

Prevalence of multi-antibiotics resistant (MAR) *Vibrio parahaemolyticus* in shrimp farms in Sarawak, Malaysia

ABSTRACT

The shrimp farming industry is constantly under threat due to outbreaks of infectious diseases and environmental problems. *Vibrio parahaemolyticus* is an important foodborne pathogen causing significant economic losses within the shrimp aquaculture industry worldwide. This research aimed to determine the prevalence of *V. parahaemolyticus* from different shrimp farms from the stocking to harvesting period and assess the antibiotic susceptibility of *V. parahaemolyticus* using the antimicrobial susceptibility test (AST). In this study, a total of 288 samples comprising twenty-four from each sample consisting of shrimp, water, effluent, and sediment samples were collected aseptically from three ($n = 3$) shrimp farms located at Telaga Air Farm 1 (Pond 6), Telaga Air Farm 2 (Pond 9) and Santubong Farm (Pond 7), Kuching, Sarawak. A molecular approach by polymerase chain reaction was used to confirm the presence of regulator gene, *toxR*, *V. parahaemolyticus*. A total of 14 antibiotics, including spectinomycin (SH100), imipenem (IPM10), amoxicillin/ clavulanic acid (AMC30), enrofloxacin (ENR5), bacitracin (B10), meropenem (MEM10), cephalothin (KF30), penicillin G (P10), tetracycline (TE30), kanamycin (K30), streptomycin(S25), rifampicin (RD2), erythromycin (E15), and nalidixic acid (NA30) were used. The results obtained showed that 51/288 (17.71%) of the collected samples with regulator gene, *toxR* *V. parahaemolyticus*. As a whole, this includes 31.25% (30/288) from sediment samples, 4.17% (4/288) from shrimp samples, 15.63% (15/288) from water samples, and 2.08% (2/288) from effluent water samples. A total of 54.9% (28/51) of *V. parahaemolyticus* acquired multiple antibiotic resistance (MAR). The resistance of antibiotics was profiled, and the multiple antibiotic resistance (MAR) indexes and classified into ten patterns. The MAR index of *V. parahaemolyticus* isolates ranged from 0.11 to 0.36. *Vibrio parahaemolyticus* isolates showed 31.38% with a MAR index > 0.2 , indicating that these isolates might be originated from high-risk sources. The data obtained from this study is helpful to monitor the presence of *V. parahaemolyticus* in the aquaculture farm management system to mitigate the hazard potentially arising from the environmental factor that causes shrimp diseases and shrimp infection.