

## **Comparison of four antibiotics with indigenous marine *Bacillus* spp. in controlling pathogenic bacteria from shrimp and *Artemia***

### **ABSTRACT**

Use of antibiotics for the control of bacterial diseases in shrimp culture has caused several adverse impacts to the industry. This has resulted in the search for alternative environment friendly approaches to overcome bacterial infections. This study was conducted to investigate the use of beneficial bacteria as an alternative to antibiotics. Ten pathogenic bacterial species isolated from shrimp, *Penaeus monodon*, and *Artemia* cysts were tested for susceptibility to indigenous marine *Bacillus subtilis* AB65, *Bacillus pumilus* AB58, *Bacillus licheniformis* AB69 and compared with oxytetracycline, chloramphenicol, gentamicin and bacitracin, which are common antibiotics used in Asian aquaculture. The *Bacillus* spp. were isolated from the local marine environment for bioremediation use in shrimp hatcheries and were proven to reduce total ammonium nitrogen. The pathogenic bacterial isolates were 90% susceptible to *B. subtilis* AB65, 70% susceptible to *B. pumilus* AB58 and *B. licheniformis* AB69 and 100% susceptible to oxytetracycline, chloramphenicol and gentamicin but only 40% to bacitracin. Two representative isolates of the vibrio group, *Vibrio alginolyticus* VaM11 and *Vibrio parahaemolyticus* VpM1, when tested for competitive exclusion by a common broth method using the marine *Bacillus* spp., showed decreased viable counts from 10<sup>8</sup> to 10<sup>2</sup> cfu mL<sup>-1</sup>. The results suggest that the action of the marine bacteria appears to be significant in protecting the host shrimp against pathogenic bacteria. In addition to the alternative use of antibiotics, the selected marine bacteria had additional bioremediation properties of reducing ammonia.

**Keyword:** alternative to antibiotics, *Artemia*, *Bacillus*, inhibition test, marine bacteria, shrimp.