ANTIBIOGRAM AND DRUG RESISTANCE PATTERN OF *ESCHERICHIA COLI* ISOLATED FROM DIARRHOEIC CALVES

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ABSTRACT

Sixty two strains of *E. coli* isolated from 116 diarrhoeic faecal samples of calves were subjected to *in vitro* antibiogram studies towards nine antimicrobial drugs by disc diffusion method. Highest sensitivity was attributed to chloramphenicol (80.64%), followed by azithromycin (77.41%), tobramycin (46.77%), amoxycillin (35.48%), Co-trimeoxozole (35.48%), enrofloxacin (22.58%), cephalothin(12.90%), chlortetracycline (12.90%), and spectinomycin (8.06%) .Multiple drug resistance was observed in all the isolates exhibiting simultaneous resistance to 3 to 8 antibacterial agents. Forty two different antibiotic resistance patterns were recorded.

KEY WORDS: antibiogram, diarrhoeic calves, drug resistance pattern, *Escherichia coli*

INTRODUCTION

Enteric colibacillosis is one of the most common and economically devastating problems encountered in neonates in farm animals. The antimicrobial agents are of great value for devising curative measures against bacterial infections. However, the frequency of R-factor and its rapid transmissibility in *E.coli* poses a serious problem in treating such infections. The aim of the present work was to evaluate the *in vitro* susceptibility of *E. coli* strains isolated from diarrhoeic buffalo and cow calves to different antimicrobial agents.

MATERIALS AND METHODS

A total of 116 diarrhoeic faecal samples were collected from 63 buffalo and 53 cow calves reared in organized and unorganized farms of the Malwa region of Madhya Pradesh. All the samples were processed for isolation of *E. coli* following the method of Edwards and Ewing (1972). The isolated strains were identified as *E. coli* on the basis of biochemical and morphological characteristic as described by Barrow and Feltham (1993), and confirmed serologically by National *Escherichia* Typing Centre, CRI, Kasauli (H.P.).

The *in vitro* antibiotic sensitivity test of the *E. coli* isolates was conducted towards nine antimicrobial drugs using standard discs (Hi-Media) on Muller-Hinton agar (Hi-Media) as per the method of Bauer *et al* (1966) with minor modifications. The antimicrobial agents used in present study were: amoxycillin (25 mcg), azithromycin (30 mcg), cephalothin (30 mcg), chloramphenicol (30 mcg), chlortetracycline (30 mcg), co-trimoxazole (25 mcg), enrofloxacin(19 mcg), spectinomycin(100 mcg) and tobramycin (10 mcg).

RESULTS AND DISCUSSION

Sixty two strains of *E. coli* were isolated from 116 diarrhoeic faecal samples. Out of these 56 isolates were typed into 27 different O serogroups, while 4 were refractory to typing and 2 were rough strains. The typable isolates belonged to the somatic group O14, O22 O138, O88, O20, O60 O116, O3, O13, O28, O69, O106, O110, O127 O159, O2, O12, O15, O97, O98, O105, O108, O132, O149, O166, O171 and O172.

The results of antibiotic sensitivity were interpreted according to the manufacturer's (Hi-Media) instructions. The highest sensitivity was attributed to chloramphenicol (80.64%), followed by azithromycin (77.41%), tobramycin (46.77%), amoxycillin (35.48%), Co-trimeoxozole (35.48%), enrofloxacin (22.58%), cephalothin(12.90%), chlortetracycline (12.90%), and spectinomycin (8.06%). Orden *et al.* (2000) observed that 65.0% *E. coli* were resistant to tetracyclines, followed by spectinomycin and chloramphenicol, which is in partial agreement with our report. Kumari (2006) also reported similar sensitivity of aminoglycosides, such as spectinomycin and tobramycin, against *E. coli*. However, contrary to present observations, Khan *et al.* (2005) recorded complete resistance in *E. coli* isolates to fluroquinilones. In present study, lowest sensitivity was observed toward β-lactam antibiotics and tetracyclines, which is in concurrence with observations of Wani *et al.* (2007). The antimicrobial drug sensitivity of coliform organisms varies with place,

time, species, and even disease to disease in the same animal (Vihan and Singh, 1989). During our investigation, no correlation could be observed between the serological groups of *E.coli* and their antibiotic sensitivity patterns. Variations in the sensitivity of *E. coli* of different serological groups and even different strains belonging to particular group have been recorded earlier also (Dubey *et al.*, 2001).

Studies of *E. coli* isolates from different animal species have shown a positive relationship between the degree of usage of an antimicrobial drug and extent of resistance to it. A high resistance has been detected against the drugs, such as tetracyclines and β-lactams, which are commonly used either as feed additive or therapeutic agents in veterinary and/or human medicine. This warrants restriction in the use of antibiotics as feed additives and their rational use in antimicrobial therapy of infections in man and animals.

Multiple drug resistant species of enterobacteriaceae are hence creating a constant need for the discovery of new antibiotics. In present research pursuit multiple drug resistance was observed in all *E. coli* strains exhibiting simultaneous resistance to 3 to 8 antibacterial agents; forty two different antibiotic resistance patterns were recorded. Multiple drug resistant isolates of *E. coli* strains from animals have been reported worldwide (Balnco *et al.,* 1993; Dubey *et al.*, 2001; Wani *et al.,* 2003). Injudicious use of antimicrobials in livestock production is suspected to significantly contribute to multiple drug resistance in species of bacteria which are common to humans and animals (Acar and Rostel, 2001).

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