

Antibiotic resistance and plasmid profiling of *Vibrio parahaemolyticus* isolated from cockles (*Anadara granosa*) at Tanjung Karang, Kuala Selangor

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Abstract: A total of sixty *V. parahaemolyticus* strains isolated from local cockles (*Anadara granosa*) were investigated by their antibiotic resistance patterns and plasmid profiles. The isolates showed multiple resistances towards most of the antibiotics tested. All strains of *V. parahaemolyticus* isolated harbored 1-3 plasmids, with sizes ranging from 2.7 to 54 kb. All *V. parahaemolyticus* strains showed high multiple antibiotic resistances in frequencies of 0.58 – 0.94 indicating that the strains were derived from high-risk sources. In addition, no particular plasmid profile was predictive of a particular pattern of antibiotic susceptibility. These findings are essential because of the suggested involvement of seafood especially shellfish and environment in transmission of this pathogen to human. Thus, indicating that seafood may be a source of food- acquired antibiotic resistant bacteria to consumer.

Keywords: *Vibrio parahaemolyticus*, antibiotic resistance, plasmid profiling, cockles

Introduction

A wide body of literature implicates the gram-negative organism *V. parahaemolyticus* with human disease and foodborne infections (Balter *et al.*, 2006, Sujeewa *et al.*, 2009). This ubiquitous microorganism, especially in water, can be isolated in clinical cases and from freshly caught fish and seafood. *V. parahaemolyticus* is associated with gastroenteritis as the most common clinical manifestation, and severe wound infection upon exposure to contaminated seafood and/ or seawater (Panicker *et al.*, 2004). In recent years, vibriosis has become one of the most important bacterial diseases in marine cultured organisms, affecting a large number of species of fish and shellfish (Li *et al.*, 1999; Molina-Aja *et al.*, 2002). In Taiwan and several other Asian countries such as Japan and Hong Kong, *V. parahaemolyticus* is an important foodborne pathogen (Wong and Lin, 2001). The role of antibiotics in the management of human infections caused by *Vibrio* species has not yet been defined, although antimicrobial resistance could be an important problem for therapy directed against these organisms (Zanetti *et al.*, 2001). Appropriate antimicrobial therapy directed is needed for a more effective management of severe infections caused by

human pathogenic *Vibrio* spp. Hence, elucidation of the antimicrobial susceptibilities of potential pathogenic vibrios will be important for prophylaxis and treatment if *vibrio* infections caused by human beings and in cultured marine organisms. Plasmids have been found in vibrios, and in some cases, their involvement in resistance to many antibiotics has been proven (Molina-Aja *et al.*, 2002; Manjusha *et al.*, 2005; Zulkifli *et al.*, 2009).

Hence, the aims of this study were to determine the antibiotic resistance patterns among *V. parahaemolyticus* isolated from cockles (*Anadara granosa*) from Tanjung Karang, Kuala Selangor; also to determine the presence of plasmids among the *V. parahaemolyticus* isolates and to correlate them with antibiotic resistance.

Materials and Methods

Bacterial strains

Sixty-two strains of *V. parahaemolyticus* were isolated from 62 out of 100 samples of local cockles (*Anadara granosa*) obtained from a harvesting site in Tanjung Karang, Kuala Selangor. The isolates were routinely grown at 35°C in Luria Bertani broth with addition of 3% (w/v) NaCl.

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