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ANTIMICROBIAL SUSCEPTIBILITY PATTERNS OF AEROMONAS HYDROPHILA FROM SEAFOOD SOURCES FROM FISH MARKET IN TUTICORIN, SOUTH EAST COAST OF INDIA

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ABSTRACT
The investigation was carried out to ascertain the incidence of Aeromonas hydrophila, an emerging human pathogen in the seafood. For this, totally seventy three seafood samples such as fish, prawn, crab, and cephalopods were collected from local fish markets of Tuticorin, Southeast coast of India and the samples processed and plated on to different Aeromonas isolation medium. The typical colonies were then confirmed as A.hydrophila by biochemical tests. They were gram-negative, rod-shaped, motile bacteria that showed a positive reaction for oxidase and catalase, fermented glucose and growth of each isolate at different temperature and NaCl. The study revealed that 34.32% of the fish samples, 20.89% of the prawn, 17% of crab and 13% of cephalopods were contaminated with Aeromonas hydrophila. Thus, the study indicates that unsafe water, poor sanitation, unhygienically processed seafood products can harbor foodborne pathogens. All the A.hydrophila isolates were tested against 16 different antibiotics and the results showed that all the isolates were 100% resistant to bacitracin, penicillin, ampicillin, and erythromycin. The resistant to other antibiotics appear to chloramphenicol (46.26%), oxytetracycline (38.8%), doxycycline (35.82%), rifampicin (28.35%), kanamycin (25.37%) and tetracycline (13.43%). These results demonstrated that the presence of virulent food born Aeromonas hydrophila in seafood with antibiotic-resistant in Tuticorin seafood markets. The increasing bacterial resistance to antibiotics has become a public health problem due to the fact that bacteria can be found seafood because it is the most efficient food item for protein supply to human beings. The occurrence of the Aeromonas hydrophila found in the in the seafood products raises hygiene and safety questions and the need for public health awareness and consciousness in this regard.

KEYWORDS: Aeromonas hydrophila, antimicrobial susceptibility, antibiotics, seafood's.

INTRODUCTION
Fish and fishery products are of great importance worldwide due to their nutritional value, clear health benefits and wholesome properties. Seafood products contribute a major food item for people in developed and developing countries. The seafood landings of India are used in different forms such as fresh, frozen, canned, dried, cured and other fishery products in domestic and foreign markets. During the financial year of 2014-15 in India, exports of marine products reached an all-time high of USD 5511.12 million. Marine product exports crossed all previous records in quantity, rupee value and USD terms. Exports aggregated to 10, 51, 243 MT valued at Rs. 33441.61 crores and USD 5511.12 million. Compared to the previous year, seafood exports recorded a growth of 6.86% in quantity, 10.69% in rupee and 10.05% growth in USD earnings (MPEDA, 2015). Further, in order to increase our foreign earnings through export, the seafood products should be free from pathogenic organisms like *Aeromonas* species by maintaining the highest quality standards as per the health requirements of the importing countries. Considering above circumstances quality control of seafood for export has become mandatory in India from 1965 onwards through the compulsory quality control and pre-shipment inspection act, 1963. Though seafood is nutritive, they are highly prone to contamination. They act as a vehicle for pathogenic bacteria naturally occurring in the aquatic environment referred as indigenous or derived from post-harvest contamination may lead to cause human morbidities and mortalities worldwide (Udgata *et al.*, 2009).

The proportion of foodborne microorganisms via seafood varies from country to country depending on climate and other factors such as fish handling and processing technique. In tropical countries like India due to lack of appropriate infrastructures and unhygienic handling,

fishery products may be contaminated by various food-borne pathogens. Species of *Aeromonas* are Gram-negative, non-spore forming, rod-shaped, facultatively anaerobic, motile bacteria that occur ubiquitously and autochthonously in the aquatic and terrestrial environment. Seafood products are among the ideal substrates for the proliferation of *Aeromonas* sp. (Janda, 1991). Among the *Aeromonas* sp. *Aeromonas hydrophila* is one of the most pathogenic bacteria to human beings. Substantial clinical and microbiological research now supports the epidemiologic evidence that *A. hydrophila* can cause gastroenteritis in some individuals mainly in children since they are considered opportunists (Janda and Abbott, 1998).

