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Evaluation of Commercial Homoeopathic and Allopathic Preparations for Their Effect on Somatic Cell Counts and Milk Composition of Nili-Ravi Buffaloes

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ABSTRACT

This study involved 20 sub-clinically mastitic quarters of 10 Nili-Ravi buffaloes. Animals were divided into two groups, viz.A (10 quarters from six buffaloes) and B (10 quarters from four buffaloes). Sampling was done before and after seven days treatment with both from homoeopathic (Mastcare injection) and allopathic (Spectrazol intramammary tube+Tribrissen injection) commercial preparations. Determinations were made for direct and indirect microscopic somatic cell counts (SCC) by standard techniques followed by analysis of milk composition (fat, protein, acidity, solids not-fat and total solids). Statistical analysis revealed no-significant differences in milk composition between group A and B, while the differences were significant before and after the treatments. It was inferred from the study that efficacy of both the preparations was similar. However, the homoeopathic treatment had an edge being more economical one.

Key Words: Mastitis; Homoeopathic; Allopathic; Milk composition; Milk quality; SCC

INTRODUCTION

Mastitis refers to the inflammation of the udder regardless of the cause. It is the most costly disease of dairy cattle resulting in severe economic losses from reduced milk production, treatment cost, increased labor, milk withheld following treatment and premature culling (Miller *et al.*, 1993). Generally, it occurs in two forms viz. clinical and sub-clinical. The latter is 30-40 times more common than the former and causes heavy economic loss in dairy industry (Schultz *et al*., 1978). Moreover, quarter based prevalence reported in India and Pakistan was 17-93% in cows and 40-48% in buffaloes (Allore, 1993). Globally, the losses due to mastitis amount to about $53 billion (Ratafia, 1987). These losses may be even higher in Pakistan because the mastitis prevention/management practices such as post milking teat dipping, udder hygiene, dry cow therapy *etc*. are not in vogue (Bilal *et al*., 2004). In Pakistan, realization about the quantity of milk produced per animal as well as its quality in terms of constituents and hygiene is gradually increasing especially in the W.T.O. scenario. Therefore, quality check is emerging as a serious concern, especially in a disease like mastitis. Usually mastitis is treated by very costly broad-spectrum antibiotics. At present, because of intensive scientific research, homoeopathic treatment is considered a standard method of therapy parallel to the allopathic treatment. With this background, this study was conducted to compare and assess the somatic cell counts (SCC) and milk composition of Nili-Ravi buffaloes.

MATERIALS AND METHODS

The project was carried out involving 20 quarters of 10 Nili-Ravi buffaloes maintained under similar conditions of housing and management at the Livestock Experiment Station of the Department of Livestock Management, University of Agriculture, Faisalabad. Quarters were divided into two groups; A (10 quarters from six buffaloes) and B (10 quarters from four buffaloes). Sampling of milk was done before and after seven days of treatment with both homoeopathic (Mastcare Injection, Animal Health Care Pvt. Limited, Dera Ghazi Khan) and allopathic (Spectrazol I/MM tube, ICI, Animal Health Division, Pakistan, plus Tribrissen Injection ,Glaxo Wellcome Limited, Pakistan) preparation followed by their examination for direct and indirect microscopic somatic cell count (SCC). Milk samples each measuring 20 mL (foremilk) from each teat from four quarters of animal was collected, following the procedure described by National Mastitis Council Inc.USA (1990). Samples were immediately subjected to Surf Field Mastitis Test (Muhammad *et al.*, 1994) diagnosed on the basis of gel formation after shaking for a few seconds.

To proceed for microbiological examination, 2 mL milk was taken from the affected quarters in a sterilized screw capped vials. Milk samples from individual quarter were examined for direct somatic cell count (SCC) by the technique as described by Schalm *et al*. (1971), while for indirect test of SCC a 3% solution (pH 10.3) of the household detergent surf (Lever Brothers, Pakistan) and

interpreted in a manner similar to California Mastitis Test (Muhammad *et al*., 1993). Bacterial isolation and identification was also carried out for the confirmation of mastitis by using Staph 110, blood agar media. Regarding milk composition acidity, total solids, solids-not-fat, was determined by Fleischmann's formula as quoted by Khan *et al*. (1983). Milk protein was determined by formal titration method (David, 1977), while for fat determination, Gerber's test as described by Aggarwala and Sharma (1961) was followed. Finally the economics of both preparations to cure mastitis were assessed. The data obtained pertaining to the above said parameters were analyzed statistically by using Randomized Complete Block Design (RCBD).

RESULTS

Surf field mastitis test (SFMT). Seven days after treatment the affected quarters in both groups A and B were SFMT negative, except milk samples of two quarters in each group, which were positive after treatment, with a cure rate of 80% on the basis of SFMT in both the groups. Similarly, no significant difference was noted in SCC of both the groups (Table I).

Isolation and Identification of Bacteria

Growth on staph 110 and blood agar media. Out of 20 milk samples, 18 yielded growth of different organisms. On the basis of cultural and morphological characteristics the organisms other than *Staphylococcus aureus* were isolated as under:

Type-I *Staphylococcus* spp. Other than *S. aureus*
Type-II *Streptococcus*
Type-III *E. coli*
Type-IV *Micrococcus*
Type-V *Bacillus* spp.

Milk Composition

Milk fat percentage. No significant difference was found in milk fat percentage between groups A and B. There were highly significant differences between before and after treatments of both the groups (Table I).

