Bacteriological Examination and Antibiogram of Milk Sample of Clinically Infected Dairy Cow Suffering from Mastitis

Subha Ganguly[1,*], Arpita Padhy[2], Saraswat Sahoo[3], Shyam Lal Garg[4], Praveen Kumar Praveen[5], Rajesh Wakchaure[6]

[1]Associate Professor & Head, [2]Assistant Professor, Department of Veterinary Microbiology, [3]Assistant Professor, Department of Veterinary Gynaecology & Obstetrics, [4]Teaching Associate, Department of Livestock Production Management, [5]Assistant Professor, Department of Veterinary Public Health & Epidemiology, [6]Associate Professor, Department of Animal Genetics & Breeding, Arawali Veterinary College, Rajasthan

***Corresponding Author:**
Email: ganguly38@gmail.com

ABSTRACT
Mastitis is chronic inflammation of the mammary gland of cattle and can have infectious and non-infectious etiology. It is characterized by physical, chemical and usually bacteriological changes in the milk and pathological changes in the glandular tissue of the udder and affects quality and quantity of milk. Mastitis is usually caused by bacteria that invade the udder, multiply and produce toxins which are harmful to the mammary gland. It remains the most economically important disease of dairy industries around the world producing great economic loss to farmers. There are two forms of mastitis viz., clinical mastitis (CM) and Sub clinical mastitis (SCM).

Key Words: *Antibiogram, Bacteriological examination, Mastitis, Milk*

INTRODUCTION

The indiscriminate uses of antibiotics and irrational treatment of bovine mastitis with different antibiotics have invited serious complications like multiple drug resistance. Till date different types of antibiotics have been tried against the pathogens in bovine mastitis with or without identification and drug sensitivity testing (Patnaik *et al*., 2013; Paul *et al*., 2013; Ganguly, 2013).
The present study was conducted to identify the etiology of clinical mastitis and the antibiotics/ antibacterial drugs which show sensitivity against the various pathogenic agents.

MATERIALS AND METHODS

Milk sample was collected by hand stripping method in a sterile sample collection tube from the affected quarter of the udder of a cross bred cattle exhibiting clinical symptoms of mastitis maintained at the Instructional Livestock Farm Complex (I.L.F.C.) of Arawali Veterinary College. The affected cattle were clinically examined at the Teaching Veterinary Clinical Complex (T.V.C.C.) of the college. The collected milk sample was then produced to the Department of Veterinary Microbiology during November, 2015 for bacteriological examination and reporting.
The milk sample was examined bacteriologically (Buxton and Fraser, 1977) by gar plate culturing and by staining by Gram's Method followed by antibiotic sensitivity test by Kirby-Bauer antibiotic disc diffusion assay method on Mueller-Hinton agar with certain modifications (Patnaik *et al*., 2014) using antibiotic discs provided by the supplier (Titan Biotech Ltd., Bhiwadi, Rajasthan, India). The concentration of antibiotic in each filter paper disc was as per the specification of the manufacturer required for laboratory purpose. Incubation of the petridishes layered with the agar containing antibiotic discs was done at 37^{o}C for 24 h in a B.O.D. incubator installed at the department.

RESULTS AND DISCUSSION

The milk sample was subjected to spread plate culture on Nutrient agar media plates. After incubation at 37^{o}C for 24h it revealed the presence of smooth, raised, mucoid, circular colonies with regular edges. Grams' method of staining revealed Gram positive cocci shaped organisms arranged in the form of chains when examined under the high power magnification of the compound microscope. The bacteria were bacteriologically determined to be grouped under *Streptococcus* spp. (Cruickshank *et al*., 1975; Buxton and Fraser, 1977; Fine gold and Martin, 1982; Ananthanarayan and Paniker, 2009).
Antibiotic assay revealed the bacterial isolates to be highly sensitive to the antibiotics, Ampicillin and Chloramphenicol with low degree of sensitivity to Amoxicillin. The degree of sensitivity was determined on the basis of zone of inhibition formed by the isolated bacteria after exposure to the particular antibiotics.
The results obtained on cultural properties of the bacteria and its antibiotic disc diffusion assay revealed in the present study was in correlation with the findings of Kumar *et al.* (2010), Patnaik*et al*. (2014) and Paul *et al.* (2013).

CONCLUSION

The present study revealed the presence of Streptococcus spp. of bacteria responsible for causing

clinical mastitis in dairy cattle. The bacterial strain was found to be sensitive to broad spectrum antibiotics which was reported and recommended to the T.V.C.C. for their administration in divided doses on alternate daily intervals in mixed preparations.

ACKNOWLEDGEMENTS

The authors are thankful to Hon'ble Dean and Management (Hony. Chairman and Secretary, Aastha Society, Sikar) of Arawali Veterinary College, Sikar for providing the necessary facilities to carry out this research work.

REFERENCES

1. Ananthanarayan, R. and Paniker, C.K. Jayaram. 2009. *Textbook of Microbiology*. 8th ed. Universities Press (India) Pvt. Ltd. Hyderabad, India. ISBN 978 81 7371 674 4.
2. Buxton, A. and Fraser, G. 1977. *Animal Microbiology*. Vol. 1. Blackwell Scientific Publications.
3. Cruickshank, R., Duguid, J.P., Marmion, B.P. and Swain, R.H.A. 1975. *Medical Microbiology*. 12th edn. Vol. II, Churchill Livingstone, London.
4. Finegold, S.M. and Martin, M.J. 1982. *Diagnostic Microbiology*. 6th ed. The C.V. Morsby Co., London.
5. Ganguly, Subha. 2014. A comprehensive and illustrious review on clinical and diagnostic aspects of Mastitis infection in high yielding lactating cows. *World J. Pharma. Res*. 3(9): 352-60.
6. Kumar, Mayur, Prasad, Arun, Tiwary, B.K. and Ganguly, Subha. 2010. Study on incidence of mastitis in cattle population of Ranchi (Jharkhand) under different dairy farm conditions. *Livest. Line*, 4(6): pp. 8.
7. Patnaik, Subhasree, Prasad, Arun and Ganguly, Subha. 2013. Mastitis, an Infection of Cattle Udder: A Review. *J. Chem. Biol. Physical Sci.,* Section-B [Biological Sciences] 3(4): 2676-8.
8. Patnaik, Subhasree, Prasad, Arun and Ganguly, Subha. 2014. Biochemical characterization and antibiogram of Staphylococcal microorganisms associated with subclinical mastitis in lactating crossbred cows. *Anim. Sci. Rep.,* 8(4): 123-9.
9. Paul, I., Isore, D.P., Joardar, S.N., Mukhopadhayay, S.K., Ganguly, S. and Pal, S. 2013.Bacteriological investigation and antibiogram on Methicillin-resistant *Staphylococcus aureus* (MRSA) causing subclinical mastitis in dairy cattle population of West Bengal. *Indian J. Comp. Microbiol. Immunol. Infect. Dis.* 34(2): 56-9.