

## **STUDIES ON MASTITIS IN BUFFALOES CAUSED BY BACTERIAL SPECIES**

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### **ABSTRACT**

Studies on the clinical mastitis in buffaloes caused by bacterial species was carried-out. Total 213 buffaloes were examined, the overall prevalence of clinical mastitis was recorded in 79.34% (169) buffaloes caused by bacterial infection, while 20.65% (44) was recorded as free from any bacterial infection. Similarly, 852 milk samples were collected from 213 animals and investigated, 56.80% (484) was found positive while 43.19% (368) was detected as negative. A relatively higher prevalence of bacterial mastitis was recorded in hind quarters against front quarters. In hind quarters, the higher prevalence of infection was recorded in left hind quarters (28.92%), while lower (26.44%) in right hind quarters. Furthermore, a higher prevalence of bacterial infection was recorded in left front quarters (22.72%) while lower prevalence was observed in right front quarters (21.90%). Generally, a higher prevalence of clinical mastitis was recorded in hind quarters as compared to front quarters. On the other hand, an incidence on clinical mastitis in buffaloes during various months of the year was also investigated. The higher incidence of clinical mastitis was observed in August (65.62%) and March (65.0%) months. Similarly a variation in the incidence of clinical mastitis in buffaloes at different months was recorded during present survey.

**Keywords:** Buffaloes, bacterial species, clinical mastitis, Prevalence.

### **INTRODUCTION**

Mastitis is recognized worldwide as the most important and very expensive disease of milk animals. In Pakistan, particularly in the province of Punjab, the total losses due to clinical mastitis is recorded around Rs 240 millions/year. The economic and other losses due to mastitis may even be higher in Pakistan than other developed countries (Shakoor *et al.*, 2006). Clinical mastitis is characterized by inflammation, redness, pain in udder, reduced and altered milk secretion from the affected quarters. The milk contains light clots, heavy clots, flakes, watery in consistency and accompanied by fever, depression, anorexia, etc. (Baloch, 2011). Inflamed udder affects milk quality, quantity and lead to great economic losses for dairy farmers. In fact only a healthy udder produces milk of a

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physiologically normal composition (Hamann, 2002). Buffaloes are main milk animals of developing countries worldwide despite the species have relatively lower and slower rate of reproduction and many reproductive problems/disorders such as inactive ovaries, silent heat, long calving intervals and mastitis (Hussein, 2002; Piccinini *et al.*, 2006).

Different etiological agents are associated with mastitis but it is commonly caused by bacterial pathogens. Among bacterial species, mastitis is mainly caused by *Staphylococcus aureus*, *Streptococcus agalactiae*, *Escherichia coli*, *Corynebacterium pyogenes*, *Streptococcus dysgalactiae* and *Streptococcus uberis* etc. (Radostitis, 2000). Moreover, quarter-wise prevalence of intramammary infection in buffaloes was recorded as 60% especially during the pre-parturient period, whereas the incidence is higher during 30 days after calving (Moroni *et al.*, 2006). The bacterial species, *Staphylococcus aureus* alone caused 53.85% clinical mastitis in buffaloes in Tehsil Burewala, Pakistan (Hameed *et al.*, 2008). Only a few studies of mastitis concerning buffalo intramammary infections have been reported in buffaloes is not enough to significantly influence milk production as in other domestic ruminants. In Pakistan, the quarter-wise and animal-wise prevalence of buffalo mastitis from different area of Attock was carried-out. However, the quarter-wise prevalence was recorded as 44.75% while animal-wise, the prevalence was observed as 44% (Bachaya *et al.*, 2005). Whereas in the rural areas of Rio de Janeiro State, Brazil, bovine clinical mastitis was reported to be higher as 40% than in other areas of the country (Motta *et al.*, 2001).

Keeping in view the above facts, the present study was therefore designed to investigate bacterial clinical mastitis in buffaloes.

## **MATERIALS AND METHODS**

The milk samples were collected from 213 buffaloes of taluka Hyderabad, Tando Allahyar and Tandojam during 2011. Before collection of milk samples, the general health and condition of the udders were observed. The surroundings of teat canals were cleaned with antiseptics (spirit) and then first few drops of milk were discarded. The milk samples were collected in sterilized Bijoux bottles and brought to the laboratory of the Department of Veterinary Microbiology, Faculty of Animal Husbandry and Veterinary Sciences, Sindh Agriculture University Tandojam. The glassware such as Petri dishes, pipettes, flasks, etc were kept in 1% HCl solution for overnight and washed well with distilled water for several times then dried in oven at 65°C. After that the sterilization of glassware was carried-out in hot-air oven at 180°C for one and half hour.

The milk samples were cultured on different culture media for the isolation and identification of bacterial species. Both, solid and broth media were used. In solid media: nutrient, blood and MacConkeys agars were used while in broth media: nutrient broth, BHI broth, etc. were prepared. The cultural and colony characteristics of the growing causative agent were examined.

