeled

test tubes taking all the possible aseptic precautions. The estimation of chloride content was done as per the standard volumetric procedure described in ICAR's Manual in Dairy Chemistry (1979). The analysis of milk sample, milk for fat, lactose and SNF contents was carried out at milkoscan. The data were analysed statistically by using students t-test at 1.0 and 5.0 per cent level of significance (Snedecor and Cochran, 1967).

RESULTS AND DISCUSSION

In the present investigation, various physical clinical and chemical tests were employed to screen out the cows suffering from mastitis, from the milch stock maintained at University Dairy Farm. After screening of cows affected from the mastitis, 12 cows were selected and divided into 3 group (4 in each) for administration of the antibiotic therapy, Tri-sodium citrate and SMPd + TMP. Clinically, mastitis was characterized by swollen hot and red quarters. Table 1 shows the mean pH of cows milk after the administration of antibiotic therapy, Tri-sodium citrate and SMPd + TMP were recorded as 7.1188, 6.6125 and 7.6670, respectively. The gradual decreased

in milk pH was recorded according to effect of medicine. It was similar to the observations made by Prakash and Sharma (1994). They had treated the mastitis affected cow with 12 g, Tri-sodium citrate daily for five days and they had found a gradual decrease in pH milk after 4th day of post treatment. From the clinical point of view, low pH is not suitable for the growth of pathogens causing mastitis while higher pH (alkaline) of varying degrees favour the bacterial growth and enhance the course of mastitis. In the present study, the mean fat percentages of cows milk recorded after the administration of antibiotic therapy, Tri-sodium citrate and SMPd + TMPd for 7 consecutive day were found to be 3.3125, 4.0375 and 2.8832, respectively. The results are in agreement with the reports of Singh *et al.* (1998), who had reported fat percentage of sub clinical and clinical effected quarters was reduced to 2.89 ± 0.78 against the normal value of 3.01 ± 0.78 g/l/day. In the present study, the mean chloride value of cow's milk was observed 0.1415, 0.1387 and 0.16112, respectively. The mean percentage of solid not fat (S.N.F.) of the cows milk after the administration of drugs was recorded 8.0030, 8.7843 and 8.2165,

Table 1 : Showing biochemical components in milk after treatment of mastitis quarters of cows

Biochemical component	Drugs	No. of animal treated				Total
		A ₁	A ₂	A ₃	A ₄	
Mean pH	T ₀	7.1000	7.2250	7.2000	6.9500	7.1188
	T ₁	6.7750	6.7000	6.4750	6.5000	6.6125
	T ₂	7.5500	7.4170	7.3500	7.1600	7.6670
Mean fats	T ₀	3.1500	3.2000	3.2500	3.6500	3.3125
	T ₁	3.7500	3.8760	4.2250	4.3000	4.0375
	T ₂	2.7600	2.8500	2.9330	3.0000	2.8832
Chloride	T ₀	0.1525	0.1425	0.1400	0.1450	0.1450
	T ₁	0.1525	0.1325	0.1350	0.1350	0.1387
	T ₂	0.1624	0.1280	0.1821	0.1720	0.1612
Specific gravity	T ₀	1.0250	1.0250	1.0277	1.0282	1.0266
	T ₁	1.0290	1.0291	1.0289	1.0293	1.0291
	T ₂	1.0122	1.0312	1.1200	1.0021	1.0413
S.N.F. %	T ₀	7.5777	7.6840	8.2738	8.4765	8.0030
	T ₁	8.7037	8.7550	8.7785	8.9000	8.7843
	T ₂	7.8600	8.1330	8.4000	8.4830	8.2165
T.S.%	T ₀	10.7278	10.8840	11.5238	12.1265	11.3155
	T ₁	12.3932	12.6300	13.0035	13.2000	12.8067
	T ₂	10.8431	10.3462	10.8210	10.8367	10.7292
Ash %	T ₀	0.6350	0.6300	0.6350	0.6425	0.6356
	T ₁	0.6850	0.6950	0.6972	0.7025	0.6962
	T ₂	0.5870	0.6220	0.6892	0.6798	0.6440
Lactose%	T ₀	4.2250	4.1250	4.2500	4.3000	4.2562
	T ₁	4.6750	4.7750	4.9000	4.9500	4.8250
	T ₂	2.3760	2.1200	2.6200	2.4200	2.4200

A – A₄ = No/. of cows

T₀ = Antibiotic therapy

T₁ = Trisodium citrate

T₂ = SMPd + TMP

respectively. The percentage of total solid (T.S.) was recorded 11.3155, 12.8067 and 10.7292, respectively.

Table 1 also shows the mean percentage of ash 0.6356, 0.6962, 0.6440 and mean percentage of lactose 4.2562, 4.8250 and 2.4200, respectively.

Hence, the antibiotic therapy was given to the 1st group of cows for 7 consecutive days showed very changes in chemical composition and pH value of milk. The 2nd group of cows received the oral doses of Tri-sodium citrate @ 30 mg/kg B.W. for 7 consecutive days. It was observed that oral administration of Tri-sodium citrate @ 30 mg/kg B.W. (not less than 12 g for a cow in Indian condition) for 6-7 day lowered the milk pH, chloride content and increased the various milk compositions of the mastitis milk. The 3rd group of cows received the mixture of SMPd + TMP by single intravenous injection. It was observed that SMPd + TMP and TMP treatments may not prove to be of adequate therapeutic efficacy and make the SMPd + TMP combination unsuitable for clinical management of mastitis thus not more expensive. So, it is concluded that Tri-sodium citrate is a suitable medicine for the treatment of the mastitis in cows.

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