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RESEARCH REPORT

DEPARTMENT OF CHEMISTRY AND TECHNOLOGY  
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**STUDY ON THE DISTRIBUTION AND HYDROCARBON CONTENT  
(ALIPHATIC AND AROMATIC) IN GASTROPODS RELATED TO SURFACE  
SEDIMENTS IN THE ESTUARINE RIVER SYSTEM OF KERTEH, DUNGUN,  
TERENGGANU**

**By  
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## LIST OF ABBREVIATIONS

<b>SYMBOL</b>	<b>Short form for</b>		
TAH	Total Aliphatic Hydrocarbons	μl	Micro liter
PAH	Polycyclic Aromatic Hydrocarbons	g	Gram
TEL	Total Extractable Lipid	cm	Centimeter
μg.g <sup>-1</sup>	Micro gram per gram	Ceri	<i>Cerithidae sp.</i>
Mg.g <sup>-1</sup>	Mili gram per gram	Neri	<i>Neritidae sp.</i>
DCM	Dichloromethane	ml	Milliliter
GC	Gas Chromatography		
°C	Degree Celsius		
Kpa	Kilo Pascal		
ww	Wet weight		
%	Percentage		
>	Greater than		
<	Lower than		
MeOH	Methanol		
Na <sub>2</sub> SO <sub>4</sub>	Sodium sulfate		
BOD	Biological Oxygen Demand		
C	Carbon		
H	Hydrogen		
PCB	Poly Chlorinated Biphenyls		

## ABSTRACT

The research was conducted at Kerteh Estuaries, which 30 km from the river is a Kerteh Petroleum Industries located. The aims is to evaluate the many sources of pollution such as fishing village, oil spill from the sand mining and drainage from the petroleum industries considering surface runoff and drainage system. Though, it cannot be related directly but it is essential to conduct a research so that preliminary assessment could be conduct if needed. This research is focusing on mollusk phyla class Gastropoda because of it behavior suit to become a biological monitoring devices. Initially, 5 stations were chosen randomly according to GPS reading. Sampling was done twice, first during the post monsoon season, end of July and second sampling during the pre-monsoon season, end of December. This will hopefully determine the differences or variation on the concentration of the hydrocarbon substances traces. In the second sampling, for the TEL analysis, I've been advice to add the total sample weight from 5 g in 1<sup>st</sup> sampling to 10 g in 2<sup>nd</sup> sampling to enhance the volume of lipid. For the first sampling, the concentration ([ ]) value for TAH considering all the 5 station range from 0.1423 ng.g<sup>-1</sup> wet weight (ww) to 3.4894 ng.g<sup>-1</sup> ww. Meanwhile, the values for [PAH] range from 0.1966 ng.g<sup>-1</sup> ww to 3.4088 ng.g<sup>-1</sup> ww. In the second sampling, the [TAH] value range from 0.1738 µg.g<sup>-1</sup> to 3.7432 ng.g<sup>-1</sup>. While for the [PAH] value, it range from 0.0720 ng.g<sup>-1</sup> till 22.0931 ng.g<sup>-1</sup>.

The total concentration of Hydrocarbon substances in the sampled organisms is important to determine its absorbing and storage capabilities. For the first sampling, the highest concentration of TAH in Cerithidae sp. is 2.9689 ng.g<sup>-1</sup> otherwise for Neritidae sp. is 3.4894 ng.g<sup>-1</sup>. Meanwhile, for the [PAH] value is 3.4088 ng.g<sup>-1</sup> for Cerithidae sp. and 1.6885 ng.g<sup>-1</sup> for the Neritidae sp. For the second sampling, in Cerithidae sp. the [TAH] value is 2.2016 ng.g<sup>-1</sup> and in Neritidae sp. are 2.9715 ng.g<sup>-1</sup>. For the [PAH], in Cerithidae sp. the value is 2.6149 ng.g<sup>-1</sup> and in Neritidae sp. is 22.0931 ng.g<sup>-1</sup>. The dominant TAH species for both sampling analysis are C<sub>4</sub>, C<sub>5</sub>, C<sub>6</sub>, C<sub>7</sub>, C<sub>19</sub>, and C<sub>20</sub>. PAH substances that abundant are Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Acenaphthene, Fluoranthene, Pyrene, and Naphthalene. In my opinion, a schedule Environmental Survey should be conducted by KUSTEM join venture by PETRONAS to assign proper environmental management. Previous research also needs to be revised and compared as an indicator of pollution occurrences. If possible, the Fisheries Dept. or Marine Dept. should clean the oil spill and plan scheduled monitoring action.

