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Bacteriological study in association with antibiotic resistance and heavy metal of bacteria isolated from macrobrachium rosenbergii larvae waste / Noor Ain Abd. Hamid.

PERPUSTAKAAN SULTANAH NUR ZAHIRAH
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PERPUSTAKAAN SULTANAH NUR ZAHIRAH UMT

BACTERIOLOGICAL STUDY IN ASSOCIATION WITH ANTIBIOTIC
RESISTANCE AND HEAVY METAL OF BACTERIA ISOLATED
FROM *Macrobrachium rosenbergii* LARVAE WASTE

By
Noor Ain binti Abd Hamid

Research Report submitted in partial fulfillment of the requirements for the
degree of Bachelor of Agrotechnology Science (Aquaculture)

Department of Fisheries Science and Aquaculture
FACULTY OF AGROTECHNOLOGY AND FOOD SCIENCE
UNIVERSITI MALAYSIA TERENGGANU
2009

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**FAKULTI AGROTEKNOLOGI DAN SAINS MAKANAN
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Adalah ini diakui dan disahkan bahawa laporan ilmiah bertajuk:

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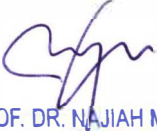
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DECLARATION

I hereby declare that the work in this thesis is my own except for quotations and summaries which have been duly acknowledge.

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Date : 29 MEI 2009

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ABSTRACT

A study was undertaken to investigate the presence of bacteria in *Macrobrachium rosenbergii* larvae waste at marine hatchery of University Malaysia Terengganu as well as to determine the correlation of antibiotic and heavy metal resistance patterns. Total plate count (TPC) were ranged from $87 \times 10^2 \text{ g}^{-1}$ to $7.07 \times 10^2 \text{ g}^{-1}$. The isolates were comprised *Aeromonas spp*, *Pseudomonas spp*, *Salmonella sp.*, *E.coli*, *Klebsiella sp.*, and *Vibrio spp*. which identified based on morphological typing by using selective agar such as Eosin Methylene-blue Lactose Sucrose Agar (EMB), Xylose Lysine Deoxycholate Agar (XLD), MacCONKEY agar, Thiosulphate Citrate Bile Sucrose Agar (TCBS) and Pseudomonas Aeromonas Selective Agar Base (GSP). The non selective agar was Trypticase Soy Agar (TSA) (Oxoid, England). Antibiotic susceptibility were conducted by using 15 different antibiotics that were commonly used in hatcheries. Results showed that Sulphamethioxazole (CT 25) was 82.5% sensitive to all isolates. Heavy metal test were conducted by using five different heavy metals with five different concentrations. Results showed that Hg and Cr were the best tolerated metals. The percentage of bacterial isolates resistance to heavy metal was 100%. This study was initiated as a preliminary attempt to establish the normal bacterial counts and aerobic, heterotrophic microflora found in larvae waste of freshwater prawn hatcheries in Malaysia and thus the antibiotic and heavy metal that resistant to the bacteria. This information will help in the future assessment of significance of isolates from diseased larvae in epizootic bacterial diseases. It is important to understand the bacteria associated with hatchery systems because the host-microbe interactions have far reaching implication on larval health, development and outbreaks of disease.

ABSTRAK

Kajian telah dilakukan untuk mengkaji kehadiran bakteria dalam bahan buangan larva udang galah di Hatchery Air Masin, Universiti Malaysia Terengganu untuk menentukan hubungan antara corak resistant antibiotik dan heavy metal. Julat total plate count (TPC) adalah dari $87 \times 10^2 \text{ g}^{-1}$ to $7.07 \times 10^2 \text{ g}^{-1}$. Pencilan yang dilakukan terdiri daripada bakteria *Aeromonas spp*, *Pseudomonas spp*, *Salmonella sp.*, *E.coli*, *Klebsiella sp.*, dan *Vibrio spp*. dimana dikenalpasti berdasarkan morfologi koloni dengan menggunakan media selektif seperti agar EMB, agar XLD, agar MacCONKEY, agar TCBS, dan agar GSP. Manakala, media umum ialah Trypticase Soy Agar (TSA). Ujian antibiotik di lakukan menggunakan 15 jenis antibiotik yang biasa digunakan di hatchery. Keputusan menunjukkan antibiotik Sulphamethioxazole (CT 25) sensitive dengan semua pencilan bacteria dengan peratusan 82.5%. Ujian heavy metal di lakukan menggunakan 5 jenis heavy metal dengan 5 kepekatan yang berbeza. Keputusan menunjukkan Mercury dan Chromium merupakan bahan berat yang bertoleransi dengan baik. Peratusan pencilan bakteria yang resistant kepada heavy metal adalah 100%. Kajian ini merupakan pencetus kepada permulaan untuk membangunkan bilangan bacteria normal dan aerobik, mikroflora heterotrofik yang dijumpai di dalam hatcheri udang air tawar dan larva di Malaysia, dan ketahanan mereka terhadap pelbagai jenis antibiotik dan logam berat dan seterusnya hubungan di antara daya ketahanan antibiotik dan logam berat. Pengetahuan ini dapat membantu kepada penilaian masa hadapan terhadap kepentingan pemencilan epizootik bakteria daripada larva yang berpenyakit. Ini sangat penting untuk kita memahami bacteria yang berkaitan dengan sistem hatcheri kerana tindak balas perumah mikroob mempunyai kesan yang sangat besar ke atas kesihatan dan perkembangan larva.