ANTIBIOTIC AND HEAVY METAL RESISTANCE OF BACTERIA ISOLATED FROM MUD CRAB (*Scylla* sp.) CULTURED IN SETIU WETLAND, TERENGGANU

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BORANG PITA 8

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PENGAKUAN DAN PENGESAHAN LAPORAN PROJEK ILMIAH I DAN II

Adalah ini diakui dan disahkan bahawa laporan ilmiah bertajuk:

Antibiotic and Heavy Metal Resistance of Bacteria Isolated from Mud Crabs (*Scylla spp*) Cultured in Setiu Wetland, Terengganu

oleh Mariam Binti Marip, No.Matrik UK 16120 telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Perikanan dan Akuakultur sebagai memenuhi sebahagian daripada keperluan memperolehi Ijazah Sarjana Muda Sains Agroteknologi (Akuakultur), Fakulti Agroteknologi dan Sains Makanan, Universiti Malaysia Terengganu.

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DECLARATION

I hereby declare that the work in thesis is my own except for quototations and summaries which have been dully acknowledged

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ABSTRACT

Seventy six of bacteria strains were successfully isolated from mud crabs (*Scylla* spp.) from Setiu Wetland, Terengganu. Their sensitivity of the bacteria isolates towards the selected antibiotics and testing the bacteria resistant against heavy metals has been done and determined. Twenty one types of selected antibiotics discs at different concentrations were used to determine the susceptibility bacterial isolates. Among the isolated bacteria, *Aeromonas hydrophila, Hafnia alvei*, *Vibrio parahaemolyticus, Vibrio alginolyticus, Chromobacterium violaceum*, *Vibrio cholerae, Vibrio metschnikovii, Plesiomonas shigelloides*, *Burkholderia pseudomallei*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Morganella morganii*, *Acinetobacter baumannii*, *Yersinia enterocolitica*, *Proteus vulgaris*, *Shewanella putrefaciens* and *Enterobacter sakazakii* were isolated. Highly found were *Aeromonas hydrophila (*25 strains), *Hafnia alvei* (14 strains), *Vibrio parahaemolyticus* (14 strains) followed by other bacteria such as species. All successfully bacteria isolated also has been tested for their ability to tolerate heavy metal cadmium (II) chloride ($CdCl_2$), potassium (II) chromate ($K_2Cr_2O_7$) and cuprum sulfate ($CuSO_4$). A heavy metals resistance pattern Cd > Cu> K was observed in bacteria isolated in the study. In the antibiotic test, bacteria showed highly susceptibility to ampicilin, amoxycillin, colistin sulphate, oleandomycin and lincomycin. Few of bacteria isolated showed highly resistance to doxycycline, erythromycin, novobiocin, spiramycin, oxytetracycline, tetracycline, furazolidone, fosfomycin, nitrofuranton, florfenicol, flumequire and chloramphenicol and 100% bacteria isolated showed resistance to oxolinic acid, kanamycin, dan nalidixin acid.

ABSTRAK

Tujuh puluh enam strain bakteria telah berjaya dipencilkan daripada ketam nipah (*Scylla* spp.) dari Setiu wetland, Terengganu.. Bakteria sensitif melawan antibiotic terpilih dan ujian bakteria melawan logam berat telah dilakukan dan ditentukan. Dua puluh satu disk antibiotik terpilih pada kepakatan yang berbeza telah digunakan untuk menentukan kebolehterimaan bakteria yang telah dipencilkan. Berdasarkan bekteria yang telah dipencilkan, *Aeromonas hydrophila, Hafnia alvei*, *Vibrio parahaemolyticus, Vibrio alginolyticus, Chromobacterium violaceum, Vibrio cholerae, Vibrio metschnikovii, Plesiomonas shigelloides*, *Burkholderia pseudomallei*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Morganella morganii*, *Acinetobacter baumannii*, *Yersinia enterocolitica*, *Proteus vulgaris*, *Shewanella putrefaciens* dan *Enterobacter sakazakii* telah dipencilkan. Paling banyak dijumpai adalah *Aeromonas hydrophila* (25 stran), *Hafnia alvei* (14 stran), dan *Vibrio parahaemolyticus* (14 stran) berbanding bakteria lain. Semua bakteria yang telah berjaya dipencilkan telah diuji kebolehan bertolerasi terhadap logam berat kadmium (II) khlorida ($CdCl_2$), potasium (II) khromat ($K_2Cr_2O_7$) and kuprum sulfat ($CuSO_4$). Corak kerintangan terhadap logam adalah Cd > Cu> K telah diperhatikan dalam bakteria yang telah dipencilkan dalam kajian ini. Dalam ujian antibiotik, bakteria menunjukkan kebolehpenerimaan terhadap ampicilin, amoxycillin, colistin sulphate, oleandomycin and lincomycin. Beberapa bakteria yang dipencilkan menunjukan kerintangan yang tinggi terhadap doxycycline, erythromycin, novobiocin, spiramycin, oxytetracycline, tetracycline, furazolidone, fosfomycin, nitrofuranton, florfenicol, flumequire dan chloramphenicol. dan chloramphenicol dan 100% bakteria yang dipencilan menujukkan rintang terhadap oxolinic acid, kanamycin, dan nalidixin acid.