ACCUMULATION OF HEAVY METALS IN MANGROVE SPECIES OF SETIU AND KUANTAN MANGROVE FOREST

RINA SHARLINDA BT ZABRI

UNIVERSITI MALAYSIA TERENGGANU

Accumulation of heavy metals in mangrove species of Setiu and Kuantan mangrove forest / Rina Sharlinda Zabri.

ACCUMULATION OF HEAVY METALS IN MANGROVE SPECIES (*Rhizopora apiculata* AND *Sonneratia alba*) OF SETIU AND KUANTAN MANGROVE FOREST

By

RINA SHARLINDA BT ZABRI

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

FACULTY OF MARITIME AND MARINE SCIENCE
MALAYSIAN UNIVERSITY OF TERENGGANU
(UMT)

2007

This project should be cited as:

Rina, S.Z. 2007. Accumulation of heavy metals in mangrove plants (*Rhizopora apiculata* and *Sonneratia alba*) of Setiu and Kuantan mangrove forest. Undergraduate thesis, Bachelor of Science (Marine Science), Faculty of Maritime and Marine Science, Malaysian University of Terengganu, Terengganu.

DEDICATED TO:

MY BELOVED FATHER, MOTHER,
FAMILY AND DEAREST ONE

"THANK YOU FOR YOUR UNDYING SUPPORT AND ENCOURAGEMENT"

ACKNOWLEDGEMENTS

Alhamdulillah, my thanks and grateful to Allah, for giving me the will and patience to complete this thesis.

Firstly, my deepest and sincere gratitude to my supervisor, Prof. Madya Dr. Kamil bin Abdul Rashid and my former supervisor, Prof Madya Dr Kamaruzzaman bin Yunus. Without their guidance and supervision, I would not be able to complete my thesis and presentation. To Dr Antonina, thank you for your undying attention, sincere from my heart. Next, to Syalindran and Chuah, master students who were responsible in guiding me throughout the whole process of producing the thesis. Their time and knowledge were really much of a help and deeply appreciated. Not forgetting all the lab assistants who helped me during my sampling session.

My acknowledgement too goes out to my best friend, Nur Diyana bt Mohd Shaid and for her endless support during my bad times. Thank you too for my housemates and coursemates, for supplying me ideas and giving me support in crucial times.

Last but not least, to my beloved parents and family, their continuous attention and encouragement make me to strive in scoring this semester. Your unconditional love and support makes me want to ace it all. To Mohd Rozani bin Razali, your motivation makes me want to do my best in everything. Thank you.

ABSTRACT

The focus of this study is to determine the heavy metal (Cd,Cu,Mn,Pb and Zn) concentration levels in mangrove parts of *Sonneratia alba* and *Rhizopora apiculata* and its sediments from Setiu and Kuantan mangrove forest. Accumulations of the heavy metals were very much concentrated in the roots of both species. The concentration of the elements detected in roots showed the highest reading in both the study areas and species. It was also found that all heavy metals detected in the mangrove parts showed a positive correlation with the elements accumulation in the sediments. Factors affecting the accumulation of heavy metals in mangrove species vary according to the characteristics of the study area; they are pH, clays and oxides, oxidation and reduction, organic matter and uptake mechanisms. Through this research, *Sonneratia alba* and *Rhizopora apiculata* showed positive tolerance towards all the elements and the concentration rate varies according to the type of element. The value of concentration factor proved that *Rhizopora apiculata* can store or absorb more heavy metals than *Sonneratia alba*. Through the research, it is known that the mangrove parts can be a bioindicator in order to identify the heavy metals present in a certain area.

ABSTRAK

Fokus penyelidikan ini adalah untuk menentukan kepekatan logam berat (Cd, Cu, Mn,Pb dan Zn) dalam bahagian-bahagian pokok bakau dan sedimen spesis *Sonneratia alba* dan *Rhizopora apiculata* dari hutan bakau Setiu dan Kuantan. Kadar pengumpulan logam berat terbukti banyak terkumpul pada bahagian akar spesis kedua-dua bakau tersebut. Seterusnya, korelasi yang positif dan memberangsangkan terhasil dengan peningkatan kepekatan logam berat dalam sedimen dan semua bahagian pokok bakau. Faktor yang mempengaruhi pengumpulan logam berat dalam spesis tembakau termasuklah bacaan pH, jenis tanah, proses pengoksidaan dan penurunan, bahan organik dan kadar serapan. Melalui penyelidikan ini, *Sonneratia alba* dan *Rhizopora apiculata* menunjukkan sifat ketahanan yang tinggi terhadap semua jenis logam berat yang diambil kira. Walau bagaimanapun, bacaan ini berubah mengikut jenis logam berat yang terlibat. Faktor pengayaan telah membuktikan bahawa *Rhizopora apiculata* mempunyai kadar penyimpanan logam berat yang lebih tingi berbanding *Sonneratia alba*. Kedua-dua spesis ini mampu bertindak sebagai penunjuk kepada kadar pencemaran di sesebuah tempat.