

Intisari

ISOLASI DAN KARAKTERISASI *Vibrio parahaemolyticus* DAN BAKTERIOFAG DARI TAMBAK BUDIDAYA UDANG VANAME (*Penaeus vannamei* Boone, 1931) DI KABUPATEN KULON PROGO

Infeksi *Vibrio* sp. memicu mortalitas tinggi pada budidaya udang vaname (*Penaeus vannamei*) dan efektivitas pengendaliannya kian terbatas akibat fenomena *Multiple Antibiotic Resistance* (MAR). Penelitian ini bertujuan untuk mengisolasi dan karakterisasi *Vibrio parahaemolyticus* dan bakteriofag pengendali *V. parahaemolyticus* dari tambak udang vaname (*Penaeus vannamei*). Penelitian tahap satu dilakukan melalui pengambilan sampel udang sakit bergejala AHPND, dilanjutkan dengan isolasi dan identifikasi bakteri secara fenotipik dan molekuler. Penelitian tahap dua dilakukan dengan pengambilan sampel air payau dan sedimen dengan teknik *purposive sampling*, dilanjutkan dengan isolasi dan pemurnian bakteriofag melalui metode *plaque assay*. Karakterisasi bakteriofag dilakukan melalui pengamatan morfologi dengan *transmission electron microscope* (TEM), analisis kurva pertumbuhan satu langkah (*one-step growth curve*) dan uji kisaran inang (*host range*). Penelitian ini berhasil mengisolasi *Vibrio parahaemolyticus* yang mengandung gen *pirA* dan *pirB* dan mengisolasi bakteriofag CTPL 3.2 yang membentuk *clear plaque* sebagai indikasi aktivitas litik. Berdasarkan pengamatan morfologi, fag CTPL 3.2 memiliki kepala ikosahedral, ekor pendek dan kontraktil sehingga diklasifikasikan ke dalam Famili *Myoviridae*. Analisis *One-step growth* menunjukkan waktu latensi (*latency period*) selama 60 menit dan estimasi jumlah anakan (*burst size*) sebesar 5 partikel/sel inang. Uji kisaran inang (*host range*) mengkonfirmasi bahwa *Vibriophage* CTPL 3.2 mampu menginfeksi strain *Vibrio parahaemolyticus* I2 dan VB4, namun tidak mampu menginfeksi *V. alginolyticus* KL1HS4, *V. harveyi* SB25 dan *Photobacterium damsela* GD05. Penelitian ini menyimpulkan bahwa *Vibrio parahaemolyticus* dan bakteriofag untuk pengendaliannya dapat diisolasi dari tambak udang vaname dan potensial untuk dimanfaatkan dalam manajemen kesehatan udang.

Kata kunci: AHPND, bakteriofag, *Vibrio parahaemolyticus*, *Penaeus vannamei*

Abstract

ISOLATION AND CHARACTERIZATION OF *Vibrio parahaemolyticus* AND BACTERIOPHAGES FROM VANAME SHRIMP (*Penaeus vannamei* Boone, 1931) PONDS IN KULON PROGO REGENCY

Vibrio sp. infections cause high mortality in vannamei shrimp (*Penaeus vannamei*) aquaculture and the effectiveness of control measures is increasingly limited due to the phenomenon of *Multiple Antibiotic Resistance* (MAR). This study aimed to isolate and characterize *Vibrio parahaemolyticus* and the bacteriophage from vannamei shrimp (*Penaeus vannamei*). The first phase of the study involved sampling diseased shrimp with AHPND symptoms, followed by isolation, phenotypic and molecular identification of bacteria. The second phase involved collecting brackish water and sediment samples using *purposive sampling*, followed by isolation and purification of bacteriophages using plaque assay. Phage characterization was performed through morphological observation using a *transmission electron microscope* (TEM), analysis of the one-step growth curve, and host range testing. This study successfully isolated *Vibrio parahaemolyticus* containing the *pyrA* and *pyrB* genes and isolated the bacteriophage CTPL 3.2, which formed clear plaques. Based on morphological observations, phage CTPL 3.2 has an icosahedral head, a short tail, and a contractile tail, thus classifying it into the *Myoviridae* family. *One-step growth curve* analysis showed an average latency period of 60 minutes and an average burst size of 5 particles/host cell. *Host range* testing confirmed that *Vibriophage* CTPL 3.2 is capable of infecting *Vibrio parahaemolyticus* strains I2 and VB4, but is unable to infect *V. alginolyticus* KL1HS4, *V. harveyi* SB25, and *Photobacterium damsela* GD05. This study concludes that *Vibrio parahaemolyticus* and bacteriophages can be isolated from vannamei shrimp (*Penaeus vannamei*) ponds and have potential for use in shrimp health management.

Keywords: AHPND, bacteriophage, *Vibrio parahaemolyticus*, *Penaeus vannamei*