Further, possible biochemical tests were also carried- out for identification of bacterial species. A few biochemical tests were conducted to confirm the identification of bacterial organism, for this purpose, oxidase, coagulase, indole, Vogues-Proskauer, urease, methyl red, gelatin liquefaction, Simmons's citrate, H<sub>2</sub>S production, catalase and Triple Sugar Iron agar tests were carried-out (Bergeys, 1992).

## RESULTS AND DISCUSSION

The results regarding overall prevalence of clinical mastitis in buffaloes was observed during present investigation (Table 1). Of the 213 buffaloes were examined, 79.34% (169) buffaloes was found positive suffering from clinical mastitis while 20.65% (44) was detected as free from any bacterial infection. It is concluded from the present study that majority of the mastitis cases in buffaloes are being caused by bacterial species. However, mastitic milk samples which exhibited no growth on culture media could be attributed to some predisposing factors of non-bacterial aetiology or buffaloes may be treated previously with a variety of antibiotics prior to sampling. Bachaya *et al.* (2005) conducted an investigation to determine the prevalence of bacterial species in clinical/sub-clinical mastitis of udder quarters and individual buffalo in Attock district of Punjab. The overall animal-wise prevalence was recorded as 77.98%. They further observed that the maximum prevalence of bacterial mastitis in individual buffalo was observed as 82.61% in tehsil Pindighaib, followed by 73.33, 80.0 and 76.0% in tehsil Attock, Jand and Fateh Jang, respectively. Whereas Sabry and Salama (2007) also carried-out a study on clinical, bacteriological and therapeutic aspects with acute mastitis in buffaloes. On bacteriological examination, out of 80 mastitic milk samples, 56 were found with acute mastitis, the bacterial prevalence in mastitis was recorded as 70%. Furthermore, Sharif and Ahmed (2007) and Chishty *et al.* (2007), reported the prevalence of clinical mastitis in 51% and 60.27% buffaloes, respectively. The overall prevalence of clinical mastitis in buffaloes caused by bacterial species observed in this study is very close to the findings of the said authors. On the other hand, the findings regarding to prevalence of clinical mastitis recorded in this investigation are not in complete agreement to the results of Sharif and Ahmed (2007) and Chishty *et al.* (2007) who recorded somewhat lower prevalence in their studies. Furthermore, that the climatic conditions are similar in both the provinces of the country. The prevalence of clinical mastitis always depends on managemental, environmental and milking practices but it is least concerned over the breed and species of the animals. Therefore, the present results regarding the overall occurrence of clinical mastitis in buffaloes caused by bacterial species are in agreement with the results of the above authors. However, the data presented in this text for the overall prevalence of clinical mastitis in buffaloes are also differed from Marta *et al.* (2007); Hameed *et al.* (2008); Yousaf *et al.* (2009) and Oliveria *et al.* (2000) who recorded somewhat lower prevalence in buffaloes and other animals. Further that, they recorded only species-wise individually but not general prevalence caused by pathogenic bacterial species, therefore, these results could not be compared with the results of the above authors recorded for individual bacterial species in their studies. However, the results could be

compared and interpreted later on, with the results of above authors for the individual bacterial incidence because we have also recorded in this survey for individual species.

During present study, the prevalence of clinical mastitis in milk samples of buffaloes was also investigated. A total of 852 milk samples were collected and examined, 56.80% (484) samples were found positive for bacterial organisms while 43.19% (368) samples was detected as negative (Table 2). Sudhan *et al.* (2005) collected mastitis milk samples from buffaloes suffering from clinical mastitis and recorded 57.89% prevalence in the mastitic milk samples of buffaloes in India. Similarly Chishty *et al.* (2007) reported 60.27% mastitis in milk samples. However, the results about the prevalence of mastitic milk samples observed in the present study are in agreement to the findings of the above authors, they also obtained similar results as recorded during present study in buffaloes of province of Sindh. Furthermore, the similarity in the findings of the present study and to those of above authors might be due the same climatic conditions are prevailing in both the study areas. Generally, there is no big variation in the climatic conditions in between two neighbouring provinces. Therefore, the results of the present study are in agreement with the results of above authors.

In the present survey, quarter-wise milk samples from buffaloes were collected and examined for bacterial presence (Table 3). Only 484 (56.80%) positive samples were recorded from front and hind quarters. From front quarters, 106 right and 110 left quarters were found infected with different bacterial species, the prevalence was observed as 21.90% and 22.72%, respectively. While from hind quarters, 128 right and 140 left quarters were also found infected with bacterial species, the prevalence of bacterial mastitis in right and left hind quarters was recorded as 26.44% and 28.92% respectively. A relatively higher prevalence of clinical mastitis was noted in the hind quarters as compared to front quarters. It is clearly concluded from the present study that the left quarters of both, front and hind quarters are more susceptible and get infected as compared to right quarters, because large number of quarters were involved in mastitis caused by bacterial species. The major reason may be the buffaloes frequently lay-down for longer period on the ground by left side and the quarters of the both, the left side remain in continuous contact with contaminated manure or soil, therefore the chances of prevalence of bacterial infection in left quarters would be higher as compared to other side.

