

PATHOGENICITY OF *Vibrio harveyi* AND  
EFFECTS OF *Lactobacillus plantarum*  
AND ANTIBIOTICS ON LARVAL  
SURVIVAL OF *Portunus pelagicus*  
(LINNAEUS, 1758)

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UNIVERSITI MALAYSIA TERENGGANU

2016



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**Thesis Submitted in Fulfilment of the Requirement for the  
Degree of Master of Science in the  
Institute of Tropical Aquaculture  
Universiti Malaysia Terengganu**

**April 2016**



## DEDICATION

I would like to dedicate this thesis to my Supervisor – for always had the warmest feelings and supportive throughout my rough years finishing this research and my late mother who had raised and teach me the value of things.

[Juariah Muhamad]

Abstract of thesis presented to the Senate of Universiti Malaysia Terengganu in fulfilment of the requirement for the degree of Master of Science.

**PATHOGENECITY OF *Vibrio harveyi* AND EFFECTS OF *Lactobacillus plantarum* AND ANTIBIOTICS ON LARVAL SURVIVAL OF *Portunus pelagicus* (LINNAEUS, 1758)**

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April 2016

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Blue swimming crab, *Portunus pelagicus* (Linnaeus, 1758) is becoming a commercially important species, where the Portunid crab fishery and culture operations are expected to continue to grow in the future. Previous studies showed that larval mortality was caused by bacterial origin and insertion of antibiotic and probiotic widely applied to the shellfish larvae culture media in order to control microbial intrusion into the entire hatchery system. The present study was conducted to determine the pathogenicity of *Vibrio harveyi* towards larval survival of *P. pelagicus*. Majority of the isolation made from previous research were from pathogenic bacteria; *Vibrio* spp.

From previous studies, potential probiotic candidate from Lactic Acid Bacteria (LAB), *Lactobacillus plantarum* was inoculated and proceeded with treatment experiment. Six treatments with triplicates using designated concentration of antibiotic – oxytetracycline (T1-T3) and LAB probiotic (*L. plantarum*) (T4-T6); (T4 –  $1.0 \times 10^5$  cfu mL<sup>-1</sup>, T5 –  $5.0 \times 10^5$  cfu mL<sup>-1</sup>, T6 –  $1.0 \times 10^6$  cfu mL<sup>-1</sup>) respectively through insertion in culture water were done to determine the mean survival rate of larvae stage zoea 1 (Z1) until it reaches zoea 4 (Z4). There were significant difference were found in mean survival rate (%) of *P. pelagicus* larvae with treatments of antibiotic and *L. plantarum* compared to the control ( $P < 0.05$ ), where with higher concentrations of dosage, it will yield higher percentage of survival rate of Z4 larvae. There is no significant difference observed in mean survival rate (%) of larvae when compared between treatment of antibiotic and *L. plantarum*. More single strains and mixed strains of potential probiotics should be applied into larviculture, and increased in dosage used to gain better survival rate of larvae.

Abstrak tesis yang dikemukakan kepada Senat Universiti Malaysia Terengganu sebagai keperluan untuk ijazah Master Sains.

**KEPATOGENAN *Vibrio harveyi* DAN KESAN *Lactobacillus plantarum* DAN ANTIBIOTIK KE ATAS KEMANDIRIAN LARVA *Portunus pelagicus* (LINNAEUS, 1758)**

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Ketam renjong, *Portunus pelagicus* (Linnaeus, 1758) telah menjadi salah satu spesies ketam yang mempunyai nilai komersial yang tinggi, dan dijangkakan permintaan dari sektor penangkapan dan pembenihan ketam renjong akan meningkat. Kajian-kajian menunjukkan bahawa kadar kematian benih kebanyakannya berpunca daripada bakteria, dan penggunaan antibiotik dan probiotik ke dalam air sistem larvikultur krustasia telah dijalankan secara meluas bagi mengawal kemasukan bakteria ke dalam sistem. Kajian ini bertujuan untuk mengkaji kepatogenan *Vibrio harveyi* terhadap larva *P. pelagicus*. Kebanyakan bakteria yang telah dipencilkan dalam kajian sebelum ini terdiri daripada kumpulan bakteria berbahaya;

*Vibrio* spp. Pada kajian terdahulu, bakteria yang berpotensi sebagai probiotik telah dipencilkan daripada kumpulan Bakteria Asid Laktik (LAB), *Lactobacillus plantarum* dan digunakan ke dalam proses larvikultur. Enam rawatan dengan tiga replikasi telah dijalankan, antibiotik – oxytetracycline (T1-T3) *L. plantarum* (T4-T6), menggunakan dos kepekatan yang telah ditetapkan; (T4 -  $1.0 \times 10^5$  cfu mL<sup>-1</sup>, T5 –  $5.0 \times 10^5$  cfu mL<sup>-1</sup>, T6 -  $1.0 \times 10^6$  cfu mL<sup>-1</sup>) ke dalam sistem air larvikultur untuk mengenalpasti kadar peratus kemandirian larva ketam renjong daripada peringkat Z1 ke Z4. Terdapat perbezaan yang ketara apabila membandingkan kadar kemandirian larva bagi eksperimen kawalan dengan eksperimen yang telah dirawat dengan antibiotik dan *L. plantarum*, di mana dengan kepekatan dos yang semakin tinggi, kadar peratus kemandirian larva hidup semakin meningkat. Bagaimanapun, tiada perbezaan ketara yang dapat diperhatikan terhadap peratus kemandirian larva apabila membuat perbandingan di antara rawatan antibiotik dan *L. plantarum*. Kesimpulannya, bakteria LAB mempunyai potensi sebagai probiotik tetapi penggunaan spesies tunggal atau spesies bercampur akan lebih mendatangkan hasil yang baik, serta peningkatan dos kepekatan bagi meningkatkan kadar kemandirian larva.