PREVALENCE AND ANTIBIOGRAM OF *ESCHERICHIA COLI* FROM BOVINE CLINICAL MASTITIS AROUND THRISSUR DISTRICT

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Abstract

A total of 289 milk samples of dairy cows with mastitis from various small and medium sized dairy farms of Thrissur were subjected to cultural examination and antibiogram studies. Of the 231 isolates obtained, 35 were found to be Escherichia coli, based on cultural characteristics and biochemical tests. The isolates were subjected to antibiotic sensitivity test of disk diffusion technique. Most of the isolates were sensitivity to gentamicin,enrofloxacin, and ceftriaxone. None of the isolates were sensitive to all the antibiotics.

Keywords : *Bovine mastitis, E. coli, anti-biogram*

Mastitis is a major risk factor of production in dairy industry. One of the major limitation in prevention and control of the disease is the diversity of the organisms causing the disease. Based on source of infection, environmental mastitis is caused when organism present in the vicinity of the cow gains access to mammary tissue and causes inflammatory changes. The point sources of coliform bacteria that cause infections include bedding materials, soil, manure and other organic matter in the environment of cows. The portal of entry for Gram-negative bacteria into the mammary gland is the teat canal (Hogan and Smith, 2002). *E. coli* causes inflammation of the mammary gland around parturition and during early lactation with local and sometimes severe systemic clinical symptoms. The disease affects many high producing cows and may cause death in severe cases (Burvenich *et al.*, 2003) This study reports the prevalence and antibiotic sensitivity pattern of *E. coli* isolates obtained from bovine mastitis cases from Thrissur.

Materials and Methods

A total of 289 cows from dairy farms and dairying households in Thrissur district, clinically affected with mastitis were included in this study. Detailed clinical examination of the animals was done. Milk samples from the

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affected quarters were collected aseptically in sterile vials.

Samples were inoculated on to Brain Heart Infusion agar plates and incubated at 37°C for 24 to 48h. The isolates were identified based on colony morphology, Gram staining and biochemical tests (Barrow and Feltham, 1993).

Antimicrobial susceptibility patterns of all the isolates were checked using agar disc diffusion method as per Bauer *et al.* (1966) against 12 different antibiotics: enrofloxacin (10ug), gentamicin (30ug), ampicillin/sulbactam (10/10ug), ceftriaxone (10ug), sulpha-trimethoprim (25ug), amoxicillin-clsavulanate (30ug) and ampicillin (10ug). The sensitivity was measured in terms of the diameter of the zone of inhibition surrounding the disc.

Results and Discussion

Out of the 289 samples cultured, 35 *E. coli* isolates were obtained. The isolates were Gram negative bacilli, oxidase negative, positive for tryptophanase, acid production, and negative for acetoin production and citrate utilisation. Further confirmation was done by observing colonies with metallic green sheen in MacConkey and Eosine-methylene blue agar.

Environmental mastitis pathogens like *E. coli* are found in the cow's environment. Immunity of the udder decreases in the initial phase of lactation, which facilitates the entry of these organisms in to the udder, causing mastitis. These pathogens are rapidly multiplying in nature and can elicit a strong systemic response in the host.These factors, along with significant endotoxin release results in localized lesions as well as systemic involvement and toxemia. Due to their ubiquitous nature, these pathogens cannot be completely eliminated from the cow's environment. Hence control measures are aimed at preventing the entry of these organisms into the mammary gland through the open teat sphincter and maintaining clean housing and bedding area for cattle.

While Ross *et al*. (2001) and Rajendran *et al*. (2006) had reported 20 per cent of bacterial etiology of mastitis from Kerala to be *E. coli*, Mallikarjunaswamy and Krishnamurthy (1996) and Sebastian (2001) reported a prevalence of 1.86 and 3 per cent, respectively in Kerala. Studies by Siji and Vijayakumar (2007) revealed that 10 per cent of mastitis were caused by *E. coli* in Kerala.

Antibiogram results of the isolates are summarized in Table. 1.Studies by Sebastian (2001) reported that enrofloxacin and chloramphenicol were most susceptible antibiotics against E. coli causing bovine mastitis. Gentamicin was found to be most

Table 1. Antibiotic sensitivity pattern of E. coli isolated from bovine mastitis.

Antibiotic	No.of sensitive isolates	No.of resistant isolates
Enrofloxacin	26	9
Gentamicin	26	9
Chloramphenicol	24	11
Tetracycline	23	12
Streptomycin	21	14
Ampicillin – Sulbactam	20	15
Cefriaxone	26	9
Amoxycillin-Clavulanate	14	21
Cefotaxim	18	17
Ampicillin	18	17
Co-trimoxazole	25	10
Ciproflozxacin	22	13
Cefoperaxone	20	15
Amoxycillin-Cloxacillin	19	16

susceptible antibiotic against E. coli according to Akhtar *et al.* (2003). Tetracycline, ampicillin and cefotaxime were found to be least sensitive by Sharma *et al.* (2007), who reported fluroquinolones to be the most sensitive, in-vitro. Continued use of tetracyclines may be the reason for increased resistance of the isolates against these antibiotics. Resistance towards sulpha trimethoprim may be due to alternate sources of folic acid available for the organisms, resulting in their survival (Sumathi *et al.,* 2008; Awandhkar *et al.,* 2009).

Enrofloxacin was used in 19 cases, while Gentamicin was used in seven. Co-trimoxazole was used to treat nine cases. Dosogne *et al.* (2002) stated that there is beneficial effect in treating coliform bovine mastitis with enrofloxacin and the effect is mediated by its bactericidal activity than resorption of its endotoxins. Gentamicin was found to be the most effective antibiotic according to the study conducted by Sumathi *et al.* (2008). The study also showed that none of the isolates were sensitive to all the antibiotics and many of the isolates are resistant to commonly used antibiotics. This calls for newer strategies for prevention and control of environmental mastitis in the state.

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