## ABSTRAK

Kajian ini dijalankan di kawasan sistem muara Kerteh, Dungun, Terengganu. Muara ini terletak lebih kurang 30 km dari kawasan perindustrian minyak utama bahagian pantai timur semenanjung Malaysia. Tujuan kajian ini dilakukan adalah untuk menilai dan mengkaji sejauh mana sumber-sumber yang boleh mencemar ekosistem akuatik yang terdapat di sekitar muara menjejaskan sistem muara Sungai Kerteh. Sumber-sumber yang dimaksudkan adalah seperti Kampung Nelayan, Kuari pengambilan pasir, dan kawasan perindustrian minyak Kerteh. Aspek pencemaran yang diambil kira adalah melalui parit saluran dan juga tumpahan minyak dari bot-bot nelayan dan kuari. Secara tidak langsung, kajian ini dapat menjadi asas yang kukuh dalam memastikan langkah-langkah pencegahan dan penyelesaian dalam menyelesaikan masalah pencemaran. Kaedah yang digunakan dalam kajian ini adalah Kawalan Biologi yang menumpukan organisma filum Molluska dalam kelas *Gastropoda sp.* Pada perigkat awal, sampel organisma kajian akan diambil dari 5 stesyen yang kedudukannya ditentukan daripada bacaan Global Positioning System (GPS). Kelima-lima stesyen ini terletak dalam lingkungan 10 – 15 km dari jambatan jalan raya Kerteh. Penyampelan dijalankan sebanyak 2 kali iaitu pada hujung bulan Ogos iaitu semasa musim kemarau (panas) dan pada bulan Disember semasa musim tengkujuh (hujan). Perbezaan keadaan cuaca ini diharapkan dapat membantu dalam memperolehi data yang berbeza dari segi kandungan hidrokarbon dalam organisma Kajian. Pada penyampelan kedua, saya dinasihatkan untuk menambah jumlah ekstrak tisu dari 5 g pada sampling pertama kepada 10 g pada sampling kedua. Ini bertujuan untuk meningkatkan jumlah TEL yang diperolehi. Dalam penyampelan



pertama, julat nilai kepekatan ([ ])\_TAH untuk kelima-lima stesyen adalah dari 0.1423 ng.g<sup>-1</sup> berat basah (ww) hingga 3.4894 ng.g<sup>-1</sup> ww. Manakala untuk PAH pula dari 0.1966 ng.g<sup>-1</sup> ww hingga 3.4088 ng.g<sup>-1</sup> ww. Pada penyampelan kedua, julat nilai [TAH] yang diperolehi adalah dari 0.1738 ng.g<sup>-1</sup> hingga 3.7432 ng.g<sup>-1</sup>. manakala bagi [PAH] dari 0.0720 ng.g<sup>-1</sup> hingga 22.0931 ng.g<sup>-1</sup>. Kepekatan bahan pencemar hidrokarbon dalam organisma kajian akan dapat membantu pemilihan organisma kawalan yang tepat dan boleh berakumulasi dalam kajian kawalan biologi ini. Pada penyampelan pertama, [TAH] tertinggi dalam spesies *Cerithidae sp.* ialah 2.9689 ng.g<sup>-1</sup> di stesyen 5. Manakala dalam spesies *Neritidae sp.* kepekatan tertinggi yang dicatatkan ialah 3.4894 ng.g<sup>-1</sup> di stesyen 2. Manakala untuk [PAH] pula, kepekatan tertinggi untuk *Cerithidae sp.* yang dicatatkan bernilai 3.4088 ng.g<sup>-1</sup> di stesyen 5 dan 1.6885 ng.g<sup>-1</sup> untuk *Neritidae sp.* juga di stesyen 5. Pada penyampelan kedua, nilai [TAH] tertinggi yang dicatatkan dalam *Cerithidae sp.* adalah 2.2016 ng.g<sup>-1</sup> di stesyen 2 manakala dalam *Neritidae sp.*, 2.9715 ng.g<sup>-1</sup> di stesyen 3. Bagi [PAH] pula, untuk *Cerithidae sp.* nilainya adalah 2.6149 ng.g<sup>-1</sup> di stesyen 2, *Neritidae sp.* adalah 22.0931 ng.g<sup>-1</sup> dalam stesyen 3. Spesies TAH yang dominan adalah C<sub>4</sub>, C<sub>5</sub>, C<sub>6</sub>, C<sub>7</sub>, C<sub>19</sub>, and C<sub>20</sub>. Bagi PAH pula, spesies yang dominant adalah Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Acenaphthene, Fluoranthene, Pyrene, dan Naphthalene. Apa yang dapat saya syorkan disini adalah, aspek-aspek kerjasama antara pertubuhan dan kelab (NGO) serta pihak kerajaan sendiri sepatutnya menjalankan aktiviti pemantauan dan penyelidikan berkala untuk menghasilkan sistem pengurusan hutan yang efisien dan bersifat jangka panjang. Badan berkaitan seperti Jabatan laut dan Jabatan perikanan sewajarnya memandang serius aspek pencemaran ini. Kajian-kajian lepas seharusnya dirujuk untuk tujuan perbandingan.