Associations of *Aeromonas hydrophila* with the human disease were reported by Von Graevenitz and Mensch (1968) in a review of 30 cases of *Aeromonas* infection, providing evidence for their recognition as human pathogens and suggesting that aeromonads transmitted from unsafe food products. *Aeromonas hydrophila* can grow at both aerobic and anaerobic conditions and they do not form spores, however, they are easily destroyed when food is thoroughly cooked (Janda and Abbott, 2010). The organism is, however, not considered to be a normal inhabitant of the gut (Janda and Abbott, 2010). Found in salt, fresh, stagnant, estuarine, soil, sewage, and even tree bark and brackish water worldwide (ICMSF, 1996). Seafood is wholesome while the seafood is alive. However, the sterility can be compromised by some contaminants from the environment and in the process of cutting, packaging as well as during distribution (Ingham, 2001). Seafood is known to constitute a vast reservoir of pathogenic bacteria with the general problem of drug resistance and environmental contamination through organic wastes and vectors (Adeleke and Omafuvbe, 2011; Samuel *et al.,* 2011; Bahrndorff *et al.,* 2013). Most of the contaminants of seafood originate from the alimentary tracts, respiratory tracts and or external surfaces of either life animal or the handlers.

The incidence of *Aeromonas hydrophila* in various fishes and other foods, water, clinical and environmental origins has been documented by several researchers (Abeyta *et al.,* 1986; Hudson *et al.,* 1992; Thayumanavan *et al.,* 2003; Vivekanandhan *et al.,* 2005). Seafood is popular food item in Tuticorin and the consumption is steadily increasing owing to their nutritional value and affordability when compared to other foods of animal origin. Prime quality of seafood mostly preferred for export and the second quality seafood's only available in the market and it was not properly iced also. But, so far, very limited reports available in Tamil Nadu on the incidence of *Aeromonas hydrophila* in seafood, which is consumed most often by the people. Considering ubiquitous nature of *Aeromonas* species in the aquatic environment, the psychrotrophic nature of the organism, the long hours taking from landing to the consumer and increasing the incidence of *A. hydrophila* as a human pathogen, the study decided to take the prevalence of *A.hydrophila* in seafood. The Food and Agriculture Organization/World Organization Health (FAO/WHO) commission recommends that to prevent seafood-borne disease in developing countries, seafood directly impacting human populations should be characterized physically, chemically and microbiologically. In light of this recommendation, the present study aimed to identify the *Aeromonas hydrophila* in seafood samples collected from Tuticorin region and to verify the isolated strains susceptibility to different antibiotics.

MATERIALS AND METHODS

Collection of sample

Popular seafood samples such as fish (n=30) (*Sardinella albella, Stolephorus commersonnii, Epinephelus malabaricus and Scomberoides commersonnianus),* prawn (n=19) (*Metapenaeus dobsoni, Metapenaeus brevicornis, Penaeus japanicus and Penaeus indicus,* crab (n=11) (*Portunus sanguinolentus and Portunus pelagicus*) and cephalopods (n=13) (*Sepia brevimana, Sepia elliptica, and Loligo duvauceli)* were collected from seafood market of Tuticorin during October 2016 for the analysis. Samples were collected at random from a number of vendors in the fish market and collection was made between 9 A.M – 12 P.M. The seafood's were collected individually in clean polythene bags and transported to the laboratory in an ice chest. Samples of seafood with visible signs of deterioration during the collection. The collected samples were examined to observe the *Aeromonas hydrophila* from external lesions and internal body muscle of all seafood. Processing and inoculation of samples for bacteriological analysis were completed within 2-4 h of collection (AOAC, 1975). Aseptic procedures were strictly followed during collection, transportation, and analysis. The collected seafood was identified using standard reference manuals (Dry, 1889; Munro, 1955; Misra, 1959).

