

**BAKTERI PROBIOTIK DALAM BUDIDAYA UDANG:  
SELEKSI, MEKANISME AKSI, KARAKTERISASI, DAN APLIKASINYA SEBAGAI  
AGEN BIOKONTROL**

Widanarni<sup>1)\*</sup>, Sukenda, Mia Setiawati

**ABSTRACT**

**PROBIOTIC BACTERIA IN SHRIMP CULTURES: ITS SELECTION, MECHANISM OF  
ACTION, CHARACTERIZATION, AND APPLICATION AS A BIOCONTROL AGENT**

Bacterial disease attack occurs at the hatchery stage, which is considered to be the most serious threat, and often results in mass mortality of shrimp larvae by vibriosis which is that caused by a luminous bacterium identified as *Vibrio harveyi*. This research was carried out to obtain local isolates of probiotic bacteria that were able to inhibit the growth of *V. harveyi* and effectively apply it as a biocontrol of vibriosis in shrimp cultures. The research was carried out as follows: (1) *In vitro* and *in vivo* selection of probiotic bacteria candidates, (2) Study of the action mechanism and characterization of the selected probiotic bacteria, (3) Study on application of the selected probiotic bacteria as a biocontrol agent in shrimp cultures. Results of *in vitro* and *in vivo* selection provided the best three isolates, which were 1Ub, SKT-b and Ua. The survival rate of shrimp larvae which were not only inoculated by *V. harveyi* but also with 1Ub, SKT-b and Ua probiotic bacteria were 88.33, 83.33, and 81.67% respectively; whereas the positive control treatment (merely inoculated with *V. harveyi*) gave a 41.67% survival rate and the negative control (without bacterial addition) was 68.33%. Studies using a rifampicin resistant marker (Rf<sup>R</sup>) demonstrated that the number of *V. harveyi* MR5339 Rf<sup>R</sup> cells in treatments without probiotic addition were higher than the treatment with the probiotic bacteria, in dead larvae, living larvae, as well as in the culture media. Partial sequencing of the 16S-rRNA gene showed that the 1Ub isolate was similar to *Pseudoalteromonas piscicida*, whereas the SKT-b and Ua isolates were similar to *Vibrio alginolyticus*. Selected probiotic bacteria could be applied directly to shrimp larva culture media, or orally through enrichment of both natural and artificial food.

**Keywords:** *Penaeus monodon* larvae, probiotic bacteria, vibriosis

**ABSTRAK**

Penyakit yang disebabkan bakteri yang paling serius dan sering menyebabkan terjadinya kematian massal pada larva udang windu di tingkat pembenihan adalah penyakit vibriosis; terjadi akibat serangan bakteri berpendar yang diidentifikasi sebagai *Vibrio harveyi*. Penelitian ini bertujuan untuk mendapatkan isolat lokal bakteri probiotik yang potensial mampu menghambat pertumbuhan *V. harveyi* serta efektif diaplikasikan dalam penanggulangan penyakit vibriosis. Tahapan penelitian mencakup: (1) Studi tentang seleksi *in vitro* dan *in vivo* bakteri kandidat probiotik, (2) Studi tentang mekanisme aksi dan karakterisasi bakteri probiotik terpilih, (3) Studi tentang aplikasi bakteri probiotik terpilih sebagai agen biokontrol pada budidaya udang. Hasil seleksi *in vitro* dan *in vivo* diperoleh tiga isolat terbaik yaitu 1Ub, SKT-b, dan Ua. Kelangsungan hidup larva udang yang selain diinokulasi *V. harveyi* juga diberi bakteri probiotik 1Ub, SKT-b dan Ua berturut-turut adalah 88.33, 83.33, dan 81.67%, sedangkan perlakuan kontrol positif (hanya diinokulasi *V. harveyi* saja) sebesar 41.67% dan kontrol negatif (tanpa penambahan bakteri) sebesar 68.33%. Hasil studi menggunakan penanda *rifampisin resisten* (Rf<sup>R</sup>) menunjukkan bahwa jumlah sel *V. harveyi* MR5339 Rf<sup>R</sup> pada perlakuan tanpa penambahan probiotik lebih tinggi dibanding pada perlakuan dengan penambahan probiotik, baik pada larva mati, larva hidup, maupun air media pemeliharaan. Hasil analisis sekuen sebagian gen 16-rRNA menunjukkan bahwa isolat 1Ub memiliki kemiripan dengan *Pseudoalteromonas piscicida*, sedangkan isolat SKT-b dan Ua memiliki kemiripan dengan *Vibrio alginolyticus*. Bakteri probiotik terpilih dapat diaplikasikan langsung pada media pemeliharaan larva udang atau melalui pengayaan pakan baik pakan alami maupun pakan buatan.

**Kata kunci:** bakteri probiotik, larva *Venaeus monodon*, vibriosis

<sup>1)</sup> Departemen Budidaya Perairan, Fakultas Perikanan dan Ilmu Kelautan IPB. Jl. Agatis, Kampus IPB Darmaga, Bogor 16680  
\* Penulis Korespondensi: (+62251) 6319729