

STUDY ON THE DISTRIBUTION AND CONCENTRATION OF  
ORGANOCHLORINE PESTICIDE IN SUNGAI MERCHANG, MARANG,  
TERENGGANU

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ORGANOCHLORINE PESTICIDE IN SUNGAI MERCHANG, MARANG,  
TERENGGANU**

**By**

**ISMAYANI BINTI HASSAN**

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JABATAN SAINS MARIN  
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Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk **Study on the Distribution and Concentration of Organochlorine Pesticide in Sungai Merchang, Marang, Terengganu** oleh **Ismayani bt Hassan**, No.Matrik **UK12358** 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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## TABLE OF CONTENT

|  | PAGE     |
|--|----------|
| ACKNOWLEDGEMENT  | ii       |
| LIST OF TABLES   | iii      |
| LIST OF FIGURES  | iv       |
| LIST OF SYMBOLS  | v        |
| LIST OF APPENDICES   | vi       |
| ABSTRACT   | vii      |
| ABSTRAK  | viii     |
| <br>   |          |
| <b>CHAPTER</b>   |          |
| <br>   |          |
| <b>1.0 INTRODUCTION</b>                                    | <b>1</b> |
| 1.1 Objectives   | 4        |
| 1.2 Justification  | 4        |
| <br>   |          |
| <b>2.0 LITERATURE REVIEW</b>                               | <b>5</b> |
| 2.1 Pesticides   | 5        |
| 2.2 Biological effect of Organochlorine Pesticides.        | 8        |
| 2.3 Inputs to the Marine Environment                       | 10       |
| 2.4 Pesticide Physical and Chemical Properties             | 12       |
| 2.5 Low Molecular Weight Hydrocarbons.                     | 13       |
| 2.6 High Molecular Weight Compounds                        | 13       |
| 2.6.1 Pesticides and PCBs                                  | 13       |
| 2.6.2 PCB (Polychlorinated Biphenyls)                      | 14       |
| 2.6.3 DDT ( <i>discholodiphenyl trichloroethane</i> )      | 14       |
| 2.6.4 Cyclodiene Compound.                                 | 15       |
| 2.7 Organophosphorus Insecticides                          | 16       |
| 2.8 Marine Sediment  | 16       |
| 2.8.1 Sources and Component of marine Sediment             | 16       |
| 2.8.2 Properties of marine Sediment                        | 17       |
| 2.9 Oyster ( <i>Crassostrea iredalei</i> )                 | 17       |
| 2.9.1 East Coast Collection Sites                          | 18       |
| 2.10 Previous Studies                                      | 19       |
| 2.10.1 Study by Fuad (1997).                               | 19       |
| <br>   |          |
| <b>3.0 METHODOLOGY</b>                                     |          |
| 3.1 StudyArea  | 20       |
| 3.2 SamplingMethod   | 22       |
| 3.3 Determination of Organochlorine Pesticides in Sediment | 22       |
| 3.3.1 Soxhlet Extraction                                   | 23       |
| 3.3.2 Solvent Concentration                                | 23       |
| 3.3.3 Copper Column  | 24       |
| 3.3.4 Silica gel / Alumina Column                          | 24       |