Table1. The overall prevalence of clinical bacterial mastitis in buffaloes.

Animal species	Total Number of mastitic animals examined	Number of animals with mastitis	% of animals with mastitis	Number of animals without mastitis	% of animals without mastitis
Buffalo	213	169	79.34	44	20.65

Table 2. The prevalence of clinical bacterial mastitis in milk samples obtained from buffaloes.

Animal species	Total Number of samples examined	Number of positive samples	% of positive samples	Number of negative samples	% of negative samples
Buffalo	852	484	56.80	368	43.19

Table 3. The prevalence of clinical bacterial mastitis in different quarters of buffaloes.

Animal species	Front Quarters % of Infected Quarters						Hind Quarters % of Infected Quarters						% of Total Infected Quarters
	Right	Right	Right	Left	Left	Left	Right	Right	Right	Left	Left	Left	
Buffalo	106	21.90	107	110	22.72	103	128	26.44	85	140	28.92	73	56.80

Khan and Muhammad (2005) conducted the quarter-wise comparative study on the prevalence of mastitis caused by bacterial species in buffaloes. They recorded a higher prevalence (29%) of mastitis in the hind quarters of Pakistani buffaloes. While Bachaya *et al.* (2005) also carried-out similar investigation on quarter-wise prevalence of mastitis in buffaloes in four different areas of Attock. The overall quarter-wise prevalence of clinical mastitis was recorded as 44.75%. However, the findings regarding the prevalence of clinical mastitis in hind quarters (28.92% in right quarters) observed in this study are very close to the values recorded by Khan and Muhammad (2005) who observed 29% prevalence of mastitis in the hind quarters of buffaloes whereas the findings about the prevalence of mastitis in hind or front quarters of buffaloes recorded during present survey are also coincide to the findings of Bachaya *et al.* (2005) who noted somewhat higher prevalence (44.75%) as compared to the present study.

Furthermore, an investigation on the incidence of clinical mastitis in buffaloes during different months of the year was also carried-out (Table 4). The higher incidence of clinical mastitis was recorded in August (65.62%) and March (65.0%) while lower in April (50.0%). The variation in incidence of clinical mastitis in buffaloes was recorded during different months. A little higher incidence recorded in clinical mastitis in buffaloes might be due to monsoon season during August where the climatic conditions remain moist and humid could help in propagation of bacterial organisms. The March as the spring season provides suitable environmental conditions for bacterial organisms. Furthermore that, in August high rain fall always takes place in the province of Sindh every year that may also pollute whole climate, however, it would be very difficult for the farmers to provide hygienic condition, in the case of soil floored houses to their animals. This might be one of the reasons and also some other managerial and milking practices could contribute in the incidence of clinical mastitis in buffaloes in the area under observation. Hashemi *et al.* (2011) and Olde *et al.* (2007) demonstrated the higher incidence of clinical mastitis in bovine occurred during December and January. They further mentioned that a seasonal variation

could influence the incidence of clinical mastitis in bovine. Rajan *et al.* (2011) reported the incidence of bovine mastitis under different climatic conditions; the highest incidence was recorded in winter followed by summer and least in rainy season.

Table 4. The number and percentage incidence of clinical mastitis in buffaloes during different months of the year.

Month	Number of animals examined	Total Number of samples examined	Number of positive samples	% of positive samples	Number of negative samples	% of negative samples
January	15	60	32	53.33	28	46.66
February	18	72	42	58.33	30	41.66
March	20	80	52	65.00	28	35.00
April	15	60	30	50.0	30	50.00
May	17	68	39	57.35	29	42.64
June	22	88	49	55.68	39	44.31
July	19	76	43	56.57	33	43.42
August	16	64	42	65.62	22	34.37
September	16	64	34	53.12	30	46.87
October	18	72	40	55.55	32	44.44
November	16	64	39	60.93	25	39.06
December	21	84	42	50.00	42	50.00
Total	213	852	484	56.80	368	43.19

## CONCLUSION

It is concluded from the present study that majority of the mastitis (79.34%) cases in buffaloes are caused by bacterial species. It was also concluded that the higher prevalence of bacterial mastitis in buffaloes is always evidence in hind quarters as compared to front quarters. In hind quarters, the higher prevalence of infection was detected in left quarters (28.92%). Furthermore, a higher incidence of clinical mastitis in buffaloes was recorded during August (65.62%) and March (65.0%) months of the year.

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