Microbes and Health
ISSN: 2226-0153 (Print) 2305-3542 (Online)
http://journal.bsvmph.org/

Microbes and Health, June 2013, 2(1): 19-21
DOI: 10.3329/mh.v2i1.17258

Short Communication

Isolation and Identification of Bacterial Agents Causing Clinical Mastitis in Cattle in Mymensingh and Their Antibiogram Profile

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[**Received**: 20 March 2013, **Revised**: 7 May 2013, **Accepted**: 12 May 2013]

A B S T R A C T

Mastitis is a serious problem for the dairy cattle in many countries of the world including Bangladesh. Among the microbial etiology bacteria plays a major role in the onset of the clinical form of the disease. Many of these bacteria are resistant to one or more antibiotics thus make the mastitis cases difficult to cure. In the present study *Staphylococcus* spp., *Streptococcus* spp., *Bacillus* spp. and *E. coli* were identified as the dominant bacterial species causing clinical mastitis in cattle in Mymensingh. Antibiogram study revealed chloramphenicol and erythromycin as the most effective antibiotic for the treatment of mastitis in these animals except those caused by *Bacillus* spp. and *E. coli,* respectively.

Keywords: Bovine clinical mastitis, Bacteria, Antibiogram, Mymensingh

Mastitis is most often the response of the host to an intramammary infection. It is considered as one of the economically important diseases of livestock, since it causes a fall in milk production, decreased milk quality for dairy purposes and results in additional costs for veterinary services and laboratory investigations (Halasa *et al.,* 2007; Ahmady and Kazemi, 2013). In addition to the risk factors such as milking hygiene, management practice, stage of lactation and parity, several prokaryotic and eukaryotic pathogens (especially bacterial agents) have been identified to be associated with the onset of mastitis in animals (Boscos *et al.,* 1996; Bhatt *et al.,* 2011; Keane *et al.,* 2013; Raemy *et al.,* 2013). Many of these bacterial agents are resistant to one or more antibiotics, thus in many cases it has become quite difficult to treat the cases. Most of the recent studies on bovine mastitis in Bangladesh were focused on the risk factors or the subclinical form of the disease (Rahman *et al.,* 2009, Islam *et al.,* 2010, Islam *et al.,* 2011). Considering these scenario, the present research work was carried out to isolate and identify dominant bacterial agents causing bovine clinical mastitis in Mymensingh and to determine the antibiotic susceptibility of isolated bacteria so that appropriate antibiotics could be suggested for their effective treatment.

A total of 16 milk samples were collected from the cases of bovine clinical mastitis during the period of July to October, 2011. The samples originated from BAU Veterinary Clinics and in and around areas of BAU campus.

Samples were inoculated into various bacteriological media *i.e.,* Blood agar, Nutrient agar, EMB agar, Nutrient broth to allow the growth of relevant bacteria. Isolation and identification of bacterial agents were performed based on their morphology, Gram's staining, cultural and biochemical characteristics as described in Cheesbrough (2006). Finally, the antibiotic resistance pattern of selected bacterial agents was done by disc diffusion test according to the method of Bauer *et al.*, (1966) using 11 randomly selected antibiotics (discussed later).

Among the 16 samples analyzed 10 (62.5%) were positive for *Staphylococcus* spp., 9 (56.25%) for *Streptococcus* spp., 6 (37.5%) for *Bacillus* spp. and 5 (31.25%) for *E. coli* were identified. In addition, non-identified organisms were observed in 8 samples (50%) (Fig. 1). *Staphylococcus* spp. are the cause of a widespread spectrum of infections in humans and different animal species. They are the most important and prevalent mastitis causing organisms globally in different animal including cattle (Zschöck*et al.,*2005; Sumathi *et al.,* 2088). *Streptococcus* spp., *E. coli* and *Bacillus* spp. have been reported to be found in the milk of cows suffering from mastitis (Bhatt *et al.,* 2011; Keane *et al.,* 2013; Raemy *et al.,* 2013).

Presence of *E. coli* from the mastitis cases could be an indication of poor hygienic conditions of the farm, since these *E. coli* strains usually originate from the cow's environment and infect the udder via the teat canal.

