**ABSTRACT**

Retrospective study on prevalence and antibiogram of mastitis in cows and buffaloes of Eastern Haryana over a period of six years from 2004 to 2009 revealed that mastitis prevalence was 85.3% in cows and 78.1% in buffaloes, respectively. The major factors influencing mastitis prevalence was number of lactations and higher rainfall. Based on cultural, morphological and biochemical examination of mastitis milk samples of positive mastitis cases, the predominant bacteria was Staphylococcus (43.6%) followed by Streptococcus (21.8%), Escherichia coli (16.3%), Klebsiella (5.4%), Corynebacterium pyogenes (5.4%), Pseudomonas aeruginosa (3.6%), and Bacillus (3.6%). Antibiogram revealed enrofloxacin to be the most sensitive drug (86.62% and 87.96%) in cows and buffaloes.

**Key words:** Mastitis, Anti-biogram, Prevalence, *Staphylococcus*, Enrofloxacin.

**INTRODUCTION**

Mastitis continues to be one of the most costly diseases of dairy animals affecting quality and quantity of milk. National Mastitis Council (1996) estimated that total economic losses resulting from mastitis in animals were due to reduction in milk production (70%), premature culling (14%), veterinary expenses (9%) and milk discarded or low graded (7%). The estimated economic loss per year due to mastitis amounts to $35 billion world over (Sharma et al., 2007). The public health importance of mastitis cannot be neglected in relation to drug residues in milk and passage of pathogenic organisms to humans. Presently, data collected on the occurrence of mastitis in relation to number of lactation, season, involvement of different microorganisms and their antimicrobial sensitivity to commonly used antibiotics in cows and buffaloes brought for diagnosis and treatment to Veterinary Unit, Karnal from 2004 to 2009 has been presented.

**Identification of isolates:** Representative milk samples (55) positive for CMT over a period of three years (2007 to 2009) were randomly selected and screened for detection of causative microorganisms of mastitis. The frequency of isolation of different microorganisms from mastitic milk samples of cows and buffaloes and shift in the antibiograms of isolates was studied. The staining and cellular morphological features of organisms were ascertained by microscopic examination of Gram stained smears. The bacteria isolated were identified on the basis of their cultural, morphological and biochemical characteristics at College Central Laboratory, College of Veterinary Sciences, Hisar.

**Antimicrobial susceptibility testing:** Minimal inhibition concentration (MIC) values of the bacterial organisms were analyzed for six different antimicrobials (M/S HiMedia Laboratories Ltd.) namely amoxicillin, enrofloxacin, gentamicin, chloramphenicol, oxytetracycline and neomycin. The disc diffusion method as described by Ellner (1978) was employed and the interpretation was made as per zone size interpretation chart provided by the manufacturer of the discs.

**Season wise prevalence of mastitis:** The year was divided into three seasons i.e winter (November
to February), summer (March to June) and rainy (July to October) and prevalence of mastitis was studied season-wise.

**Lactation wise prevalence of mastitis:** The effect of lactation on mastitis in cows and buffaloes was studied by dividing animals in five lactation groups (L₁, L₂, L₃, L₄ and L₅).

**Weather data:** The rainfall data over six years (2004-2009) was supplied by Weather observation Center of CCS, Haryana Agricultural University, Regional Research Station, Uchani (Karnal).

**RESULTS AND DISCUSSION**

The prevalence of mastitis over a period of six years was 85.3% in cows and 78.1% in buffaloes with an overall prevalence of 81.7%. Buffaloes have been reported to be less susceptible to mastitis than cattle (Thapa and Kaphle, 2002). Low prevalence in buffaloes is due to tight teat sphincters, which have smooth muscular fibers constituting a better barrier to microorganism invasion than cows (Krishnaswamy et al., 1965). The year-wise prevalence of mastitis in cows and buffaloes was lowest (64.5 and 54.6%) in 2004 and highest (90.1 and 82.4%) in 2007 and 2008, respectively with an increasing trend. Weather data also indicated increase in rainfall (mm) from 2004 to 2008 (Fig.1) and thus a direct correlation was observed between rainfall and prevalence pattern.