The entire specimen was rinsed with sterile water to remove adhering particles. The external surface was swabbed with a sterile cotton swab using an ethanol dipped and flamed forceps and spread onto the macConkeys agar, TCBS agar, XLD agar and *Aeromonas* agar. Similarly, whole body samples of seafood were mixed with sterile saline (1:9) homogenized with mortar and pestle. The homogenized solution was designed as a stock solution. To prepare decimal dilutions, 0.1 ml of the stock solution as transferred into 0.9 ml saline as 10^{-1} dilution. Similar 0.1 ml allocates from the 10^{-1} dilution was transferred into 0.9 ml saline to prepare 10^{-2} dilution. A 0.1ml of each dilution was inoculated into duplicate *Aeromonas* agar plates. The inoculated plates were incubated for 48 hours at 36^{o}C aerobically and each plate was examined for colony appearance. Individual isolates were streaked onto the TSA agar slants incubated at 25^{o}C for 24 hours and after the growth of the bacteria, the slants were preserved at 4^{o}C for further studies.

***Aeromonas hydrophila* identification**

The typical colonies were transferred to the trypticase soy agar plates for biochemical identification according to Palumbo *et al.*, (1992). Oxidase test was performed on blood agar plate by pouring oxidase reagent on the plate. Oxidase positive colonies were picked up within 10-12 seconds after the appearance of purple color. All oxidase positive colonies were isolated and all these cultures were undergone for morphological characterization such as shape, size, gram character and motility test and other biochemical tests such as catalase, citrate, indole, MR, VP, urea, glucose fermentation, sucrose, lactose, D-mannitol, gelatin hydrolysis, urease, dulcitol, ONPG, arginine decarboxylase, lysine decarboxylase and ornithine decarboxylase. Physiological characters were studied by observing the growth of each isolate at temperatures of 4, 37 and 40°C in different concentrations of NaCl as 0, 1, 2, 3 and 4% to confirm the identification of the *A. hydrophila* bacteria. The results were compared with the *Aeromonas* ATCC 7966 as reference strain to compare the results.

Antimicrobial Susceptibility test

Antimicrobial agents

The following antimicrobial agents were tested by disc diffusion; chloramphinicol (30 mg), streptomycin (10 mg), Rifampicin (5 mg), Bacitracin (10 unit), Kanamycin (30 µg), Pencillin (10 mg), Oxytetracycline (30 mg), Ampicillin (25 mg), Cloxacillin (5 mg), Ciprofloxacin (5 mg), Gentamycin (10 mg), Piperacillin (100 µg), Carbenicillin (100 µg), Erythromycin (15 µg), Doxycyclin (30 mg) and Tetracycline (30 mg) (Becton Dickinson, Maryland, USA).

Kirby-Bauer disc diffusion method

Well-isolated colonies of *Aeromonas hydrophila* from a 16-18 h old *Aeromonas* agar plates were taken. A suspension of the colonies with 0.85 percent normal saline was made, optical density adjusted to 0.5 McFarland and used for the performance of the procedure as described previously (Woods *et al.*, 1995). After the inoculated plates had dried sufficiently the discs were placed on the medium, gently pressed and plates incubated at 35^{o}C in 5 percent CO_2 atmosphere for 16-18 h. Each zone size was interpreted with reference to the NCCLS standards (2000) as sensitive and resistant.

RESULTS

The seafood collected from the market was tested for the prevalence of *Aeromonas hydrophila*. Samples were spread plated with *Aeromonas* agar, McConkey agar, XLD agar showed growth of *Aeromonas* bacteria which primarily conferred that the bacteria associated with the external and internal contamination in seafood from the environmental sources. On the basis of their growth in different media and other biochemical tests, the present isolates were confirmed to be *Aeromonas hydrophila*.

