ENVIRONMENTAL ASSESSMENT OF METALLIC TRACE ELEMENT (Cd, Pb, Zn, Cu) CONTAMINATION IN SURFICIAL SEDIMENT AT COASTAL WATERS OF SETIU, TERENGGANU

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Lihat Sebelah

ENVIRONMENTAL ASSESSMENT OF METALLIC TRACE ELEMENT (Cd, Pb, Zn, Cu) CONTAMINATION IN SURFICIAL SEDIMENT AT COASTAL WATERS OF SETIU, TERENGGANU

By

Nor Sahidah Binti Jamaludin

Research Report submitted in partial fulfillment of

the requirements for the degree of

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PPSMS PITA E6

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FINAL YEAR PROJECT REPORT VERIFICATION

PENGAKUAN DAN PENGESAHAN LAPORAN

It is hereby declared and verified that this project report titled **Environmental Assessment of Metallic Trace Elements (Cd, Pb, Zn, Cu) Contamination in Surficial Sediment at Coastal Water of Setiu, Terengganu by Nor Sahidah binti Jamaludin , UK30597** have been examined and all errors identified have been corrected. This report is submitted to the School of Marine and Environmental Sciences as partial fulfillment towards obtaining the **Bachelor of Science (Marine Science** from School of Marine and Environmental Sciences, Universiti Malaysia Terengganu.

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DECLARATION

It is hereby declared and verified that this project report titled **Environmental Assessment of Metallic Trace Elements (Cd, Pb, Zn, Cu) Contamination in Surficial Sediment at Coastal Water of Setiu, Terengganu by Nor Sahidah binti Jamaludin , UK30597** have been examined and all errors identified have been corrected. This report is submitted to the School of Marine and Environmental Sciences as partial fulfillment towards obtaining the **Bachelor of Science (Marine Science)** from School of Marine and Environmental Sciences, Universiti Malaysia Terengganu.

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%	-	Percentage
°	-	Degree
°C	-	degree Celcius
Cd	-	Cadmium
Cu	-	Copper
d	-	Diameter
EF	-	Enrichment Factor
g	-	gram
HCl	-	Hydrochloric acid
HF	-	Hydrofluoric acid
HNO_2	-	Nitric acid
ICP-MS	-	Inductively Coupled Plasma Mass Spectroscopy
I-geo	-	Index of geo-accumulation
Max	-	Maximum values
Mean	-	Average
Min	-	Minimum values
mL	-	Millilitre
Ø	-	phi
Pb	-	Lead

PLI	-	Pollution Load Index
SRM	-	Standard Reference Material
Std Dev	-	Standard Deviation
TOC	-	Total Organic Carbon
Zn	-	Zinc
µg/g dw	-	microgram per gram dry weight
µg/g	-	microgram per gram
µm	-	micronmeter

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ABSTRACT

The distributions of selected metallic trace elements (Cd, Pb, Zn and Cu), total organic carbon and particle mean size were determined in 27 surficial sediment at coastal waters of Setiu, Terengganu. Closed acid digestion method were used for the heavy metal analysis. Dry sieving method and dry combustion method were used for the particle mean size and total organic carbon analysis in this study. From this study, higher metals concentration in surficial sediment were dominated with Zn with the average concentration of 13.40 ± 5.25 μg/g dw, followed by Pb, Cu and Cd with average concentration 7.32± 3.02 μg/g dw, 4.38 ± 1.57 μg/g dw and 0.03 ± 0.02 μg/g dw respectively. The distribution of total organic carbon ranged between 0.02% to 1.89%, while particle mean size ranged between 0.50Ø and 3.52Ø respectively. The average of each heavy metal was found to be lower compared to the Upper Continental Crust (UCC). Correlation analysis showed that all metals have a weak correlation with the both distribution of particle mean size and total organic carbon. Other than that, co-association with selected metal also showed that those metal does not comes from the same sources except for Zn and Pb. Overally, based on the finding in this study, metal pollution in coastal waters of Setiu were below the safety level and directly defines the area to be not contaminated with metal pollution. This finding is crucial to update the current status of environmental assessment for selected metals pollution in surficial sediment at coastal waters of Setiu, Terengganu. For the future study, more sampling station are recommended near to the river mouth to the coastal areas to identify the sources of metal.

PENILAIAN ALAM SEKITAR TERHADAP PENCEMARAN LOGAM BERAT TERPILIH (Cd, Pb, Zn, Cu) DALAM PERMUKAAN SEDIMEN DI PESISIR PANTAI SETIU, TERENGGANU

ABSTRAK

Taburan unsur-unsur logam logam berat terpilih (Cd, Pb, Zn dan Cu), jumlah karbon organik dan saiz partikel ditentukan di 27 sedimen di pesisir pantai Setiu, Terengganu. Dalam kajian ini, kaedah penghadaman asid tertutup digunakan untuk analisis logam berat. Manakala kaedah pengayakan kering dan kaedah pembakaran kering telah digunakan bagi analisa saiz partikel dan jumlah karbon organik. Hasil dapatan kajian, kepekatan logam yang tertinggi didominasi oleh Zn dengan kepekatan purata 13.40 ± 5.25 μg / g dw, diikuti oleh Pb, Cu dan Cd dengan kepekatan purata 7.32 ± 3.02 μg / g dw, 5.49 ± 6.34 μg / g dw dan 0.03 ± 0.02 μg / g dw. Taburan jumlah karbon organic direkod adalah antara julat 0.02% hingga 1.89%, manakala saiz partikel antara julat 0.50Ø dan 3.52Ø. Secara keseluruhan, purata kepekatan logam berat terpilih didapati lebih rendah berbanding dengan kepekatan pada lapisan permukaan kerak bumi. Analisis perhubungan antara logam berat dan jumlah karbon organik menunjukkan bahawa semua logam mempunyai hubungan yang lemah. Selain daripada itu, hubungan antara logam berat terpilih juga menunjukkan bahawa logam tidak datang dari sumber yang sama kecuali Zn dan Pb. Keseluruhannya, berdasarkan dapatan kajian, pencemaran logam berat pada sedimen di pesisir pantai Setiu adalah di bawah tahap selamat dan secara langsung menunjukkan kawasan kajian tidak tercemar dengan logam berat. Penemuan dari kajian ini penting bagi tujuan mengemas kini status semasa penilaian alam sekitar bagi pencemaran logam berat terpilih dalam sedimen di pesisir pantai Setiu, Terengganu. Bagi kajian di masa hadapan, penambahan stesen persampelan disyorkan berhampiran dengan muara sungai ke kawasan pantai bagi mengenalpasti punca logam berat.