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Pathogens Associated with Bovine and Bubaline Mastitis in Peri-Urban Areas of Faisalabad, Pakistan.

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Abstract

Pathogens associated with bovine and bubaline mastitis were studied in peri-urban areas of Faisalabad, Pakistan. Seventy-five quarters of the foremilk-samples, collected from 14 randomly selected buffaloes (clinically mastitic quarters n = 7, sub-clinically mastitic quarters n = 48) and 5 cows (clinical n = 2; sub-clinical n = 18 quarters), were subjected to a microbiological examinations. The diagnosis of sub-clinical mastitis was based on the results of Surf Field Mastitis Test. The results of present studies revealed that *Staphylococcus aureus* was the frequently encountered pathogen, accounting for 48.08% isolates from 55 mastitis infected quarters of dairy buffaloes and 33.33 % isolates from 20 mastitic-quarters of cows. *Streptococcus agalactiae* was the second most frequently isolated mastitis-pathogen accounting for 21.15 % of all isolates from dairy buffaloes and 27.77 % of all the isolates from cow. Together, these two contagious mastitis-pathogens accounted for 94.55 and 90.00 % of isolates, recovered from buffalo and cow-quarters, respectively.

Key words: Pathogens, bovine, bubaline, mastitis Pakistan.

Introduction

Mastitis is the most costly disease of the dairy industry throughout the world that affects both quality and quantity of milk. Field surveys of major livestock diseases in Pakistan have indicated that it is one of the most important health hazards in the country (Arshad *et al.* 1995; Ajmal, 1990). Mastitis is the outcome of interactions of various factors associated with the host, pathogen(s) and the environment. Infectious agents, particularly various species of bacteria, are the most important etiologic agents of mastitis (Ibtisam *et al.*, 2006) Which have been isolated and identified from affected animals.

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Numerically, Staphylococci and Streptococci were the most abundant groups of bacteria for mastitic animal, followed by coli-form and coryne bacterium in some areas of Pakistan (Ghuman, 1967; Hashmi *et al.* 1980, Anwar & Chudary, 1983; Ahmed *et al.*, 1991;Iqbal *et al.*, 2004; Khan *et al.*, 2004) and elsewhere (Chander and Baxi, 1975; Hodges *et al.* 1984; Al-Shawabkeh and Aziz, 1987; Chanda *et al.*, 1989; Latfi *et al.*, 1994). However, extant of prevalence ranges from 20-80% in each case. Technically somatic cell-count closely method shows culturally positive results. Another technique called Surf Field Mastitis Test developed by Khan *et al.*, (2004) exhibited the same results.

Keeping in view the importance of this disease, present studies were carried out to determine the types and intensity of pathogens associated with bovine and bubaline mastitis in periurban areas of Faisalabad-Pakistan.

Materials and Methods

The present study was conducted in peri-urban areas of Faisalabad, Pakistan, during Fall 2005. The areas selected for the study comprised of buffalo colonies, situated at Samundari Road, Jhang Road, Aminpur Road, Sargodha Road and at Satiana Road, in Faisalabad.

Three farms, randomly selected, in each of above 5 roads of Faisalabad, metropolis, maintaining 5-12, 13-21, 22-29, 30-37 buffaloes /cows were visited. The owners were interviewed through performa, which is too large to be described here. All animals were examined physically, where required.

The number of clinical mastitis cases, were counted and milk of all the apparently mastitis free-quarters, were subjected to Surf Field Mastitis Test (Muhammad *et al*.,1995) for the estimation of prevalence of sub-clinical mastitis. For isolation of pathogens from clinically and sub-clinically mastitic buffaloes and cows, 75 quarters of the foremilk-samples were collected from 14 randomly selected buffaloes (clinically mastitic quarters n = 7, sub-clinically mastitic quarters n = 48) and 5 cows (clinical n = 2; sub-clinical n = 18 quarters), were collected by the procedure described by National

Mastitis Council Inc., U.S.A. (1990). Milk samples were not collected from animals, which were treated with antibiotics by any route, till 96 hours of treatment. Quarter-fore milk samples, collected at the time of afternoon milking, were used. The collected samples were immediately cooled in the ice boxes and transferred to the Mastitis Research Laboratory, Department of Clinical Medicine and Surgery, University of Agriculture, Faisalabad, where the samples were cultured and identified by the procedures described by National Mastitis Council Inc., USA (1987). The diagnosis of sub-clinical mastitis was based on the results of Surf Field Mastitis Test (Muhammad *et al.*, 1995). A quarter was considered to be infected if 5 or more similar colonies were present on the plate (Robinson *et al.*, 1988). The organisms other than Staphylococci, were identified by routine biochemical test (National Mastitis Council Inc., 1990).