|            |   |           |
|------------|---|-----------|
| 3.3.5      | Florisol Column   | 25        |
| 3.3.6      | Analysis of Gas Chromatography (GC/ECD)                                   | 26        |
| 3.4        | Recovery Test   | 27        |
| 3.5        | Organic Carbon Analysis   | 27        |
| 3.6        | Particle Size Analysis  | 28        |
| 3.6.1      | Dry Sieving   | 28        |
| 3.6.2      | Particle Size Analysis (PSA)  | 28        |
| 3.6.3      | Statistical analysis  | 29        |
| 3.7        | Flow Chart (Summary) for sediment samples                                 | 30        |
| 3.8        | Flow Chart (Summary) for sediment samples                                 | 31        |
| <b>4.0</b> | <b>RESULT</b>   | <b>32</b> |
| 4.1        | Distribution of Organochlorine pesticides in sediment                     | 32        |
| 4.1.1      | BHC Group   | 37        |
| 4.1.2      | Cyclodiene Group  | 40        |
| 4.1.3      | DDT Group   | 43        |
| 4.2        | Distribution of Organochlorine pesticides in <i>Crassostrea irredalei</i> | 45        |
| 4.2.1      | BHC Group   | 48        |
| 4.2.2      | Cyclodiene Group  | 51        |
| 4.2.3      | DDT Group   | 54        |
| 4.2.4      | Recovery test for Sediment and <i>Crassostrea irredalei</i>               | 56        |
| 4.2.5      | Total Extractable Lipid (TEL)   | 59        |
| 4.3        | Other parameter   | 60        |
| 4.3.1      | Physical parameter  | 60        |
| 4.3.2      | Total Organic Carbon  | 61        |
| 4.3.3      | Particle size Analysis  | 63        |
| <b>5.0</b> | <b>DISCUSSION</b>   | <b>64</b> |
| 4.3.4      | BCH Group   | 67        |
| 4.3.5      | Cyclodiene Group  | 68        |
| 4.3.6      | DDT Group   | 69        |
| 4.3.7      | Total Extractable Lipid (TEL)   | 70        |
| 4.3.8      | Physical parameter  | 70        |
| 4.3.9      | Total Organic Carbon  | 72        |
| 4.3.10     | Particles size and texture of sediment                                    | 74        |
| <b>5.0</b> | <b>CONCLUSION</b>   | <b>75</b> |
|            | REFERENCES  | 77        |
|            | APPENDIX  | 81        |
|            | CURRICULUM VITAE  | 103       |

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## LIST OF TABLE

| <b>TABLE</b>  |  | <b>PAGE</b> |
|---------------|--|-------------|
| Table 2.1     | Classes of Pesticides by Use   | 7           |
| Table 2.3     | A Comparison between Atmospheric and River inputs of some organochlorines to the World Oceans (t/yr.). (Clark, 1997).  | 11          |
| Table 2.10    | Result of study conducted by Fuad, 1997.   | 19          |
| Table 3.1     | The station and coordinate of sampling site at Sungai Merchang, Marang   | 21          |
| Table 4.1     | The concentration (ng/g) values of organochlorine pesticide residues in sediment sample by station                     | 34          |
| Table 4.2     | The concentration (ng/g) values of organochlorine pesticide residues in <i>Crassostrea irredalei</i> sample by station | 35          |
| Table 4.3 (a) | Recoveries of OCPs by GC-ECD with n-Haxane solvent in sediment   | 58          |
| Table 4.3 (b) | Recoveries of OCPs by GC-ECD with n-Haxane solvent in <i>Crassostrea irredalei</i>                                     | 58          |
| Table 4.4     | The values of temperature, pH and salinity for Sungai Merchang.  | 60          |
| Table 4.5     | The percentage total organic carbon (TOC) in 1st and 2nd sampling  | 62          |
| Table 4.6     | The texture of sediment characteristic in 1st and 2nd sediment   | 63          |

