

## Short Communication

# ***In vitro* susceptibility of commonly used antibiotics against *Vibrio* spp. isolated from Lobster (*Panulirus homarus*)**

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The sensitivity of 28 isolates of *Vibrio* spp. isolated from the edible muscle of lobster was compared using commonly used antibiotics. The *in vitro* susceptibility of the isolates was studied by disk diffusion method using disks contained tetracycline, ampicillin, penicillin, doxycycline, streptomycin and erythromycin. All bacterial strains studied in this research showed high degree of resistance to the antibiotics used in both human medicine and those employed in aquaculture which is of great importance.

**Key words:** *Vibrio* spp., antibiotic susceptibility, lobster.

## INTRODUCTION

*Vibrio* infection usually occurs in marine and estuarine environments and has been reported through the world. Vibriosis is caused by gram negative bacteria in the family of Vibrionaceae. The major *Vibrio* species isolated from fish, shrimp and lobster are *V. parahaemolyticus*, *V. harveyi*, *V. alginolyticus*, *V. vulnificus*, *V. anguillarum* and *V. fluvialis* (Grisez et al., 1997; Verdnock et al., 1997; Hosseini et al., 2004). Most of the *Vibrio* species are pathogenic for human and usually responsible for causing alimentary infections in some countries where fish or shellfish are consumed raw or lightly cooked (Amaro et al., 1997). Currently, 12 species of *Vibrio* genus are known to be associated with human infections acquired by consumption of contaminated foods and water (Mead et al., 1999). *Vibrio* spp. were reported for the first time in Japan as a cause of gastroenteritis (Fujino et al., 1951), where *V. parahaemolyticus* is implicated as a cause of at least a quarter of food borne diseases (Feldhusen, 2000) mostly after the consumption of raw or undercooked seafood (Farmer et al., 2003). *V. vulnificus* is associated with severe wound and soft tissue infections and even septicemia especially in children or persons with compromised immune system. This pathogen is responsible for 0.1% of the food borne

diseases with hospitalization and for 1% of the foodborne deaths in the USA (Mead et al., 1999). Hence, the present study was undertaken to determine the degree of antibacterial resistance of *Vibrio* spp. isolated from lobster in the Persian Gulf.

## MATERIAL AND METHOD

### Isolation and identification of *Vibrio* spp.

Sixty lobsters (*Panulirus homarus*) were caught from Hendijan in south coast of Iran during October to December 2009. The samples were transferred to the laboratory in appropriate conditions. In the laboratory as a first step, 225 ml of alkaline peptone water (APW) was added to 25 g of homogenized lobster flesh and incubated at 37°C. The samples of flesh were cultivated on thiosulfate citrate bile salts sucrose agar (TCBS, BD diagnostics, Heidelberg, Germany) and on modified cellobiose polymyxin-B colistin agar (MCPC). After incubation at 37°C for 24 h, the isolates were used for further screening tests including Gram staining, oxidase and catalase tests and culture in SIM and TSI media and other biochemical tests described by Hosseini et al. (2004).

### Antibiotic susceptibility test

Antibiotic susceptibility tests were performed using the disk diffusion method on Mueller-Hinton agar (Oxoid) according to the national committee of clinical laboratory standards (NCCLS) (2002). Disks containing the following antibiotics were used: Penicillin G (10 U,

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**Table 1.** Antibacterial susceptibility and resistance of *Vibrio* isolates to antibiotics.

Species	Tetracycline		Ampicillin		Penicillin		Doxycycline		Streptomycin		Erythromycin	
	S	R	S	R	S	R	S	R	S	R	S	R
<i>V. parahaemoliticus</i>	1	12	1	12	3	10	1	12	1	12	1	12
<i>V. harveyi</i>	0	8	0	8	2	6	2	6	2	6	0	8
<i>V. orientalis</i>	0	3	0	3	1	2	0	3	0	3	1	2
<i>V. vulnificus</i>	1	1	1	1	0	2	1	1	0	2	0	2
<i>V. cholerae</i>	0	1	0	1	1	0	1	0	1	0	1	0
<i>V. alginolyticus</i>	0	1	0	1	0	1	0	1	0	1	0	1

Oxoid), ampicillin (10 µg, Oxoid), streptomycin (30 µg, Oxoid), erythromycin (15 µg, Oxoid), tetracycline (30 µg, Oxoid) and doxycycline (30 µg, Oxoid). The disks were dispensed on the surface of the medium and incubated aerobically at 25°C for 24 h. The results were recorded as resistant or susceptible by measurement of the inhibition zone diameter according to the interpretive standard of NCCLS (2002).

## RESULTS

Six *Vibrio* species were identified including *V. parahaemoliticus*, *V. harveyi*, *V. orientalis*, *V. vulnificus*, *V. cholerae*, *V. alginolyticus* and were examined for antibiotic susceptibility. Antibiotic susceptibilities of 28 isolates of *Vibrio* species are presented in Table 1. According to the results, *Vibrio* isolates demonstrated strong resistance to 6 commonly used antibiotics. Resistance rate of *V. parahaemoliticus* isolates to antibiotics was 92.3% for tetracycline, ampicillin, doxycycline, streptomycin, erythromycin and 76.9% for penicillin.

## DISCUSSION

Vibriosis is one of the most frequent diseases affecting crustaceans, fishes and molluscs. To treat such infections, it is a common practice to employ antibiotics such as oxytetracycline, enrofloxacin, sarafloxacin and florfenicol. In the present study, data on antibiotic resistance indicates that all the 28 isolates of *Vibrio* spp. were highly resistant to examined antibiotics.

Resistance of marine fish and shrimp pathogenic bacteria to commonly used antibiotics has been reported before throughout the world (Chowdhury et al., 1989; Schmidt et al., 2000). Persistence of oxytetracycline and oxalic acid in sediments for several months (Hansen et al., 1992) gives rise to a significant increase in bacterial resistance as well as the risk of having residues of antibiotic substances in fish meat used for human consumption (Alderman et al., 1992). The antibiotic resistance is transferable to other bacteria through R-plasmids. Potential consequences of excessive antibiotic use in animal culture are the development of

drug-resistant bacteria and reduced efficacy of treatment for animal and even human diseases (Rhodes et al., 2000). Furthermore, inappropriate use of antibiotics is likely to cause an unnecessary impact on the environment. The incidence of high antibiotic resistance in lobster or other aquatic animals with no recent history of antibiotic usage is related to increased or excessive and prophylactic use of antibiotics in shrimp farms. It is suggested from the results that the use of antibiotics should be strictly controlled in shrimp farms to prevent the dissemination of antibiotic-resistant bacteria that may carry R-plasmids to other bacteria.

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