A total of 67 bacterial isolates were recovered from seafood and *A.hydrophila* was identified based on the morphological, conventional and biochemical analysis. Morphologically the isolated colonies showed in TCBS agar no growth, MacConkey agar showed lactose fermenting colonies showed pink color colonies and non-lactose fermenting colonies showed colorless colonies, in the XLD media *Aeromonas* species showed pink color colonies and in the *Aeromonas* agar, dark green opaque colonies with dark centers indicated the *Aeromonas hydrophila*.

The biochemical characteristics of the isolates those measured by conventional methods were summarized in Table 2. They were gram-negative, rod-shaped bacteria. All isolates were oxidase and catalase positive, citrate positive, indole positive, MR positive, ONPG positive and gelatin hydrolysis positive. The bacteria were capable of producing acid from arabinose, whereas acid and gas from different sugar media such as maltose, mannitol, and sucrose. Consequently, the isolates showed positive growth at 37°C with the optimum at 24°C but no growth found at 4°C and 40°C. Additionally, they were capable of growing in 0-2% NaCl, however, no growth was noted in 3-4% NaCl supplemented media. All the isolates gave positive results by reacting with arginine dihydrolase and lysine decarboxylase and negative reaction shown for ornithine decarboxylase, urease, dulcitol, lactose, urea, and VP.

A total of sixty-seven *A.hydrophila* isolates were obtained from the seafood samples during the study period. All the 67 strains of *A.hydrophila* showed variation in the percentage of occurrence of the seafood. About 34.32% of fish, 20.89% of prawn, 25.37% of crab and 19.40% of cephalopods were infected with this organism (Table 1).

Table 3 shows the results of in-vitro susceptibility test of *Aeromonas hydrophila* isolates from seafood using the disc diffusion assay. The antibacterial susceptibility testing of 67 isolates of *Aeromonas hydrophila*, the isolates were 100% sensitive to ciprofloxacin, gentamycin, piperacillin and carbenicillin followed by 88.05% sensitive to streptomycin, 86.56% sensitive to tetracycline, 71.64% sensitive to rifampicin, 74.62% sensitive to kanamycin, 64.17% sensitive to doxycycline, 61.19% sensitive to oxytetracycline and finally 53.73% sensitive to chloramphenicol. In another hand, the *Aeromonas hydrophila* isolates were resistant 100% to ampicillin, bacitracin, penicillin, cloxacillin, and erythromycin. While to chloramphenicol (46.26%), oxytetracycline (38.8%), doxycycline (35.82%), rifampicin (28.35%), kanamycin (25.37%), tetracycline (13.43%) and streptomycin (11.94%).

Table 1: Percentage incidence of *Aeromonas hydrophila* isolates from seafood samples.

Seafood samples	No. of samples	Strains isolated	Positive for *A.hydrophila*	% of occurrence
Fish	50	30	23	34.32
Prawn	50	19	14	20.89
Crab	25	11	17	25.37
Cephalopods	25	13	13	19.40

Table 2: Biochemical characterization of *Aeromonas hydrophila.*

Trypticase soyagar		Buff coloured colonies at 25^{o}C for 4 days
Grams staining		Negative rod shape
Motility		Motile
Catalase		Positive
Citrate		Positive
Indole		Positive
MR		Positive
VP		Negative
Urea		Negative
Sucrose		Positive
Lactose		Negative
Arabinose		Positive
D-mannitol		Positive
Maltose		Positive
Gelatin hydrolysis		Positive
Urease		Negative
Dulcitol		Negative
Oxidase		Positive
ONPG		Positive
Arginine decarboxylase		Positive
Lysine decaboxylase		Positive
Ornithine decarboxylase		Negative
Growth on TCBS		Negative
Growth in NaCl solution (%)	0	Positive
	1	Positive
	2	Positive
	3	Negative
	4	Negative
Growth at (^{o}C)	4	Negative
	24	Positive
	37	Positive
	40	Negative

Table 3: Antibacterial susceptibility pattern of the *A.hydrophila* isolates from seafood's.

