CHAPTER I

INTRODUCTION

Vibrio parahaemolyticus is a gram-negative marine bacteria which cause gastroenteritis in human through consumption of contaminated seafood (Vuddhakul et al., 2000). It was first identified in 1950 by Fugino et al. as a cause of a gastroenteritis outbreak in Japan with the number of 272 infected persons and 20 total deaths (Daniel et al., 2000). Since then it becomes a significant bacteria causing outbreak of gastroenteritis across the globe (Chowdhury et al., 2000). Further to causing gastroenteritis via seafood consumption, the infection is also acquired by direct invasion through wound. Although the extra-intestinal infection is not favored by this organism, it could occasionally occur as showed in few case reports of wound infections (Johnson et al., 1984 and Ahsan et al., 1988).

The majority of gastrointestinal infections due to *Vibrio parahaemolyticus* do not require antibiotic treatments and are self-limiting, however, in prolonged or severe cases, antimicrobial therapy may be included. Fluoroquinolone, the newer quinolone generation, have been chosen as the one of the current drugs of choice for patients infected with *Vibrio parahaemolyticus* because of its high potency against most gram-negative aerobic organism including bacterial pathogens of gastrointestinal tract such

as *E. coli*, *Salmonella spp.*, *Shigella spp.*, *Yersinia enterocolitica*, *Campylobacter jejuni* and *Vibrio spp.*(Wolfson and Hooper, 1985). Though it has just been released in the mid-1980s, fluoroquinolone has been extensively used for treatment of broad range of clinical infections in human, such as respiratory tract, gastrointestinal tract and genitourinary tract, due to broader activities and less side effects comparing to the parent drug, nalidixic acid (WHO/EMC/ZDI/98.10).

Currently, several quinolones including fluoroquinolones (e.g., ciprofloxacin and norfloxacin), are available for treatment of food animal diseases in many countries and in some regions they are also used for the disease prevention and growth promotion (WHO/EMC/ZDI/98.10). With this overlapping usage, the question about the resistant mutant in animal and human has raised for fluoroquinolone. Since bacteria resistant to the original class of quinolone (e.g., nalidixic acid, oxolinic acid) may have reduced susceptibility or resistance to fluoroquinolone and bacteria resistant to one fluoroquinolone are generally cross-resistant to other fluoroquinolones (WHO/EMC/ZDI/98.10).

Recently, Okuda and his colleague (1999) had demonstrated two point mutations in *gyrA* QRDR at codon 83 and *parC* QRDR at codon 85 in his laboratory ciprofloxacin resistant *Vibrio parahaemolyticus* mutants. For more understanding in a fluoroquinolone resistance pattern and genetic information of *Vibrio parahaemolyticus*, the isolates from environment, and clinical specimens which have MIC $\geq$ 1 μg/ml have been investigated for the mutations in *gyrA* and *parC* genes. The study has focused in QRDR (Quinolone-Resistant-Determining-Region) of *gyrA* and *parC* gene –The

genes encoded DNA gyrase and topoisomerase IV which are considered to be targets for quinolone resistance - as described in the previous study of laboratory induced *Vibrio parahaemolyticus* in ciprofloxacin resistant strains by Okuda et al. (1999).