DISTRIBUTION OF PESTICIDE (ORGANOCHLORINE) IN TERENGGANU RIVER ESTUARINE SEDIMENTS

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DISTRIBUTION OF PESTICIDE (ORGANOCHLORINE) IN TERENGGANU RIVER ESTUARINE SEDIMENTS

By

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Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk: Distribution of Pesticide (Organochlorine) in Terengganu River Estuarine Sediments oleh Norbadariah binti Redzuan, No. Matrik UK 12195 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 (Sains Samudera), Fakulti Pengajian Maritim dan Sains Marin, Universiti Malaysia Terengganu.

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LIST OF ABBREVIATION

BHC	: Benzene hexachloride
DCM	: Dichloromethane
DDD	: Dichloro-Diphenyl-Dichloroethane
DDE	: Dichloro-Diphenyldichloro-Ethylene
DDT	: Dichloro-Diphenyl-Trichloroethane
DO	: Dissolved oxygen
GC-ECD	: Gas Chromatography-electron capture detector
GCIS	: Gas Chromatography Internal Standard
GPS	: Global Positioning System
HCH	: Hexachlorocyclohexane
HCl	: Hydrochloric acid
Na_2SO_4	: Sodium sulphate
ND	: Not detected
OCP	: Organochlorine pesticide
PCB	: Polychlorinated biphenyl
ppt	: Part per thousand
TCMX	: Tetra- chloro-m-xylene
TEL	: Total Extractable Lipid

LIST OF SYMBOLS

μ	: micron
μL	: micronlitre
^0C	: degree Celsius
g	: gram
kg	: kilogram
L	: litre
mL	: mililitre
M	: mole
ng	: nanogram
sec	: second
V	: volume

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DISTRIBUTION OF PESTICIDE (ORGANOCHLORINE) IN TERENGGANU RIVER ESTUARINE SEDIMENTS

ABSTRACT

Organochlorine pesticide in sediment samples were detected using Gas Chromatography - Electron Capture Detector (GC-ECD).The primary aim of this study is to determine the species of organochlorine pesticide (OCP) and their concentration in Terengganu River Estuarine sediment. The levels of contamination of 16 species organochlorine pesticides such as HCHs, DDTs, aldrin, dieldrin and endrin were determined in estuarine sediments along the Terengganu River Estuary in Terengganu. The concentration of various pesticides in sediments from the mouth of estuaries along the river were in the range of 0.01–1853095 ng/g (alpha-BHC), 0.002–1669 ng/g (beta BHC), 0.0002–6048 ng/g (gamma-BHC), 0.0003–2422 ng/g (delta-BHC), 0.02–17874 ng/g (heptachlor), 0.01 – 49029 ng/g (aldrin), 0.004 – 9565 ng/g (heptachlor epoxide isomer B), 0.002 – 69855 ng/g (endosulfan alpha), 0.01 – 11679280 ng/g (dieldrin), 0.15 – 5972 ng/g (DDE), 0.28 – 8428 ng/g (endrin), 0.42 – 1899 (endosulfan beta), 0.47 – 24132 ng/g (DDD), 0.5 – 2484 ng/g (endrin aldehyde), 0.14 – 4652 ng/g (endosulfan sulfate) and 21.5 – 29006 ng/g (DDT). Among the organochlorine pesticides, dieldrin and gamma-BHC were most dominant in the estuarine sediments. The highest concentration of dieldrin was estimated at station 2 near the mouth of Terengganu River estuary (11679280 ng/g) while that of gamma-BHC at the same station (6048 ng/g). Among the cyclodiene compounds, alpha-BHC was in abundance in most of the sediments whereas DDT could be detected at the smaller river channel.

ABSTRAK

Gas Chromatography - Electron Capture Detector (GC-ECD) adalah merupakan keadah paling ideal untuk mengesan taburan dan kepekatan OCP dalam sediment. Tujuan keadah ini dijalankan adalah untuk mengenalpasti spesis OCP yang ada di muara Sungai Terengganu beserta kepekatannya. 16 spesis OCP telah dikesan di kawasan kajian dan didapati bahawa spesis yang telah diharamkan penggunaannya juga dijumpai seperti HCH, DDT, aldrin, dieldrin adalah 0.01–1853095 ng/g 0.002–1669 ng/g (beta BHC), 0.0002–6048 ng/g (gamma dan endrin. Kepekatan pestisid yang dijumpai adalah dalam berbagai-bagai julat. Bagi sepsis alpha-BHC -BHC), 0.0003–2422 ng/g (delta-BHC), 0.02–17874 ng/g (heptachlor), 0.01 – 49029 ng/g (aldrin), 0.004 – 9565 ng/g (heptachlor epoxide isomer B), 0.002 – 69855 ng/g (endosulfan alpha), 0.01 – 11679280 ng/g (dieldrin), 0.15 – 5972 ng/g (DDE), 0.28 – 8428 ng/g (endrin), 0.42 – 1899 (endosulfan beta), 0.47 – 24132 ng/g (DDD), 0.5 – 2484 ng/g (endrin aldehyde), 0.14 – 4652 ng/g (endosulfan sulfate) and 21.5 – 29006 ng/g (DDT). Gamma-BHC dan dielrin telah dijumpai sebagai sepsis yang mendominasi kawasan kajian. Kepekatan dielrin paling tinggi telah dijumpai di stesen kajian 2 dengan kepekatan 11679280 ng/g manakala gamma-BHC ialah 6048 ng/g. Bagi spesis yang terhasil melelui tindakbalas kimia, alpha-BHC adalah senang dijumpai di dalam sample manakala DDT jarang dijumpai.