

## **Virulence-associated genes and antibiotic resistance patterns of *Vibrio* spp. isolated from cultured marine fishes in Malaysia**

### **ABSTRACT**

Background: Vibriosis is an important bacterial disease of cultured marine fishes worldwide. However, information on the virulence and antibiotic resistance of *Vibrio* spp. isolated from fish are scarce. This study investigates the distribution of virulence associated genes and antibiotic resistance patterns of *Vibrio* spp. isolated from cage-cultured marine fishes in Malaysia. Results: A total of 63 *Vibrio* spp. isolated from 62 cultured marine fishes in various geographical regions in Peninsular Malaysia were analysed. Forty-two of the isolates (66.7%) were positive for all *chiA*, *luxR* and *vhpA*, the virulence genes produced by pathogenic *V. harveyi*. A total of 62 *Vibrio* isolates (98%) had *tlh* gene of *V. parahaemolyticus*, while *flaC* gene of *V. anguillarum* was detected in 43 of isolates (68%). Other virulence genes, including *tdh*, *trh*, *hlyA* and *toxRvc* were absent from any of the isolates. Multiple antibiotic resistance (MAR) was exhibited in all strains of Harveyi clade, particularly against ampicillin, penicillin, polypeptides, cepheims and streptomycin. The MAR index ranged between 0.06 and 0.56, and 75% of the isolates have MAR index of higher than 0.20. Host species and geographical origin showed no correlation with the presence of virulence genes and the antibiotic resistance patterns of *Vibrio* spp. Conclusions: The study indicates that majority of *Vibrio* spp. isolated from cultured marine fishes possess virulence genes, but were not associated with human pathogen. However, the antibiotics resistance is a real concern and warrants ongoing surveillance. These findings represent an updated knowledge on the risk of *Vibrio* spp. to human health, and also provides valuable insight on alternative approaches to combat vibriosis in cultured fish.

**Keyword:** *Vibrio*; Cultured fish; Virulence genes; Multiple antibiotics resistance