

## Biosafety of *Vibrio parahaemolyticus* from vegetables based on antimicrobial sensitivity and RAPD profiling

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**Abstract:** This study was undertaken to characterize the antibiotic resistance and randomly amplified polymorphic DNA (RAPD) profiles of *Vibrio parahaemolyticus* isolates from raw vegetable samples. A total of 46 isolates of *V. parahaemolyticus* recovered from raw vegetables samples and were confirmed by PCR were analyzed in this study. Most of the isolates were resistant to nalidixic acid (93.48%) and were the least resistant towards imipinem (4.35%). The MAR index results also demonstrated high individual and multiple resistances to antibiotics among the isolates. From the RAPD analysis, the size for RAPD fragments generated ranged from 250 bp to 1,500 bp, with most of the strains contained three major gene fragments of 350, 1,000 and 1,350 bp. The RAPD profiles revealed a high level of DNA sequence diversity within the isolates. Antibiotic resistance and RAPD proved to be effective tools in characterizing and differentiating the *V. parahaemolyticus* strains.

**Keywords:** Biosafety, *Vibrio parahaemolyticus*, RAPD, vegetables, antibiotic

### Introduction

Pathogenic *V. parahaemolyticus* is one of the leading causes of bacterial gastroenteritis in many countries. The United States Centers for Disease Control and Prevention (CDC) reported that while infections due to *Shigella*, *Listeria*, *Escherichia coli* O157:H7 and *Salmonella* had decreased dramatically for 2005, infections due to *Vibrio* had increased (Chang *et al.*, 2010). For a long time, *V. parahaemolyticus* has been known to be ubiquitously present in brackish and marine waters, and infection to human is frequently associated with the consumption of contaminated seafood or raw or undercooked shellfish (Guoxiang *et al.*, 2009; Lynch *et al.*, 2005). However, recent foodborne outbreaks throughout the world have been intensively linked to consumption of fresh fruits, vegetables and unpasteurized juices (Gorny, 2006). In Malaysia, an outbreak in Kedah in 2003 was reported to be caused by *V. parahaemolyticus* linked to 'kerabu tauge', a local dish mixed with vegetables (Mohamad *et al.*, 2006). Cross-contamination of raw fruits and vegetables with seafood represents a

potential mode of transmission of *V. parahaemolyticus* to humans (WHO/FSF/FSO, 1998). In our previous study (Tunung *et al.*, 2010), there was a prevalence of *V. parahaemolyticus* in raw vegetables and other environmental samples.

It has been known that antibiotic therapy can reduce the duration and severity of symptoms of *Vibrio* infections in severe cases; however bacterial resistance to antibiotics has become an emerging medical issue threatening the public health due to the wide availability of antibiotics and sometimes misuse of drugs without proper prescription (Adeleye *et al.*, 2008). Previous studies have shown that streptomycin, rifampicin, kanamycin, tetracycline and polymixin B were active against *Vibrio* spp. but a study by Ottaviani *et al.* (2001) showed that *V. parahaemolyticus* were resistant to penicillin, carbenicillin, ampicillin, cephalotin, kanamycin and rifampicin (Zulkifli *et al.*, 2009). Zulkifli *et al.* (2009) also reported the resistance of *V. parahaemolyticus* towards tetracycline. The growing problems with antimicrobial drug resistance are beginning to erode our antibiotic armamentarium to combat antibiotic resistance and thus limiting

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