ACCUMULATION OF HEAVY METALS IN *Avicennia marina* AND *Bruguiera cylindrica* OF SETIU AND KUANTAN

By

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

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APPROVAL AND CERTIFICATION FORM
RESEARCH PROJECT I AND II

I certify that the research report entitled: Accumulation of heavy metals in *Avicennia marina* and *Bruguiera cylindrica* of Setiu and Kuantan by PATRICIA BLAIR AK GOH, Matric No. UK10080 have been read and all corrections recommended by the examiners have been done. This research report is submitted to the Department of Marine Science in partial fulfilment of the requirements for the degree of Bachelor of Science in Marine Science, Faculty of Maritime and Marine Science, Universiti Malaysia Terengganu.

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MY DEAREST FATHER, MOTHER,
FAMILY AND BELOVED ONE

'THANK YOU FOR YOUR ENCOURAGEMENT AND SUPPORT'

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ABSTRACT

Avicennia marina and *Bruguiera cylindrica* leaves, barks, roots and sediments samples were collected from Setiu and Kuantan mangrove forests which then analyzed for Cd, Cu, Pb and Zn. The roots of *B. cylindrica* showed the highest concentration of each metal (Cd = 0.143μg/g; Cu = 4.97 μg/g; Pb = 1.47 μg/g; Zn = 22.68 μg/g) in Setiu and *A. marina* roots (Cd = 0.079 μg/g; Cu = 4.93 μg/g; Pb = 2.31 μg/g; Zn = 23.42 μg/g) in Kuantan. Concentration factor results showed that *A. marina* had a higher degree of metals' storage compare to *B. cylindrica* of heavy metals which indicate that *A. marina* accumulates more metals. Heavy metals concentration in sediment of Kuantan mangroves is higher than Setiu. Respectively, the metals level in the mangrove plants was under the surrounding sediment's metal levels but above natural level of metal uptake by plants. The high level uptake of metals by both mangrove species indicates that there was metals contamination in the mangrove area. The success of *A. marina* and *B. cylindrica* in both Setiu and Kuantan mangrove forest most likely due to the plants' ability to actively avoid uptake of metals, even when sediment concentrations were high.

ABSTRAK

Sampel daun, kulit pokok, akar dan sedimen spesies *Avicennia marina* dan *Bruiguiera cylindrica* dikumpul dari hutan paya laut di Setiu dan Kuantan untuk dianalisis bagi menentukan kepekatan Cd, Cu, Pb dan Zn. Akar *B.cylindrica* menunjukkan kepekatan paling tinggi untuk setiap logam berat (Cd = 0.143μg/g; Cu = 4.97 μg/g; Pb = 1.47 μg/g; Zn = 22.68 μg/g) di Setiu dan akar *A.marina* (Cd = 0.079 μg/g; Cu = 4.93 μg/g; Pb = 2.31 μg/g; Zn = 23.42 μg/g) di Kuantan.Keputusan factor kepekatan (CF) menunjukkan darjah penyimpanan logam berat *A.marina* adalah lebih tinggi berbanding *B.cylindrica*. Ini bermakna *A.marina* boleh menyerap lebih banyak logam berat. Kepekatan logam berat dalam sediment di Kuantan lebih tinggi berbanding Setiu. Kandungan Cd,Cu, Pb dan Zn dalam kedua-dua spesies adalah lebih rendah berbanding dalam sediment tetapi lebih tinggi daripada pengambilan semulajadi logam berat oleh tumbuh-tumbuhan. Tahap pengambilan logam berat yang tinggi dalam kedua-dua spesies menunjukkan pencemaran logam berat telah berlaku di kawasan tersebut. Tahap kemandirian *A.marina* dan *B.cylindrica* yang tinggi di kawasan hutan paya laut Setiu dan Kuantan adalah disebabkan oleh keupayaannya untuk mengelakkan penyerapan logam berat walaupun sedimen di sekelilingnya mempunyai kandungan logam berat yang tinggi.