## LIST OF FIGURE

| FIGURE |  | PAGE |
|--------|--|------|
| 3.1    | The location of sampling station at Sg. Merchang, Marang                                 | 20   |
| 3.2    | The map location of Sungai Merchang, Marang  | 21   |
| 4.1 a  | The concentration of OCPs in sediment by station for 1st sampling                        | 36   |
| 4.1 b  | The concentration of OCPs in sediment by station of 2nd sampling.                        | 36   |
| 4.2    | The concentration of total BHC group in sediment for 1st and<br>2nd sampling             | 38   |
| 4.2 a  | The concentration of BHC in sediment by station for 1st sampling                         | 39   |
| 4.2 b  | The concentration of BHC in sediment by station for 2nd sampling                         | 39   |
| 4.3    | The concentration of Cyclodiene group in sediment by station<br>for 1st and 2nd sampling | 41   |
| 4.3 a  | The concentration of Cyclodiene in sediment group by station for<br>the 1st sampling     | 42   |
| 4.3 b  | The concentration of Cyclodiene group in sediment by station for<br>the 2nd sampling     | 42   |
| 4.4    | The concentration of DDT group by station in sediment for 1st and<br>2nd sampling        | 44   |
| 4.4 a  | The concentration of DDT group in sediment for the 1st sampling                          | 44   |
| 4.4 b  | The concentration of DDT group in sediment for 2nd sampling                              | 45   |
| 4.5 a  | The concentration of Organochlorine pesticides in oyster for<br>1st sampling             | 47   |
| 4.5 b  | The concentration of Organochlorine pesticide in oyster for<br>2nd sampling              | 47   |
| 4.6    | The concentration of BHC group in oyster for 1st and 2nd sampling                        | 49   |
| 4.6 a  | The concentration of BHC group in oyster for 1st sampling                                | 50   |
| 4.6 b  | The concentration of BHC group in oyster by station for 2nd sampling                     | 50   |
| 4.7    | The concentration of Cyclodiene group in oyster for 1st and<br>2nd sampling              | 52   |
| 4.7 a  | The concentration of cyclodiene group in oyster for 1st sampling                         | 53   |
| 4.7 b  | The concentration of Cyclodiene group in oyster for 2nd sampling                         | 53   |
| 4.8    | The concentration of DDT group in oyster for 1st and 2nd sampling                        | 55   |
| 4.8 a  | The concentration of DDT group in oyster by station for 1st sampling                     | 55   |
| 4.8 b  | The concentration of DDT group in oyster by station for 2nd sampling                     | 56   |
| 4.9 a  | The value of TEL in sediment and oyster by station for 1st sampling                      | 59   |
| 4.9 b  | The value of TEL in sediment and oyster by station for 2nd sampling                      | 60   |
| 5.1 a  | Total organic carbon vs concentration of BHC in 1st and 2nd sampling                     | 73   |
| 5.1 b  | Total organic carbon vs concentration of Cyclodiene group in 1st and<br>2nd sampling     | 73   |
| 5.1 c  | Total organic carbon vs concentration of DDT in 1st and 2nd sampling                     | 74   |

## LIST OF SYMBOLS AND SHORTFORMS

|                                 |                                   |
|---------------------------------|-----------------------------------|
| $\alpha$                        | :Alpha                            |
| $\beta$                         | :Beta                             |
| $\gamma$                        | :Gamma                            |
| $\delta$                        | :Delta                            |
| $\Sigma$                        | :Sum                              |
| <                               | :Less than                        |
| >                               | :More than                        |
| 0C                              | :Degree Celsius                   |
| %                               | :Percent                          |
| ng                              | :Nanogram                         |
| mg                              | :Miligram                         |
| ml                              | :Mililitre                        |
| g                               | :Gram                             |
| kg                              | :Kilogram                         |
| ppb                             | :Part per billion                 |
| r                               | :Correlation value                |
| ppt                             | :Part per trillion                |
| vs                              | :Versus                           |
| Conc.                           | :Concentration                    |
| DDT                             | :Dichlorodiphenyl trichloroethane |
| DDD                             | :Dichlorodiphenyldichloroethane   |
| DDE                             | :Dichlorodiphenylchloroethane     |
| TCMX                            | :Tetrachloro-m-xylene             |
| TOC                             | :Total organic carbon             |
| PSA                             | :Particle size analysis           |
| GC                              | :Gas chromatography               |
| ECD                             | :Electron capture detection       |
| BHC                             | :Benzenehexachloride              |
| HCH                             | :Hexachlorosichlohexane           |
| TEL                             | :Total extractable lipid          |
| Na <sub>2</sub> SO <sub>2</sub> | :Sodium sulfate                   |
| H <sub>2</sub> O <sub>2</sub>   | :Hydrogen peroxide                |
| DCM                             | :Dilchlorometana                  |
| GPS                             | :Global position system           |
| OCPs                            | :Organochlorine pesticides        |
| POPs                            | :Persistent organic pollutant     |
| SAM                             | :Sahabat Alam Malaysia            |
| UPM                             | :Universiti Putra Malaysia        |
| HCB                             | :Hexachlorobenzene                |
| TBT                             | :Tributiltin                      |
| GERG                            | :Geochemical and research group   |
| 1st                             | :First                            |
| 2nd                             | :Second                           |

