


DEPARTMENT OF AGRICULTURE (MALAYSIAN) IN
COOPERATION WITH THE INTERNATIONAL AGRICULTURAL
RESEARCH CENTER FOR TROPICAL CEREALS

INTERNATIONAL AGRICULTURAL
RESEARCH CENTER

INSTITUTE OF SCIENCE AND TECHNOLOGY
MARA UNIVERSITY OF TECHNOLOGY MALAYSIA

1100042329

LP 22 FST 4 2006



1100042329
Concentration of heavy metals (Mercury and Arsenic) in relation to particle size and organic carbon in sediment off Johor During Pre-Monsoon Season / Noor Sakinah Ramli.



PERPUSTAKAAN
KOLEJ UNIVERSITI SAINS & TEKNOLOGI MALAYSIA
21030 KUALA TERENGGANU

1100042329		

Lihat sebelah

**HAK MILIK
PERPUSTAKAAN KUSTEM**

CONCENTRATION OF HEAVY METALS (MERCURY AND ARSENIC) IN
RELATION TO PARTICLE SIZE AND ORGANIC CARBON IN SEDIMENT OFF
JOHOR DURING PRE-MONSOON SEASON.

By

NOOR SAKINAH BT RAMLI

Research report submitted in partial fulfillment of
the requirement for the degree of
Bachelor of Science (Marine Science)

Department of Marine Science
Faculty of Science and Technology
UNIVERSITY COLLEGE OF SCIENCE AND TECHNOLOGY MALAYSIA
2006

1100042329

This report should be sited as:

Noor Sakinah, R. 2006. Concentration of heavy metals (Hg and As) in relation to mean particle size and organic carbon in sediment off Johor during pre-monsoon season. Undergraduate thesis, Bachelor of Science (Marine Science), Faculty of Science and Technology, Kolej Universiti Sains dan Teknologi Malaysia. 84pp.

No part of this project may be produced by any mechanical, photographic, or electronic process, or in any form of photographic recording, nor may it be stored in a retrieval system, transmitted, or otherwise copied for public or private use, without written permission from the author and supervisor of the project.

ACKNOWLEDGEMENT

Firstly, praise to be to God for giving us enough strength, patience and confidence to finish my thesis.

I gratefully acknowledge the help of lecturers, lab assistants and all friends especially Mala, Rina and Nas who have aided me in the preparation of this thesis. In particular, I would like to thank my supervisor, Prof. Dr. Noor Azhar b. Mohamed Shazili for his guidance and support throughout the project. I really appreciate his encouragement and his knowledge gives to me on his research field. I am fortunate to be able to experience this research work. I also express my appreciation to Dr Antonina bt. Abdullah for reviewing the manuscript and giving advice on the text.

I would also like to express my deep appreciation to the lab assistants of Oceanography laboratory for allowing me to use the apparatus and instruments for analytical work. My appreciation also goes to master students especially to Joseph and Ong for helping me to run the CVAAS and ICP-MS machines and for their guidance, criticisms during laboratory works and for the useful information for the preparation of this thesis.

Last but not least, I must also thank others who gave moral support in preparation of this thesis. Most importantly to my parents (En Ramli and Pn Aishah) and siblings for their continuous encouragement and advice in pursuing my studies here.

ABSTRAK

Kajian ini merujuk kepada penentuan taburan logam berat iaitu Merkuri dan Arsenik serta mengkaji perkaitannya dengan min saiz partikel sedimen dan kandungan karbon organik di perairan sekitar pantai Johor. Sebanyak 15 stesen telah dianalisis. Keputusan mendapati bahawa taburan kepekatan merkuri adalah dalam julat 0.0199 hingga $0.0419 \mu\text{gg}^{-1}$ dan taburan kepekatan arsenik adalah dalam julat 1.74 hingga $14.55 \mu\text{gg}^{-1}$. Kepekatan merkuri mempunyai hubungan kolerasi yang lemah dengan karbon organik ($r = 0.3218$) dan mempunyai hubungan yang sederhana dengan min saiz partikel ($r = 0.4391$). Sementara itu, kepekatan arsenik turut mempunyai hubungan kolerasi yang lemah dengan karbon organik ($r = 0.3949$) dan mempunyai hubungan kolerasi yang terlalu lemah dengan min saiz partikel ($r = -0.0579$). Berdasarkan kepada keseluruhan keputusan yang diperolehi, dianggapkan bahawa terdapat satu kawasan persampelan yang didapati tercemar oleh logam berat arsenik dengan mencatatkan nilai kepekatan arsenik yang melebihi nilai min $10 \mu\text{gg}^{-1}$ iaitu kepekatan di dalam sedimen secara semulajadi manakala semua stesen tidak menunjukkan kepekatan merkuri yang melebihi daripada nilai semulajadi merkuri dalam sedimen iaitu $0.05 \mu\text{gg}^{-1}$.

ABSTRACT

The focus of this study was the determination of heavy metals such as mercury and arsenic concentrations and their relationship with sediment particle size and organic carbon content in Johor coastal sediment. A total of 15 sediment samples were analyzed. The results showed that the concentration of mercury varied from 0.0199 to 0.0419 μgg^{-1} dry wt and the concentration of arsenic varied from 1.74 to 14.55 μgg^{-1} dry wt. Mercury concentration showed low correlation with organic carbon content ($r = 0.3218$) and medium correlation with mean sediment particle size ($r = 0.4391$). Meanwhile, arsenic concentration was also not strongly correlated with organic carbon content ($r = 0.3949$) and showed almost negligible relationship with mean sediment particle size ($r = -0.0579$). According to the results obtained, it is assumed that only the sampling site off Johor coastline is contaminated with arsenic as the level there exceeded mean natural value in sediment ($10 \mu\text{gg}^{-1}$) but all stations had concentration of mercury below $0.05 \mu\text{gg}^{-1}$ which is the natural value of mercury in marine sediment.