Based on cultural, morphological and biochemical examination of milk samples of positive mastitis cases, the predominant bacteria was *Staphylococcus* (43.6%) followed by *Streptococcus* (21.8%), *Escherichia coli* (16.3%), *Klebsiella* (5.4%), *Corynebacterium pyogenes* (5.4%), *Pseudomonas aeruginosa* (3.6%), and *Bacillus* (3.6%). These findings were in close agreement with earlier reports of Kothe *et al.* (1993) and Kumar and Sharma (2002). The high prevalence of *Staphylococcus* might be due to intracellular nature of organism and multiple drug resistance (Kumar and Sharma, 2002). *Staphylococcus* is the most common contagious pathogen which spreads from infected to clean udder during milking process (Harmon, 1993). Hence hygienic milking is of paramount importance to the control of this infection.

*Streptococci* were found second largest mastitogen in cows and buffaloes. Similar reports were also made by Prasad (2002) in dairy animals of Himachal Pradesh. This pathogen is a contagious pathogen and its major reservoir is infected udder. The dry period is the time of greatest susceptibility to new environmental Streptococcal infections; therefore, dry period antibiotic therapy will eliminate this infection to an extent of 70% (Jones, 2006). The occurrence of *E.coli* (16.3%) was more or less similar to that observed by Sharma *et al* (2007) in mastitic milk of buffaloes. This is an environmental pathogen, which may be transmitted during milking and between milking. Control of these pathogens can be achieved by keeping milking environment clean. The prevalence of *Corynebacterium spp.* (5.4%), *Pseudomonas aeruginosa* (3.6%), *Klebsiella* (5.4%) and *Bacillus* (3.6%) was low similar to the reports of Sumathi *et al.* (2008).

The emergence of drug resistance is well known due to indiscriminate use of antibiotics. For successful treatment, *in vitro* sensitivity testing is done to achieve effective antibiotic therapy. Enrofloxacin has been found to be the most sensitive (86.62%...
and 87.96%) in cows and buffaloes (Table 1) similar to the report of Kumar and Sharma, (2002) from Hisar (Western Haryana). The sensitivity pattern of different bacterial isolates in representative milk samples (55) of three years (2007-2009) was recorded. All the isolates showed higher sensitivity to enrofloxacin followed by gentamicin in 2007 and 2008. In year 2009, Streptococci spp. showed higher sensitivity to gentamicin and chloramphenicol followed by enrofloxacin. All the isolates showed resistance towards Amoxicillin. A decrease in sensitivity for each drug is observed indicating increasing resistance of bacterial isolates every year and it may be due to indiscriminate and frequent use of these antibiotics (Sharma et al., 2007). The under dosing and incomplete course of treatment could be another reason for their ineffectiveness against bacterial isolates (Kumar and Sharma, 2002).

The possibility of relationship between season of year and incidence of mastitis is important in the control of mastitis. Presently, highest prevalence of mastitis was recorded in cows (41.6%) and buffaloes (49.5%) during rainy season. A similar seasonal trend was also reported by Neave et al. (1957) & Kumar and Sharma (2002). Later, Patil et al (2005) from Bidar (Karnataka) also recorded highest prevalence of subclinical mastitis in buffaloes from August to October (37.6-43.5%). Monsoon season has been reported to favour mastitis because occurrence of soiled udder and teats due to wet floors, prevalence of large number of flies and unhygienic hands of milkers dictating higher level of mastitis incidence during this period is more than other seasons of year (Joshi and Gokhle, 2006).

The per cent prevalence of mastitis in cows and buffaloes was highest (30.6 and 31.7%) in first lactation and lowest (6.2 and 5.7%) in fifth lactation. The prevalence of sub clinical mastitis in bovines of an organized farm was also found highest during 1st to 3rd lactation (Mitra et al., 1995). In contrast to these reports, highest prevalence of mastitis was found during third and fourth lactation in cows and buffaloes (Kumar and Sharma, 2002; Sharma et al., 2007). It is difficult to explain the reasons for high prevalence of mastitis during first lactation in cows and buffaloes but the results recorded were similar for all the six years of observations.

It can be concluded that Staphylococcus was found to be the predominant bacteria involved in mastitic milk. Antibiogram revealed enrofloxacin to be the most sensitive (86.62% and 87.96%) in cows and buffaloes. Determination of antimicrobial sensitivity test may be helpful in treatment of mastitis and may prevent indiscriminate use of antibiotic.
REFERENCES