## LIST OF APPENDICES

| APPENDIX  | PAGE |
|---|------|
| 1 Chromatogram of standard solution   | 82   |
| 2 Two-way Anova analysis of Concentration OCPs group in sediment sample   | 83   |
| 3 Two-way Anova analysis of Concentration BHC group in sediment sample  | 84   |
| 4 Two-way Anova analysis of Conc. Cyclodiene group in sediment sample   | 85   |
| 5 Two-way Anova analysis of Concentration DDT group in sediment sample  | 86   |
| 6 Two-way Anova analysis of Concentration OCPs group in <i>Crassostrea irradialei</i> sample                    | 87   |
| 7 Two-way Anova analysis of Conc. BHC group in <i>Crassostrea irradialei</i> sample                             | 88   |
| 8 Two-way Anova analysis of Conc. Cyclodiene group in <i>Crassostrea irradialei</i> sample                      | 89   |
| 9 Two-way Anova analysis of Conc. DDT group in <i>Crassostrea irradialei</i> sample                             | 90   |
| 10 a Total Organic carbon in 1 <sup>st</sup> and 2 <sup>nd</sup> sampling for all station                       | 91   |
| 10 b Total organic carbon in 1 <sup>st</sup> sampling for all station   | 91   |
| 10 c Total Organic Carbon in 2 <sup>nd</sup> sampling for all station   | 91   |
| 11 Physical Parameter For 1 <sup>st</sup> and 2 <sup>nd</sup> sampling for all station                          | 92   |
| 12 a Salinity (ppt) vs conc. of BHC group in sediment of 1 <sup>st</sup> and 2 <sup>nd</sup> sampling           | 93   |
| 12 b Salinity (ppt) vs Conc. of Cyclodiene group in sediment of 1 <sup>st</sup> and 2 <sup>nd</sup> sampling    | 93   |
| 12 c Salinity (ppt) vs Conc. of DDT group in sediment for 1 <sup>st</sup> and 2 <sup>nd</sup> sampling          | 93   |
| 13 a Temperature (°C) vs Conc. of BHC group in sediment for 1 <sup>st</sup> and 2 <sup>nd</sup> sampling        | 94   |
| 13 b Temperature (°C) vs Conc. of Cyclodiene group in sediment for 1 <sup>st</sup> and 2 <sup>nd</sup> sampling | 94   |
| 13 c Temp. (°C) vs Conc. of DDT group in sediment for 1 <sup>st</sup> and 2 <sup>nd</sup> sampling              | 94   |
| 14 a pH vs Concentration of BHC group in sediment for 1 <sup>st</sup> and 2 <sup>nd</sup> sampling              | 95   |
| 14 b pH vs Conc. of Cyclodiene group in sediment for 1 <sup>st</sup> and 2 <sup>nd</sup> sampling               | 95   |
| 14 c pH vs Concentration of DDT group in sediment for 1 <sup>st</sup> and 2 <sup>nd</sup> sampling              | 95   |
| 15 a Salinity (ppt) vs Conc. of BHC group in oyster for 1 <sup>st</sup> and 2 <sup>nd</sup> sampling            | 96   |
| 15 b Salinity (ppt) vs conc. of Cyclodiene group in oyster for 1 <sup>st</sup> and 2 <sup>nd</sup> sampling     | 96   |
| 15 c Salinity (ppt) vs Conc. of DDT group in oyster for 1 <sup>st</sup> and 2 <sup>nd</sup> sampling            | 96   |
| 16 a Temperature (°C) vs Conc. of BHC group in oyster for 1 <sup>st</sup> and 2 <sup>nd</sup> sampling          | 97   |
| 16 b Temperature (°C) vs Conc. of Cyclodiene group in oyster for 1 <sup>st</sup> and 2 <sup>nd</sup> sampling   | 97   |
| 16 c Temperature (°C) vs Conc. of DDT group in sample for 1 <sup>st</sup> and 2 <sup>nd</sup> sampling          | 97   |
| 17 a pH vs Concentration of BHC group in oyster sample for 1 <sup>st</sup> and 2 <sup>nd</sup> sampling         | 98   |
| 17 b pH vs Conc. of Cyclodiene group in Oyster sample for 1 <sup>st</sup> and 2 <sup>nd</sup> sampling          | 98   |
| 17 c pH vs concentration of DDT group in Oyster sample for 1 <sup>st</sup> and 2 <sup>nd</sup> sampling         | 98   |
| 18 Result PSA analysis of Merchang river (1st sampling)   | 99   |
| 19 Result PSA analysis of Merchang river (2nd sampling)   | 100  |
| 20 a The Mean size, Sorting, Skewness and Kurtosis (phi) for 1st sampling                                       | 101  |
| 20 b The Mean size, Sorting, Skewness and Kurtosis (phi) for 2 <sup>nd</sup> sampling                           | 101  |
| 21 Photos of variety apparatus and sampling sites   | 102  |

