

ANTIBIOGRAM OF *AEROMONAS* SPECIES ISOLATED FROM LIVESTOCK PRODUCTS

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Abstract: In the present study fifty isolates of *Aeromonas* species obtained from various livestock products, isolated by conventional cultural method followed by confirmation using PCR assay were screened for their antimicrobial susceptibilities. Isolates exhibited cent per cent resistant to ampicillin and cephalothin; 74% to bacitracin and 70% to nitrofurantoin. Intermediate resistance/ susceptibility of 30%, 26%, 18%, 16%, 10% and 8% to nitrofurantoin, bacitracin, ciprofloxacin, streptomycin, enrofloxacin and kanamycin was observed, respectively. *Aeromonas spp.* were highly sensitive to cefaclor and cefoperazone (100 % each), followed by kanamycin (94%), enrofloxacin (90%), streptomycin (84%) and ciprofloxacin (82%). Presence of resistant bacteria in livestock foods is of major public health concern, as it may lead to treatment failures among consumers.

Keywords: *Aeromonas spp.*, Antibiogram, Livestock products, Sensitivity.

INTRODUCTION

Antibiotic resistance is a global problem, especially in developing countries including India [1]. *Aeromonas spp.* (species) are gram negative, motile, rod shaped, oxidase and catalase positive, motile (except *A.salmonicida*), nonspore forming bacteria that are ubiquitous in aquatic environments [2]. Even though they were only recognized to cause disease in poikilotherms in the beginning, they are now attributed as etiological agents of a wide spectrum of diseases in humans and animals [3]. *Aeromonads* are isolated from various livestock products like milk, chicken, mutton, carabeef and pork and so described as emerging food borne pathogens [2]. Globalisation, changing food habits and movement of foodstuffs lead to transfer of resistant genes among bacteria causing more complications. Lack of proper regulations, indiscriminate use of antibiotics lead to very high antimicrobial resistance in India [4]. In this connection, a study was undertaken to determine the antimicrobial profile of *Aeromonas* isolates from various livestock products.

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MATERIAL AND METHODS

Samples of livestock products were collected in and around greater Hyderabad Municipal Corporation, India as follows: milk from government, private dairies and local vendors; chicken from Sunday markets; carabeef and mutton from local markets and government slaughter houses. All samples were collected aseptically and transferred to laboratory at the earliest possible. In line with the procedures adopted from Didugu *et al.* [3], *Aeromonas* spp. were isolated using cultural method and confirmed by PCR assay, targeting 16S rRNA. A total of 50 isolates, among which 20 isolates from milk and 10 each from chicken, mutton and carabeef were selected for evaluation of antimicrobial susceptibility by disk diffusion assay with MH (Muller-Hinton) agar [5]. The interpretation was made as per the zone size interpretation chart (Table I) provided by manufacturer (Himedia®) of discs.

RESULTS AND DISCUSSION

The results of *Aeromonas spp.* isolates in antibiotic sensitivity test were tabulated in Table no. I.

Table I: Result of antibiotic sensitivity test

S.No	ANTIBIOTIC (mcg)	Result of Antibiotic Sensitivity Test: No. of positives (%)		
		Sensitive	Intermediate	Resistant
1	Ampicillin (10 mcg)	--	--	50 (100 %)
2	Bacitracin (10 units)	--	13 (26 %)	37 (74 %)
3	Ciprofloxacin (5 mcg)	41 (82 %)	9 (18 %)	--
4	Cefaclor (30 mcg)	50 (100 %)	--	--
5	Cefoperazone (75 mcg)	50 (100 %)	--	--
6	Cephalothin (30 mcg)	--	--	50 (100 %)
7	Enrofloxacin (10 mcg)	45 (90 %)	5 (10 %)	--
8	Kanamycin (30 mcg)	47 (94 %)	3 (6 %)	--
9	Nitrofurantoin (300 mcg)	--	15 (30 %)	35 (70 %)
10	Streptomycin (10 mcg)	42 (84 %)	8 (16 %)	--

Antibiotic sensitivity of the standard cultures of *Aeromonas spp.* was also studied, which revealed resistance to only ampicillin, while remaining all antibiotics tested in this study were sensitive. In this study *Aeromonas spp.* isolates exhibited cent percent resistance to ampicillin and cephalothin and cent per cent sensitivity to cephalosporins (cefaclor and cefoperazone). Similar findings on ampicillin, cephalosporin [6, 7] and cephalothin [7] was reported by various authors in support of findings observed in this study. Sensitivity of *Aeromonas spp.*

isolates towards cephalosporins in this study indicates the limited use of those antibiotics in livestock industry in the studied area. 84% of the tested isolates showed susceptibility to streptomycin in this study in agreement with other reports [8]. *Aeromonas* strains are almost universally susceptible to Quinolones [2]. 84% of isolates were sensitive to ciprofloxacin and 90% of isolates to enrofloxacin observed in this study was similar to the findings various reports [6, 9], whereas resistance to ciprofloxacin was also reported [9] among various quinolones. In agreement with the results of Kaskhedikar and Chhbra [6], Kanamycin showed 94% sensitivity and in contradiction with the same author resistance towards nitrofurantoin was observed in this study. Cent per cent resistance towards bacitracin observed in this study was in accordance with the findings of Abulhamd [8]. Differences in the sensitivity/resistance might be due to variation in source of the isolates, frequency and type of antimicrobial agents used for treating various infections in different geographical areas [16,7]. Worldwide, there is growing concern about increased prevalence of antibiotic resistance and it is now generally accepted that the main factor is increased use of antibiotics [1]. The frequencies of bacterial strains resistant to antimicrobial agents increased dramatically in the environment as a consequence of *indiscriminate use of antibiotics* [10]. Presence of resistant strains of *Aeromonas spp.* indicate the possibility of transfer of antimicrobial resistance to consumers, causing treatment failures and enhancing the severity of infections, which is a major public health concern.

CONCLUSION

From this study it is concluded that majority of the isolates of *Aeromonas spp.* obtained from livestock products are resistant to penicillins and susceptible to cephalosporins and fluoroquinolones. Slaughtering of food animals and milking of dairy animals before completion of antibiotic withdrawal period is common in India, leading to deposition of antibiotic residues in livestock products. Regular monitoring and stringent regulations are needed to tackle the problem of antimicrobial resistance.

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