

## ABSTRACT

### **IMMUNE RESPONSE OF WHITE SHRIMP *Litopenaeus vannamei* (Boone, 1931) IN A BIOFLOC SYSTEM COMBINED WITH PROBIOTICS *Bacillus* sp. D2.2 AGAINST BACTERIAL INFECTION *Vibrio harveyi***

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White shrimp (*Litopenaeus vannamei*) diseases can be caused by bacteria, viruses, or co-infection. One of the bacterial infectious diseases is Vibriosis caused by *Vibrio harveyi*. The disease has an impact on the decline in aquaculture production and high economic losses. The controlling efforts that can be taken are to improve the immune system in shrimp through the application of probiotics and biofloc systems. This research aimed to study the treatment effect and analyze the best treatment between probiotics, biofloc system, and a combination of both to improve the immune response of white shrimp to *V. harveyi* infection. Shrimp test used has an average weight of  $\pm 12$  g with a density of 10 fish/tank and there were five treatments namely control +, control -, probiotic feed, biofloc system, and a combination of feed probiotics and biofloc system. The parameters observed included Total Haemocyte Count (THC), phagocytocyte activity, phagocytic index, Differential Haemocyte Count (DHC), Total Vibrio Count (TVC) and total *Bacillus* sp. D2.2, clinical symptoms, survival rate, relative percent survival, and water quality. The results of research indicate probiotics *Bacillus* sp. D2.2 on feed and biofloc system affect the immune response of white shrimp, which can increase THC, AF, IF, Total *Bacillus* sp. D2.2, SR, RPS, and minimize clinical symptoms of *V. harveyi* infection with the highest increase in the combination treatment of feed probiotics and biofloc system.

**Keywords:** *Penaeid, Immunostimulant, THC, Biocontrol, Vibriosis.*

## ABSTRAK

### **RESPON IMUN UDANG VANAME *Litopenaeus vannamei* (Boone, 1931) DALAM SISTEM BIOFLOK YANG DIKOMBINASI DENGAN PROBIOTIK *Bacillus* sp. D2.2 TERHADAP INFEKSI BAKTERI *Vibrio harveyi***

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Penyakit pada udang vaname (*Litopenaeus vannamei*) dapat disebabkan oleh bakteri, virus, ataupun koinfeksi. Salah satu penyakit infeksi bakteri adalah Vibriosis yang disebabkan oleh *Vibrio harveyi*. Penyakit tersebut telah berdampak terhadap penurunan produksi budidaya dan kerugian ekonomi yang cukup tinggi. Upaya pengendalian yang dilakukan adalah meningkatkan sistem imun pada udang melalui aplikasi probiotik dan penerapan sistem bioflok. Penelitian ini bertujuan untuk mempelajari pengaruh pemberian perlakuan dan menganalisis perlakuan terbaik antara probiotik, bioflok, dan kombinasi keduanya untuk meningkatkan respon imun udang vaname terhadap infeksi *V. harveyi*. Udang uji yang digunakan mempunyai bobot rata-rata  $\pm 12$  g dengan kepadatan 10 ekor/bak dan terdapat lima perlakuan yaitu kontrol +, kontrol -, probiotik pakan, bioflok, dan kombinasi probiotik pakan dan bioflok. Parameter yang diamati meliputi *Total Haemocyte Count* (THC), aktivitas fagositosis, indeks fagositosis, *Differensial Haemocyte Count* (DHC), *Total Vibrio Count* (TVC) dan total *Bacillus* sp. D2.2, gejala klinis, *Survival Rate* (SR), *Relatif Percent Survival* (RPS), dan kualitas air. Hasil penelitian menunjukkan pemberian probiotik *Bacillus* sp. D2.2 pada pakan dan bioflok berpengaruh terhadap respon imun udang vaname yaitu dapat meningkatkan THC, AF, IF, Total *Bacillus* sp. D2.2, SR, RPS, dan memperkecil gejala klinis infeksi *V. harveyi* dengan peningkatan tertinggi pada perlakuan kombinasi probiotik pakan dan bioflok.

**Kata kunci :** *Penaeid, Imunostimulan, THC, Biokontrol, Vibriosis.*