ARSENIC (As) AND MERCURY (Hg) IN ROCKY SHORE ORGANISMS FROM THE COAST OF TERENGGANU

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Universiti Malaysia Terengganu

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ARSENIC (As) AND MERCURY (Hg) IN ROCKY SHORE ORGANISMS FROM THE COAST OF TERENGGANU

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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JABATAN SAINS MARIN
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PENGAKUAN DAN PENGESAHAN LAPORAN PROJEK PENYELIDIKAN I DAN II

Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk:
ARSENIC (As) AND MERCURY (Hg) IN ROCKY SHORE ORGANISMS FROM THE COAST OF TERENGGANU oleh MOHD FUAD BIN MISKON, No.Matrik UK12188 telah diperiksa dan semua pembetulan yang disarankan telah dilakukan. Laporan ini dikemukakan kepada Jabatan Sains Marin sebagai memenuhi sebahagian daripada keperluan memperolehi IJAZAH SARJANA MUDA SAINS SAMUDERA, Fakulti Pengajian Maritim dan Sains Marin, Universiti Malaysia Terengganu.

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LIST OF ABBREVIATIONS/SYMBOLS

SYMBOLS	MEANING
EPA	Environmental Protection Agency
g	Gram
°C	Degree Celcius
%	Percentage
ml	Milliliter
As	Arsenic
Hg	Mercury
m^3	Meter cube
e.g.	Example
°F	Degree Fahrenheit
cm	Centimeter
µg/g	Microgram per gram
HNO_3	Nitric Acid
H_2O_2	Hydrogen Peroxide
NaOh	Sodium Hydroxide
APDC	Ammonium Pyrrolidine Dithiocarbamate
MIBK	Methyl Isobutyl Ketone

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ABSTRACT

The objectives of this study was to determine the concentration and distribution of arsenic (As) and mercury (Hg) in the tissue of rock oysters, limpets, *Thais* sp and barnacles from the coast of Terengganu, to study the relationship between the location of sampling stations with heavy metal content and the relationship between the size of organisms with heavy metal content. Analysis of metals indicated that arsenic distributed more than mercury in tissue of study organisms. There was no correlation between concentration of As and Hg with every sampling station due to the different environment and sources of contamination in every sampling station. Also, no correlation stated between different sizes of organisms with As and Hg content in their tissues. This probably due to the characteristic of As and Hg as non-essential metals and toxicant. Based on data achieved, all study organisms in every sampling station were contaminated with As while Hg concentration was acceptable in safety limit. As concentration through this study showed values ranged from 1.30–4.12 μg/g wet weight that exceeded the permissible limit (1 μg/g wet weight) established by the Malaysian Food Act 1983 and Food Regulations 1985 Fourteen Schedule. Previous studies have lack of data on As and Hg in Malaysia due to the difficulties of analysis. Therefore, it is of major concern now to monitor the level of contamination of As and Hg especially on marine organisms that used to be in human diet as it can brings harm to mankind.

ABSTRAK

Objektif kajian ini adalah untuk menentukan kepekatan dan taburan logam berat arsenik (As) dan merkuri (Hg) dalam tisu tiram, remis (*limpet*), siput haliah (*Thais* sp) dan teritip (*barnacles*), mengkaji hubungan antara lokasi stesen penyampelan dengan kandungan logam berat dalam organisma terbabit dan mengkaji hubungan antara saiz organisma yang berbeza dengan kandungan logam berat di dalamnya. Analisis logam berat mendapati taburan arsenik adalah lebih tinggi berbanding merkuri di dalam tisu organisma yang dikaji. Tiada hubungan yang didapati antara kepekatan logam berat dalam tisu bagi setiap stesen penyampelan oleh kerana wujud persekitaran dan punca pencemaran logam berat yang berbeza bagi setiap stesen. Selain itu, tiada hubungan yang didapati antara saiz organisma dengan kanduingan arsenik dan merkuri di dalam tisu. Hal ini berkemungkinan kerana ciri-ciri arsenik dan merkuri sebagai logam tidak perlu dan bahan toksik. Berdasarkan data yang didapati, semua organsima yang dikaji telah dicemari dengan arsenik manakala kepekatan merkuri masih lagi di tahap terkawal. Kepekatan arsenik yang didapati dalam kajian ini berjulat 1.30–4.12 μg/g berat basah yang melebihi nilai selamat (1 μg/g berat basah) yang dikeluarkan oleh Akta Makanan Malaysia 1983 dan Peraturan Makanan 1985 Jadual Empat Belas. Kajian terdahulu mengalami kekurangan maklumat mengenai arsenik kerana kesukaran dalam analisis. Oleh itu, adalah merupakan sesuatu yang sangat penting sekarang untuk mengkaji tahap pencemaran oleh arsenik dan merkuri terutamanya kepada organisma marin yang menjadi salah satu makanan manusia kerana ia boleh membawa bahaya kepada manusia.