

DISTRIBUTION OF Cd AND Pb
(DISSOLVED AND PARTICULATE) IN THE SOUTH CHINA SEA
OFF DUNGUN-KEMAMAN COAST

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Distribution of Cd and Pb (Dissolved and Particulate) in the South China Sea off

Dungun-Kemaman Coast

By

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**DECLARATION AND VERIFICATION REPORT
FINAL YEAR RESEARCH PROJECT**

It is hereby declared and verified that this research report entitled:

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Dungun-Kemaman Coast by Raja Ahmad Zuhairi Bin Raja Othman, Matric No.
UK15880** have been examined and all errors identified have been corrected. This report
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LIST OF ABBREVIATIONS

Ag	-	Argentum
ANOVA	-	Analysis of Varians
APDC	-	Ammonia pyrrolidine dithiocarbamate
APHA	-	American Public Health Association
As	-	Arsenic
Au	-	Aureum
Be	-	Berium
Cd	-	Cadmium
Cs	-	Cesium
DHFS	-	Department of Health and Family Services
EPA	-	Environmental Protection Agency
GFAAS	-	Graphite Furnace Atomic Absorption Spectrometry
GPS	-	Global Positioning System
HCl	-	Hydrochloric Acid
Hg	-	Mercury
HNO ₃	-	Nitric Acid
HF	-	Hydroflouric Acid
ICP-OES	-	Inductively Couple Plasma-Optical Emission Spectrometer
INWQS	-	Malaysia Interim National Water Quality Standard
Li	-	Lithium
MIBK	-	Methyl isobutyl ketone
µg ⁻¹	-	microgram per gram
µg ⁻¹	-	microgram per liter
Pb	-	Lead

PTFE	-	Polytetrafloroethylene
Sg.	-	River (Sungai)
Sn	-	Tin
Sr	-	Strontium

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ABSTRACT

Dungun-Kemaman Coast is located in east of Peninsular Malaysia where surrounded with human activities and industrial. The area of this study also influenced by the water inlet from South China Sea Ocean and from the major River of Terengganu Terengganu River, Dungun River, Kemaman River, Paka River and other small rivers. There have 12 stations that have been detect the concentration of Cd and Pb in dissolved and particulate fraction. On the other hand, the objective of this study is to determine the status of Cd and Pb concentrations according to Malaysia Interim National Water Quality Standards (INWQS). The particulate samples were separated from water by using 0.45 μm pore size PTFE filter paper. Water (filtered) samples were subjected to APDC-MIBK pre-concentration and particulate samples were totally digested by using strong acids. Cd and Pb were analyzed using GFAAS and ICP-OES. The range of cadmium concentrations (dissolved) in Dungun-Kemaman Coast is as follow: Dungun (0.031-0.132 μgL^{-1}), Paka (0.020-0.909 μgL^{-1}), Kerteh (0.026-0.065 μgL^{-1}) and Kemaman (0.015-0.271 μgL^{-1}). Meanwhile, the lead concentrations were Dungun (0.038-0.508 μgL^{-1}), Paka (0.095-1.174 μgL^{-1}), Kerteh (0.036-0.358 μgL^{-1}) and Kemaman (0.041-0.360 μgL^{-1}). According to the INWQS, these concentrations in Dungun-Kemaman coast are classified in Class I (Natural level). In addition, for cadmium particulate fraction in Dungun-Kemaman Coast is as follow: Dungun (26.45-267.51 μgg^{-1}), Paka (32.92-202.03 μgg^{-1}), Kerteh (17.11-143.34 μgg^{-1}) and Kemaman (11.34-71.82 μgg^{-1}). Meanwhile, the lead concentrations were Dungun (9.16-110.70 μgg^{-1}), Paka (19.42-30.85 μgg^{-1}), Kerteh (17.08-65.99 μgg^{-1}) and Kemaman (15.52-34.98 μgg^{-1}).

TABURAN KADMIUM DAN PLUMBUM (TERLARUT DAN PARTIKULAT) DI LAUT CHINA SELATAN BERDEKATAN PANTAI DUNGUN-KEMAMAN

ABSTRAK

Pantai Dungun-Kemaman terletak di timur Semenanjung Malaysia dimana dikelilingi dengan aktiviti manusia dan industri. Kawasan kajian ini juga dipengaruhi oleh aliran dari Laut China Selatan dan daripada sungai utama di Terengganu seperti Sg. Terengganu, Sg. Dungun, Sg. Kemaman, Sg. Paka dan sungai-sungai kecil. Terdapat 12 stesen yang dipilih untuk mengesan kepekatan Cd dan Pb dalam bentuk terlarut dan partikulat. Selain itu, objektif lain bagi kajian ini adalah untuk menentukan status kepekatan Cd dan Pb mengikut Piawaian Interim Kualiti Air Kebangsaan (INWQS). Sampel partikulat dipisahkan dengan menggunakan kertas turas PTFE 0.45 μm . Sampel air yang telah ditapis akan diekstrak menggunakan APDC-MIBK pra-kepekatan dan sampel partikulat dicernakan menggunakan asid kuat dan dianalisis dengan menggunakan GFAAS dan ICP-OES. Julat kepekatan kadmium (terlarut) di kawasan kajian adalah sebagai berikut: Dungun(0.031-0.132 μgL^{-1}), Paka(0.020-0.909 μgL^{-1}), Kerteh(0.026-0.065 μgL^{-1}) dan Kemaman(0.015-0.271 μgL^{-1}). Manakala, kepekatan plumbum adalah Dungun(0,038-0.508 μgL^{-1}), Paka(0,095-1.174 μgL^{-1}), Kerteh(0,036-0.358 μgL^{-1}) dan Kemaman(0,041-0.360 μgL^{-1}). Menurut INWQS, kepekatan Cd dan Pb di Pantai Dungun-Kemaman dikelaskan dalam Kelas I (peringkat semulajadi). Selain itu, kadmium partikulat di Pantai Dungun-Kemaman adalah sebagai berikut: Dungun(26.45-267.51 μgg^{-1}), Paka(32.92-202.03 μgg^{-1}), Kerteh(17.11-143.34 μgg^{-1}) dan Kemaman (11.34-71.82 μgg^{-1}). Sementara itu, kepekatan Pb adalah seperti berikut Dungun(9.16-110.70 μgg^{-1}), Paka(19.42-30.85 μgg^{-1}), Kerteh(17.08-65.99 μgg^{-1}) dan Kemaman (15.52-34.98 μgg^{-1}).