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# Cu AND Zn DISTRIBUTION IN SURFACE SEDIMENT FROM THE COAST OF JOHOR IN RELATION TO PARTICLE SIZE

By

Tonny Anak Ganyai

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

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KOLEJ UNIVERSITI SAINS DAN TEKNOLOGI MALAYSIA
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**JABATAN SAINS SAMUDERA**
**FAKULTI SAINS DAN TEKNOLOGI**
**KOLEJ UNIVERSITI SAINS DAN TEKNOLOGI MALAYSIA**

## PENGAKUAN DAN PENGESAHAN LAPORAN PROJEK PENYELIDIKAN I DAN II

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk:

**Cu And Zn Distribution In Surface Sediment From The Coast Of Johor In Relation To Particle Size** oleh Tonny Anak Ganyai, No. Matrik UK7702 telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Samudera sebagai memenuhi sebahagian daripada keperluan memperolehi Ijazah Sarjana Muda Sains (Sains Samudera), Fakulti Sains dan Teknologi, Kolej Universiti Sains dan Teknologi Malaysia.

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Tonny Anak Ganyai

Bachelor Science (Marine Science)

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## SYMBOLS

| Symbol | Meaning |
|---|---|
| % | Percentage |
| µm | Micrometer |
| µg | microgram |
| Cu | Copper |
| EDTA | Ethylenediamenetetra Acidic |
| EF | Enrichment Factor |
| $g\ cm^{-3}$ | Gram per senti meter cube |
| GPS | Global Positioning System |
| HCL | Hydrochloric Acid |
| HF | Hydrofluoric Acid |
| $HNO_3$ | Nitric Acid |
| $H_2O_2$ | Hydrogen peroxide |
| ICPMS | Inductively Couple Plasma Mass Spectrometry |
| Kg | kilogram |
| mm | millimeter |
| ml | milliliter |
| °C | Celsius Degrees |
| PSA | Particle Size Analysis |
| Zn | Zinc |
| Ø | phi |

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## ABSTRAK

Kepekatan logam Cu dan Zn yang terkandung dalam sedimen di perairan Johor telah ditentuk dan perkaitan antara saiz pertikal sediment dan kandungan karbon organic dengan kepekatan logam turut dikaji. Saiz pertikal didapati sederhana halus dengan purata min saiz 1.5531±0.4289 Ø. Kandungan karbon organic bagi sedimen Johor berjulat dari 0.0598% hingga 1.26% dengan nilai purata bagi kawasan Johor mencatat 0.4551± 0.3338 %. Kepekatan logam berat pada saiz 63μm mencatatkan 6.47 ± 1.46 μg/g untuk Cu dan 114.15 ± 40.68 μg/g untuk Zn.

Perhubungan antara saiz patikel dan karbon organick dengan logam berat bagi sedimen Johor didapati lemah. Kepekatan logam berat telah dianalisis dengan menggunakan kaedah factor pengkayaan (EF) untuk mengetahui paras pencemaraan di kawasan kajian. Daripada keputusan kajian, Zn boleh dikatogerikan sebagai pengkayaan bererti dan dijangkakan pencemaran berlaku hasil dari sumber antropogenik. Sementara, Cu boleh diketogerikan sebagai penkayaan yang sedikit.

## ABSTRACT

The sediments off the Johor coast was measured for their Cu and Zn concentration and their relationship with particle size and organic carbon content were also studied. Johor sediment was found to be medium sand with an average mean size of 1.5531±0.4289 Ø respectively. The organic carbon content were 0.0598% - 1.26% with average 0.4551± 0.3338 %. Mean concentration of heavy metals for 63μm fraction of Johor sediment were 6.47 ± 1.46 μg/g for Cu and 114.15 ± 40.68 μg/g for Zn.

The correlation between particle size and organic carbon with heavy metals were weak for Johor sediment. The heavy metal concentrations were analyzed by enrichment factor (EF) method to assess the contamination level of study area. The results indicate that there is significant enrichment of Zn while Cu can be categorized as slightly enriched.