Milk protein percentage. No significant difference was found in milk protein percentage between groups A and B. There were significant differences between before and after treatment of both groups (Table I).

Milk acidity percentage. No significant difference was found in milk acidity percentage between groups A and B. There were highly significant differences between before and after treatment of both groups (Table I).

Total solids percentage. No significant difference was found in milk total solids percentage between groups A and B. There were highly significant differences between before and after treatment of both groups (Table I).

Solids-non-fat percentage. No significant difference was found in milk solids-not-fat percentage between groups A and B. There were highly significant differences between before and after treatment of both groups (Table I).

Table I. Values of various parameters of milk samples before and after treatment

Group	Before treatment	After treatment	Mean
Somatic cell count (SCC/mL) in the milk of buffaloes			
A	$5.4\times10^5\pm5.09\times10^4$	$5.3\times10^5\pm4.1\times10^4$	$5.4\times10^5\pm3.2\times10^4$
B	$6.7\times10^5\pm7.02\times10^4$	$5.6\times10^5\pm3.1\times10^4$	$6.1\times10^5\pm4.3\times10^4$
Mean	$6.0\times10^5\pm4.5\times10^4$	$5.4\times10^5\pm3.1\times10^4$	
Viable bacterial count per mL of milk on Blood agar			
A	$8.0\times10^2\pm1.5\times10^2$	$4.9\times10^2\pm0.7\times10^2$	$6.5\times10^2\pm0.9\times10^2$
B	$7.8\times10^2\pm2.4\times10^2$	$4.0\times10^2\pm0.9\times10^2$	$5.9\times10^2\pm1.3\times10^2$
Mean	$7.9\times10^2\pm1.4\times10^2$	$4.5\times10^2\pm0.6\times10^2$	
Viable bacterial count per mL of milk on Staph 110 medium			
A	$5.1\times10^2\pm1.6\times10^2$	$1.5\times10^2\pm0.5\times10^2$	$3.3\times10^2\pm0.9\times10^2$
B	$4.8\times10^2\pm3.1\times10^2$	$0.8\times10^2\pm0.4\times10^2$	$2.8\times10^2\pm1.6\times10^2$
Mean	$5.0\times10^2\pm1.7\times10^2$	$1\times10^2\pm0.6\times10^2$	
Milk fat percentage			
A	6.42±0.08	6.84±0.11	6.63±0.08
B	6.40±0.13	6.94±0.14	6.67±0.11
Mean	6.41±0.08	6.89±0.09	
Milk protein percentage			
A	4.32±0.07	4.47±0.06	4.40±0.05
B	4.45 ±0.07	4.58 ±0.07	4.52 ±0.05
Mean	4.38 ±0.05	4.53 ±0.05	
Milk acidity percentage			
A	0.1634±0.0031	0.1471±0.004	0.1688±0.0027
B	0.1668±0.0035	0.1794 ±0.002	0.173±0.0024
Mean	0.1651±0.0023	0.1767 ±0.002	
Total solids percentage			
A	15.500±0.151	16.258±0.201	15.879 ±0.150
B	15.580 ±0.204	16.357 ±0.214	15.968 ±0.169
Mean	15.540±0.124	16.307 ±0.147	
Solids-non-fat percentage			
A	9.059±0.081	9.418 ±0.093	9.238 ±0.073
B	6.205±0.074	9.522 ±0.095	9.633 ±0.0004
Mean	9.132 ±0.056	9.470 ±0.066	

Economics of treatment. Efficacy of allopathic and homoeopathic treatment was found almost equal. However, homoeopathic treatment was more economical than allopathic treatment.

DISCUSSION

Cure rate on the basis of SFMT was 80%, which is in close agreement with the observation of Randhawa *et al*. (1999), who treated cows and buffaloes mastitis in India with Spectrazol treatment and found that recovery rate, was 89.74%. Difference in results of treatment is because mastitis prevention practices are not in vogue in Pakistan (Fazal-ur-Rehman, 1995).

Cultural as well as morphological characteristics showed that *Staph* spp., *Streptococcus* spp., and *E. coli* were the major pathogens causing mastitis in buffaloes. These microorganisms constitute surface microflora of udder of buffaloes (Awan, 1969), and enter into teat during unhygienic milking or due to injury to the udder. Prevalence of the *Staphylococcus* spp. was highest followed by *Streptococci* and *E. coli*. These findings are in line with those of Jaffery and Rizvi (1975) and Chanda *et al*. (1989).

After treatment, SCC slightly decreased to about normal values. The most important factor causing variation in SCC is mammary gland infection (Eberhart *et al*., 1979). The findings in this study for SCC values are in agreement with those of International Dairy Federation (1967), Deshpande and Vyas (1973), Singh and Singh (1981) and Hungerford (1990).

The primary changes in milk quality resulting from mastitis are due to breakdown of milk protein and/or milk fat by proteolytic enzyme plasmin and lipolytic enzyme lipase that originate from somatic cells (Saemen *et al*., 1988; Barbeno, 1989; Muhammad *et al*., 1995). Solid-non-fat (SNF) contents of milk were decreased due to sub-clinical mastitis. This is in close agreement with studies of King (1967). Decrease in milk acidity percentage was explained by Schalm *et al.* (1971), who reported in mastitis an increased permeability of the glands to blood components (e.g. chlorides, bicarbonates). This brought about elevation in the milk pH, making it less acidic.

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