
Supplementation of marine probiotics in the water on *Litopenaeus vannamei* and its positive impact on survival rate and microbiota after an AHPND stress

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Abstract

The aquaculture industry is continuously interested in innovative practices with the aim of improving farm practices while ensuring sustainable development. This is reflected in a global demand for quality shrimp and a minimal impact on the environment. One of the key strategic priorities is to improve resistance to pathogenic bacteria causing outbreaks and economic losses. A 7-week water supplementation with or without probiotics was performed on *Litopenaeus vannamei* PL12 before and during a 15-day challenge test with *Vibrio parahaemolyticus* causing AHPND. The capacity of the marine bacteria consortium on shrimp survival rate was evaluated and was multiplied by 2.7 at the end of the challenge compared to the control. A metabarcoding analysis was done on dead and alive shrimps to understand what was happening at the microbiota level to explain this survival gain. The results showed that marine probiotics, added to the water, have a positive impact on the shrimp larvae gut. The microbiota was marked by the presence of the *Pseudoruegeria* genus, known to be a defense mechanism against pathogens. This genus coupled with marine probiotics allowed shrimp larvae to have the therapeutic arsenal to fight the pathogen, explaining the better survival rate. The results show the ability of our marine probiotics to influence the shrimp gut microbiota. Another characteristic of marine probiotics, previously demonstrated, is the lipopeptides' synthesis which presented an antibiofilm activity against a *Vibrio* specie. These studies demonstrated the ability of our marine probiotics to help shrimp larvae fight against stress caused by *V. parahaemolyticus*.

Keywords: shrimp, marine probiotics, Bacillus, metabarcoding

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