## ABSTRACT

Concentrations of organochlorine pesticides (OCPs) in tissue of oyster (*Crassostrea irradaiei*) and sediment in the Merchang river, Marang were determined. The distribution of OCPs in the Merchang river involved 7 sampling stations for the sediment sample while 6 (1<sup>st</sup> sampling) and 3 station (2<sup>nd</sup> sampling) for the oyster sample. Oyster, filter feeder and sedentary organisms, were use in order to test OCPs pollution. OCPs compound were widely distributed in Merchang river environment, with BHC, cyclodiene and DDT group contamination being particularly prevalent. The results showed that OCPs widely existed in the sediment sample compared to the oysters sample. During the 1<sup>st</sup> sampling in sediment, concentration of  $\Sigma$ BHC ranged from 3.67-136.78 ng/g, followed by  $\Sigma$ cyclodiene from 5.78-42.52 ng/g and  $\Sigma$ DDT was ranged from 5.32-35.71 ng/g. Meanwhile, in the oysters sample concentration of  $\Sigma$ BHC varied from 0.034-3.31 ng/g,  $\Sigma$ cyclodienes varied from 0.17-83.93 ng/g and  $\Sigma$ DDT from 5.52-8.69 ng/g. However, during the 2<sup>nd</sup> sampling there were only three stations that was detected in the oyster, with the range of  $\Sigma$ BHC from 4.76-31.72 ng/g,  $\Sigma$ cyclodiene between 26.37-82.89 ng/g and  $\Sigma$ DDT from 17.73-62.58 ng/g. The concentration of total BHC in different station of sediment varied from 0.0008-151.994 ng/g, followed by concentration of total cyclodiene varied from 0.17-83.93 ng/g and  $\Sigma$ DDT was ranged from 5.52-8.69 ng/g. The occurrence of these residual pesticides in the Merchang river can be attributed to the intense agriculture and urban activity around the area.

## ABSTRAK

Kepekatan OCPs di dalam tisu tiram (*Crassostrea irradalei*) dan sedimen dalam sungai Merchang, Marang ditentukan. Taburan pestisid berklorin dalam sungai Merchang melibatkan 7 stesyen sampling bagi sediment manakala 6 stesyen untuk sampling 1 dan 3 stesyen bagi sampling ke-2. Tiram merupakan organisma yang tinggal di tanah dan makan secara menapis digunakan dalam kajian pestisid berklorin. Bahan pestisid berklorin secara meluas tersebar di persekitaran sungai Merchang khususnya dengan kontaminasi kumpulan BHC, cyclodiene dan DDT. Keputusan menunjukkan pestisid berklorin wujud dengan meluas dalam sampel sedimen berbanding di dalam sampel tiram. Semasa sampling pertama dalam sedimen, kepekatan  $\Sigma$ BHC adalah di terletak antara 3.67-136.78 ng/g, diikuti oleh  $\Sigma$ cyclodiene di antara 5.78-42.52 ng/g dan  $\Sigma$ DDT dalam julat 5.32-35.71 ng/g. Manakala dalam sampel tiram menunjukkan kepekatan  $\Sigma$ BHC pelbagai dari 0.034-3.31 ng/g, diikuti  $\Sigma$ cyclodienes berjulat antara 0.17-83.93 ng/g dan  $\Sigma$ DDT dalam 5.52-8.69 ng/g. Walaubagaimanapun, semasa sampling yang ke-2, hanya 3 stesyen yang dapat dikesan dalam sample tiram dengan julat  $\Sigma$ BHC dari 4.76-31.72 ng/g,  $\Sigma$ cyclodiene dalam lingkungan 26.37-82.89 ng/g dan  $\Sigma$ DDT dari 17.73-62.58 ng/g. Kepekatan jumlah BHC dalam stesyen yang berbeza yang terdapat pada sediment adalah berjulat antara 0.0008-151.994 ng/g, diikuti oleh kepekatan jumlah cyclodiene berjulat antara 0.17-83.93 ng/g dan  $\Sigma$ DDT dalam lingkungan 5.52-8.69 ng/g. Kehadiran pestisid dalam sungai Merchang adalah disebabkan oleh aktiviti agrikultur dan pembangunan yang meluas di kawasan tersebut.