Results

Of the 55 quarter fore milk samples collected from 14 buffaloes suffering from clinical (n = 7 quarters) and sub-clinical mastitis (n = 48 quarters), 52 (94.55%) yielded growth of different microorganisms when cultured on esculin blood agar and MacConkey's agar plates. A total of 52 isolates of 10 different microbial species were recovered. *Staphylococcus aureus* was the most frequently recovered bacterial species accounting for 48.08% of all isolates, followed by *Streptococcus agalactiae* (21.15%), *Staphylococcus hyicus hyicus* (7.69%), *Staphylococcus epidermidis* (5.76%), Bacillus species (3.8%). *Staphylococcus hominis* (1.92%) and also *Escherichia* coli (1.9%). One isolate of yeast accounted for 1.92% of 52 isolates (Table-1).

Out of the 20 quarter fore milk samples (clinical n = 02; sub-clinical n = 18 quarters), 18, yielded growth when cultured on esculin blood and MacConkey's agar plates. Six different microbial species were recovered From 18 isolates. *Staphylococcus aureus* was the most frequently isolated organism (accounting for 38.89% of the total 18 isolates) followed by *Streptococcus agalactiae* (27.78%), *Corynebacteria*l spp. (11.11%), *Bacillus* spp. (11.11%), *Escherichia coli* (5.56%) and *Nocardia* spp. (5.56%). All isolates of *Bacillus* species and *Nocardia* spp. were encountered in combination with other microorganism(s) (Table-2).

Discussion

Although, mastitis is an inflammation of mammary glands, regardless of the cause, different types of pathogens, bacteria in particular, are, by far the most frequently associated, etiologic agents of this disease. *Staphylococcus aureus* was the frequently encountered pathogen, as it accounted for 48.08% isolates from 55 mastitis infected quarters of dairy buffaloes, and 38.89 % isolates recovered from 20 mastitic-quarters of cows. In buffaloes as well as in cows, *Streptococcus agalactiae* was the second most frequently isolated mastitis-pathogen, accounting for 21.15 % of all isolates, recovered from dairy buffaloes and 27.77 % of all the isolates, recovered from cow. Together, these two contagious mastitis-pathogens accounted for 94.55 and 90.00 % of isolates, recovered from buffalo and cow-quarters, respectively. In agreement with the findings of present study, Allore, 1993, while reviewing the important studies conducted in countries, like, India, Pakistan, Indonesia, Sri Lanka and Egypt, endowed with both dairy buffalo and cow, also concluded that clinical as well as sub-clinical mastitis, in dairy animals, in these countries, is predominantly contagious in nature. The results of the present study, are also in a broad agreement with the findings of several previous workers like, Chander and Baxi (1975); Hashmi *et al.* (1980); Anwar and Chaudary (1983); Hodges *et al.* (1984); Al-Shawabkeh and A. Aziz (1987); Chanda *et al.* (1989); Iqbal (1992); Allore, (1993); Lafi *et al.* (1994); Ramachandraiah *et al.* (1998); Khan *et al.* (2004). These studies in different ecological zone reveal the variety of organism present in the various ecological zones and this can help to affective properly lactive as well as curative vaccines against these pathogens.

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Table-1: Frequency distribution of isolates (n=52) recovered from 55 mastitic (clinical n=7) and sub-clinically (n = 48) quarters of 14 buffaloes in peri-urban areas of Faisalabad.

S. No	Species	No. of isolates	Frequency (%)
1.	*Staphylococcus aureus*	25	48.08
2.	*Streptococcus agalactiae*	11	21.15
3.	*Staphylococcus hyicus hyicus*	04	7.69
4.	*Staphylococcus epidermidis*	03	5.76
5.	*Staphylococcus hominis*	01	1.9
6.	*Undifferentiable (nontypable) Coagulase negative Staphylococcus species*	02	3.8
7.	Corynebacterial species	2	3.9
8.	*Escherichia coli*	01	1.9
9.	Bacillus spp.	02	3.8
10.	Yeast	01	1.9
	Total	52	

Table-2: Frequency distribution of isolates (n = 18) recovered from 20 mastitic (clinical n=2; sub-linical n=18) quarters of 5 cows in peri urban areas of Faisalabad.

S. No	Species	No. of isolates	Frequency (%)
1	*Staphylococcus aureus*	7	38.89
2	*Streptococcus agalactiae*	5	27.78
3	Corynebacterial spp.	02	11.11
4	Bacillus spp.	02	11.11
5	*Escherichia coli*	1	5.56
6	Nocardia spp.	1	5.56
	Total	18	