Antibiotic resistance and sensitivity pattern of the isolated bacterial agents are presented in Table 1. Isolated *Staphylococcus* showed various degree of sensitivity against ampicillin, amoxicillin, neomycin, erythromycin and chloramphenicol, while resistance to other antibiotics used was observed. Erythromycin and chloramphenicol were found highly sensitive against the *Streptococci*. Most of the *E. coli* were sensitive to streptomycin, neomycin, and chloramphenicol. The isolated *Bacillus* showed sensitivity against erythromycin and neomycin. Chloramphenicol has been suggested to be one of the important groups of antibiotic for the treatment of bovine clinical mastitis (Sumathi*et al.,* 2008). Results of our preset study suggests that chloramphenicol and erythromycin could be the most effective antibiotics to treat the

To cite this article: Rahman MT, MS Islam and M Hasan, 2013. Isolation and identification of bacterial agents causing clinical mastitis in Cattle in Mymensingh and their antibiogram Profile. Microbes Health, 2(1): 19-21.

cases of bovine clinical mastitis in Mymensingh except the cases caused by *Bacillus* spp., and *E. coli,* respectively.

Table 1. Antibiogram of bacterial agents isolated from clinical cases of bovine mastitis

Name of Bacteria (n)	Sensitivity pattern	Penicillin (n/%)	Ampicillin (n/%)	Amoxicillin (n/%)	Streptomycin (n/%)	Neomycin (n/%)	Gentamycin (n/%)	Erythromycin (n/%)	Chloramphenicol (n/%)	Trimethoprim (n/%)	Cephalothin (n/%)	Metronidazole (n/%)
Staphylococcus spp. (10)	Highly sensitive	0 (0)	0 (0)	2 (20)	7 (70)	0 (0)	3 (30)	10 (100)	10 (100)	0 (0)	5 (50)	0 (0)
	Moderate sensitive	5 (50)	10 (100)	8 (80)	2 (20)	10 (100)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Resistant	5 (50)	0 (0)	0 (0)	1 (10)	0 (0)	7 (70)	0 (0)	0 (0)	10 (100)	5 (50)	10 (100)
Streptococcus spp. (9)	Highly sensitive	0 (0)	0 (0)	0 (0)	4 (44.44)	0 (0)	0 (0)	9 (100)	9 (100)	0 (0)	0 (0)	0 (0)
	Moderate sensitive	0 (0)	0 (0)	0 (0)	2 (22.22)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	9 (100)	0 (0)
	Resistant	9 (100)	9 (100)	9 (100)	3 (33.33)	9 (100)	9 (100)	0 (0)	0 (0)	9 (100)	0 (0)	9 (100)
Bacillus spp. (6)	Highly sensitive	0 (0)	0 (0)	0 (0)	1 (16.67)	0 (0)	0 (0)	2 (33.33)	0 (0)	0 (0)	0 (0)	0 (0)
	Moderate sensitive	0 (0)	0 (0)	0 (0)	2 (33.33)	4 (66.67)	0 (0)	4 (66.67)	1 (16.67)	0 (0)	0 (0)	0 (0)
	Resistant	6 (100)	6 (100)	6 (100)	3 (50)	2 (33.33)	6 (100)	0 (0)	5 (83.33)	6 (100)	6 (100)	6 (100)
E. coli (5)	Highly sensitive	0 (0)	0 (0)	0 (0)	3 (60)	0 (0)	0 (0)	0 (0)	4 (80)	0 (0)	0 (0)	0 (0)
	Moderate sensitive	0 (0)	0 (0)	0 (0)	0 (0)	5 (100)	0 (0)	1 (20)	1 (20)	0 (0)	0 (0)	0 (0)
	Resistant	5 (100)	5 (100)	5 (100)	2 (40)	0 (0)	5 (100)	4 (80)	0 (0)	5 (100)	5 (100)	5 (100)

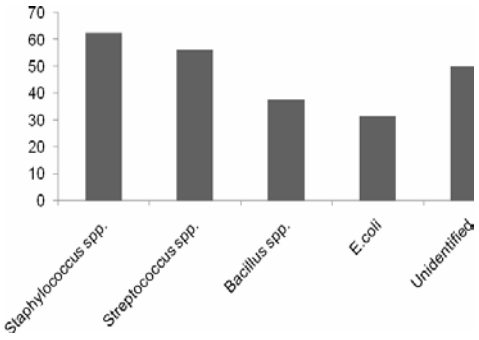

Fig. 1. Percentage of bovine mastitic milk samples found positive for different bacterial agents.

Acknowledgement

The authors sincerely acknowledge BAURES for financial support (project No. 2011/03/AUGC) to carry out the research.

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