Antibiotics	No .of sensitive	Percentage	No. of resistance	Percentage
Chloramphinicol (30 mg)	36	53.73	31	46.26
Streptomycin (10 mg)	59	88.05	8	11.94
Rifampicin (5 mg)	48	71.64	19	28.35
Bacitracin (10 unit)	-	-	67	100
Kanamycin (30 µg)	50	74.62	17	25.37
Pencillin (10 mg)	-	-	67	100
Oxytetracycline (30mg)	41	61.19	26	38.8
Ampicillin (25 mg)	-	-	67	100
Cloxacillin (5 mg)	-	-	67	100
Ciprofloxacin (5 mg)	67	100	-	-
Gentamycin (10 mg)	67	100	-	-
Piperacillin (100 µg)	67	100	-	-
Carbenicillin (100 µg)	67	100	-	-
Erythromycin (15 µg)	-	-	67	100
Doxycyclin (30 mg)	43	64.17	24	35.82
Tetracycline (30 mg)	58	86.56	9	13.43

DISCUSSION

Bacteriological studies are very important procedures for actual disease diagnosis and identification of the pathogens in food products. Generally, *Aeromonas* species are the most commonly found contaminants in fish and marine products, which to an extent is explained by their ubiquitous nature in the environments (Hanninen *et al.,* 1997). In the aquatic environment, they form part of the normal microbiota being able to multiply under abnormal environmental conditions. The present study was aimed to isolate and identify the causative bacteria from commonly edible seafood collected from the market and it provides useful information on *Aeromonas hydrophila* bacteria survival in seafood through environmental and personal hygiene. Similarly, isolation of *A.hydrophila* from seafood done by various researchers. Mostofa (2007) from *Heteropneustes fossilis*, Mamnur Rashid *et al.,* (2008) from Thai pangus, Rahman and Choudhry (1996) from carp fishes, Hasan (2007) from *Labeo rohita*, *Catla catla*, *Cirrhinas cirrhosus*, *Cyprinus carpio*. Sindermann (1979) has stated that the *A. hydrophila* is an opportunistic pathogen and contamination in food products through the high organic load, stress factors, sublethal oxygen level, and temperature could be the contributing factors for the infection. Maalej *et al.,* (2003) studying the seasonal dynamics of *Aeromonas* in the treated urban effluent, in surface marine waters and seafood along the coast of Sfax (Mediterranean Sea, Tunisia).

In the current study, biochemical results such as gram-negative, motile, oxidative, acid forming in arabinose, growth of each isolate at different temperature (24°C & 37°C) & NaCl (0-2%) and other conventional biochemical analysis proved the *Aeromonas hydrophila* bacterial infestation and these results consistency with the finding of earlier researchers (Erdem *et al.,* 2009). Ahmed (2009) confirmed the contamination of *A. hydrophila* on the basis of the above characters. The possible sources of contamination of seafood with *A.hydrophila* were the release of waste waters into an aquatic system that might enhance the population of *Aeromonas* sp. (Bagyalaksmi *et al.,* 2009). Other than this post-harvest contamination in seafood by unsafe water, poor sanitation and unhygienically processed seafood can harbor the foodborne pathogens. In the present study, the level of incidence in fish samples was higher when compared to the observations of Tsai and Chen (1996), Fricker and Tompsett (1989) and Hudson and Delacy (1991) from different geographical regions. Higher prevalence of *A.hydrophila* in seafood market samples due to the poor sanitation, time and temperature abuse of this highly perishable food in the markets. In fish market, seafood are left open with little or no ice and fly infestation is common. However, the prevalence levels were much lower than those reported by Abeyta and Wekell (1988) and Gobat and Jmmi (1993) in fresh fishes sold in retail outlets of Switzerland where they reported as the extremely high prevalence of *A.hydrophila*. Variations in the incidence level of *A.hydrophila* in the seafood of different parts of the world can be attributed to secondary contamination during handling, storage, and transportation. Water used in post-harvest processing has frequently been shown to be contaminated with *Aeromonas* species (Slade *et al.,* 1986).

