Multiple drug resistance in *Aeromonas hydrophila* isolates of fish

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Abstract

Fourteen antibacterial agents belonging to 9 different groups of antibiotics viz. aminoglycosides, cephalosporins, nitrofurantoin, fluroquinolones, chloramphenicol, sulphonamides, tetracyclines, penicillin and polymixin were used for in vitro sensitivity testing of eight isolates of *Aeromonas hydrophila* isolated from fifteen samples of fish, collected from retail shops in Mhow city. The sensitivity (100%) was attributed to ciprofloxacin, cefuroxime, ceftriaxone, cephotaxime, chloramphenicol, gentamycin, kanamycin, nitrofurantoin, nalidixic acid and ofloxacin followed by Co-trimoxazole (62.2%) and oxytetracycline (50%). All the isolates were resistant to ampicillin and colistin antibiotics. That means, none of the isolates were found to be sensitive for penicillin and polymixin group of antibiotics. Multiple drug resistance was also observed in all A. hydrophila isolates.

Keywords: Antibacterial agents, Multiple drug resistance, Antibiotics, Isolates.

Introduction

The culminating quarter of the previous century witnessed the explosion of scientific interest in members of the genus Aeromonas. Aeromonads have emerged as important food-borne pathogen world wide (Merino et al., 1995). These organisms have been readily isolated from a wide variety of foods like fish, eggs, meat, meat products, milk and milk products (Agarwal, 1997; Melas et al., 1999; Arora, 2004; Kumar et al., 2005; Nawaz et al., 2006).

The antimicrobial agents are of great value for devising curative measures against bacterial infections. But, progressively increasing resistance to these agents is a serious cause of concern and periodic monitoring of drug resistance of these organisms should be carried out in different geographical areas so that appropriate agent can be chosen for empiric therapy.

Mounting concerns for emergence of drug-resistance among aeromonads are reflected in a number of reports viz. Zheng et al. (1999); Chandrakanthi et al. (2000); Vivekanandhan et al. (2002); Yucel and Ctak (2003) and Emekdas et al. (2006). The problems of multi-drug resistant aeromonads are more intricate in developing nations like India and other South East Asian countries.

Materials and Methods

In this study, a total of 15 samples of fish were collected from retail shops located in Mhow and Indore for the isolation of Aeromonas hydrophila. The samples were collected as per the procedure recommended by International Commission on Microbiological Specification for Food (ICMSF, 1978).

Fourteen antibacterial agents belonging to 9 different groups of antibiotics viz. aminoglycosides, cephalosporins, nitrofurantoin, fluroquinolones, chloramphenicol, sulphonamides, tetracyclines, penicillin and polymixin were used for in vitro antibacterial sensitivity testing of eight Aeromonas hydrophila isolates from fish, using the disc diffusion assay (Bauer, 1966).

Results and Discussion

High percentage of antimicrobial resistance and emergence of multiple drug resistance among the A. hydrophila strains was observed. The sensitivity (100%) was attributed to ciprofloxacin, cefuroxime, ceftriaxone, cephotaxime, chloramphenicol, gentamycin, kanamycin, nitrofurantoin, nalidixic acid and ofloxacin followed by Co-trimoxazole (62.2%) and oxytetracycline (50%).

All the isolates were resistant to ampicillin and colistin antibiotics. That means, none of the isolates were found to be sensitive for penicillin and polymixin group of antibiotics.

Out of total eight isolates of *A. hydrophila*, one isolate was sensitive to 12 drugs, five to 11 drugs and two to 10 drugs. Multiple drug resistance was observed in all A. hydrophila isolates (Table 1).

Table-1. Multiple drug resistance in A. hydrophila isolates

Sr.No.	No. of drugs	No. of resistant isolates	Percentage of resistant isolates (n = 08)
1	02	01	12.5%
2	03	02	25.0%
3	04	05	62.5%
Total		08	100%

The present results are in concurrence with the reports of Motyl et al. (1985), Soliman (1999), Chandrakanthi et al. (2000), Yucel and Ctak (2003) and Emekdas et al. (2006) who reported that cephalosporins like cephotaxime, aminoglycosides, chloramphenicol, tetracycline, nitrofurantoin inhibited most of the A. hydrophila strains and that all the strains were resistant to penicillin and colistin. In the present study, all the isolates of A. hydrophila exhibited multiple drug resistance as also reflected in the reports of Zheng et al. (1999) and Vivekanandhan et al. (2002).

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