The number of different kinds of seafood used for the isolation of *A.hydrophila*, for this we prefer most economically important seafood items and the prevalence was high in fish than other seafood. This is agreed with Tsai and Chen (1996) & Vivekanandhan *et al.,* (2005). The chitinous shell of the seafood may not be that conducive to the proliferation of the *A.hydrophila* as moisture-rich body surface of fish. Apart from this secondary contamination such as poor customary practices coupled with unhygienic handling resulted high prevalent of the food born pathogen (Hatha & Lakshmanaperumalsamy, 1997).

All the 67 isolates were under the sensitivity test against 16 different antibiotics and the results showed that the isolates have multiple drugs resistant to ciprofloxacin, gentamycin, piperacillin, and carbenicillin and were resistant to chloramphenicol, streptomycin, rifampicin, kanamycin, oxytetracycline, doxycycline, and tetracycline. The results of the present study agree with the results of Alzainy (2011); Vivekanandhan *et al.,* (2002) and Zheng *et al.,* (1999), while Hassan *et al.,* (2004) found the isolates from fish were resistant to (amoxicillin, meropenem, oral cephalosporin, cefaclor, cephalexin, cephalothin and colistin), Gold and Salit (1993) found *A.hydrophila* was resistant to penicillin, ampicillin, flucloxacillin, carbenicillin, cefazolin. Abdel-Gwad and Abdel-Rahman (2004) found in vitro susceptibility of the *A. hydrophila* isolates to a variety of antibiotics revealed to 100% of isolates were resistant to penicillin and ampicillin. Soliman (1988) reported all isolates were resistant to (ampicillin and novobiocin) the similar results recorded by Sohair and Eman (2002) who reported that isolates were resistant to (penicillin & ampicillin), Kaskhedikar and Chhabra (2010) show 100% of isolates were resistant to (ampicillin and colistin) antibiotics. Abdel-Gwad and Abdel-Rahman (2004) found in vitro susceptibility of the *A. hydrophila* isolates to a variety of antibiotics revealed to 100% of isolates were resistant to penicillin and ampicillin. Yucel & Ctak (2003); Emekdas *et al.,* (2006); Soliman (1999), Chardrakanthi (2000), reported that all isolates were 100% resistant to (penicillin and colistin). Gurol *et al.,* (2006) reported all *Aeromonas sp*. was found to be susceptible to ciprofloxacin in his studies and was agreed with the present observation. In contrast Gurol *et al.,* (2006) also reported *A. hydrophila* resistance to streptomycin and it disagreed with the present observation. Resistant forms against antibiotics may be due to the β-lactamase enzyme production of these isolates, so they agree with the results of our study which show 100% resistance to cloxacillin, penicillin, ampicillin, and bacitracin antibiotics. Chowdhury (1998)

has reported that higher percentage of the *Aeromonas* bacteria represent strong resistant to the erythromycin. When analyzing the previous investigations (Hudson & De Lacy, 1991; Gonazalez *et al.,* 2001; Thayumanavan *et al.,* 2003; Vivekanandhan et al., 2005; Seethalakshmi *et al.,* 2006) a considerable increase in the prevalence of *A.hydrophila* in seafood was observed over the years. In the present study, 67 isolates were observed to be multiple antibiotics resistant to commercially available standard antibiotics (ciprofloxacin, gentamycin, piperacillin, and carbenicillin). Similatrly Seethalakshmi *et al.,* (2006) reported 73 *A.hydrophila* isolates from seafood were observed to be multiple antibiotics resistant to 20 antibiotics. Zainab *et al.,* (2011) reported 76.6% *A.hydrophila* isolated from frozen fish samples in Baghdad. In this study rate of resistance to antibiotics from strains of *Aeromonas hydrophila* is hypothesized as being related to acquiring resistance through mobile genetic elements/plasmids (Hedges *et al.,* 1985). Similarly Vivekanandhan *et al.,* (2005) undergone the isolation of multi-resistant food born *A. hydrophila* from seafood in other parts of the Tamil Nadu are coincided along with our own findings warrant the need to take proper measures to prevent the introduction of resistant *Aeromonas* sp. into seafood, because the ingestion of contaminated fish may result in resistance gene transfer from fish to the human intestinal microbiota.

Antimicrobial resistance is a fact which is increasingly worrying health authorities, due to its increasing occurrence each year (Palu *et al.,* 2006). The main drawback of the antibiotic treatment of *A. hydrophila* infection is the high potentiality of the organism to develop resistance against the antibiotic (Mitchell and Plumb, 1980). In the current study, the bacterial isolates (*A. hydrophila*) were resistant to a most commonly used antibiotic such as ampicillin. Since ampicillin as it is one of the most common antibiotics used in living things, excessive use of ampicillin in might predispose current findings. Consistent with our hypothesis, Jongjareanjai *et al.,* (2009) have reported that *A. hydrophila* showed considerable levels of resistance against chloramphenicol, penicillin, bacitracin, ampicillin, and cloxacillin, because of a higher level of antibiotics in the aquatic environment through the wastewater disposal. The increasing antibiotic resistance among them also causes health problems and these characteristics make it be an emerging pathogen posing several threats to human beings.

Aeromonas hydrophila infection of seafood is a zoonotic disease which can be spread from animal to man and vice versa. Accident exposure to this bacteria may lead to getting the disease by cutting ourselves while butchering affected fish or impaling a sharp fin into our hand is a sure way to infect ourselves, also, people who may be immune - deficient or immune-incompetent such as (the very young, the elderly or those with other disease problems) are at the highest risk (Ladon and Randy, 1991). The number, route, mode of transmission, and stability of an infectious agent outside to the host determines the severity of the infection. Generally, the main routes of exposure in humans are ingestion of contaminated foods and water or direct contact with contaminated waters and mud, human exposure to *Aeromonas hydrophila* has risen due to the increased usage of aquatic recreational sites especially with its warm climate (Adler and Altman, 1993; Hassan *et al.,* 2004; Yogananth *et al.,* 2009) because these infections occur sporadically and infrequently and they are more common in warmer climates (Kelly *et al.,* 1993). *Aeromonas hydrophila* bacteria in human associated with gastroenteritis which causes rice water diarrhea with loose stools filled with blood and mucus in people with promised immune systems (Castro-Escarpull *et al.,* 2003). In the present study, bacterial strains isolated from seafood showed antibiotic resistance and increasing this type of resistance against antibiotics cause a healthiness difficulty in consumers. The prevalence and multiple antibiotic resistance of *Aeromonas hydrophila* in seafood samples have been reported by Seethalakshmi (2006). At present, the chief means of controlling the diseases caused by *Aeromonas hydrophila* is by antibiotic treatment and improvement of management (Rahim *et al.,* 2010) but the extensive use of antibiotics leads to an increase in antibiotic resistance among them which causes health problems in human being (Ansary *et al.,* 1992). *Aeromonas* species might have developed resistance towards several of these antibiotics and so portends danger in the antimicrobial therapy.

The present study highlights the presence of *A.hydrophila* in seafood of Tuticorin fish market intended for human consumption in the city. High prevalence of multiple antibiotics resistant was noticed. The resistant to various antibiotics are normally associated with enteric infections caused by species of *Aeromonas*.

CONCLUSIONS

The results of the present study revealed that seafood sold in the market was contaminated with *A.hydrophila*. Source of the selected organism may from contaminated catching environment and secondary contamination from post-harvest processing may contribute to its distribution. The study showed that the initial evidence of the isolation, identification of *A. hydrophila* from seafood. This research work also confirms the incidence of *Aeromonas* species that are multiple antibiotics resistance from seafood which indicates a public health problem, hence stringent control in the use of antibiotics for chemotherapy of *Aeromonas* infections is suggested to reduce the organism's resistance to frequently used antibiotics and a biotherapeutic treatment is needed to avoid outbreak occurrence. However, further studies are needed to demonstrate the molecular and serological characterization of the organism. Monitoring pathogen distribution in community environments associated with learning programs that explain risk continues to be an important activity in developing regions.

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