

**THE USE OF FATTY ACID BIOMARKERS TO  
DEFINE THE ORIGIN OF ORGANIC  
MATERIAL IN KERTEH WARER SYSTEM**

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ORGANIC MATERIAL IN KERTEH WARER SYSTEM**

**By**

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**JABATAN SAINS MARIN  
FAKULTI PENGAJIAN MARITIM DAN SAINS MARIN  
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**PENGAKUAN DAN PENGESAHAN LAPORAN PROJEK  
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Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk:

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## LIST OF ABBREVIATIONS

$\Omega$	-	omega
FA	-	fatty acid
SAFA	-	saturated fatty acid
PUFA	-	polyunsaturated fatty acid
MUFA	-	monounsaturated fatty acid
EPA	-	eicosapentanoic acid
DHA	-	docosapentanoic acid
GC	-	gas chromatography
HPLC	-	high performance liquid chromatography
GC-FID	-	gas chromatography flame ionized detector
FAMES	-	fatty acid methyl ester
ANOVA	-	analysis of variance
Ns	-	not significant

## LIST OF APPENDICE

Appendix 1 : Figures of laboratory work

## ABSTRACT

Fatty acid composition in sediments, water and organisms (*Telescopium telescopium*, *Elimia clenchi*, *Penaeus monodon*, *Chiromantes eulimene*) from Kerteh river, lagoon and Petronas Port harbour was determined. These samples were collected in April 2010 in order to define the origin of organic material as assessed by fatty acid markers. Lipid extraction was done using one-step method. The fatty acid profile of sediment characterized by higher level of PUFAs in every locations. At Kerteh river, there was 90.4 % of PUFAs followed by 57.0% of PUFAs at Petronas Port harbour (sea) while 39.0 % at lagoon. There were five fatty acid markers identified in all samples which are mangrove leaves, microalgae, diatoms, bacteria and zooplankton. Mangrove leaves and zooplankton were found dominated in the river while at lagoon mangrove leaves were dominated and at the Petronas Port Harbour mangrove leaves and bacteria were dominated in the area. The existence of the fatty acids C18:3n3 indicates the mangrove detritus sources where it occur in all samples and at all locations. From the result obtained, the fatty acid biomarkers has determined the sources of organic material in sediments, SPMs and organisms from river, lagoon and port area. The results indicate that the origin of organic material in Kerteh water system which were Kerteh river, lagoon and Petronas Port harbour suggest they were contributes from autochthonous sources as the mangroves leaves (C18:3n3) shows their occurrence in all samples and all locations.

# PENGGUNAAN BIOMARKER ASID LEMAK UNTUK MENENTUKAN ASAL-USUL BAHAN ORGANIK DALAM SISTEM AIR KERTEH.

## ABSTRAK

Komposisi asid lemak dalam sedimen, air dan organisma (*Telescopium telescopium*, *Elimia clenchi*, *Penaeus monodon*, dan *Chiromantes eulimene*) dari sungai Kerteh, lagun dan pelabuhan Petronas (laut) telah ditentukan. Sampel-sampel ini diambil pada bulan April 2010 dalam rangka untuk menentukan asal-usul bahan organik yang dinilai oleh penanda asid lemak. Pengekstrakan lipid dilakukan dengan menggunakan kaedah satu langkah. Profil asid lemak dari sedimen ditandai dengan tahap yang lebih tinggi iaitu PUFA disetiap lokasi. Di sungai Kerteh, terdapat 90.4% PUFA diikuti dengan 57.0 % juga dari PUFA di pelabuhan Petronas (laut) sementara di lagun ialah 39.0 % PUFA. Terdapat lima penanda asid lemak yang telah dikenal pasti di dalam semua sampel iaitu detritus bakau, mikroalga, diatom, bakteria dan zooplankton. Detritus bakau dan zooplankton dijumpai mendominasi kawasan sungai Kerteh sedangkan di lagun juga didominasi oleh detritus bakau manakala di pelabuhan Petronas pula didominasi oleh detritus bakau dan juga bakteria. Kewujudan penunjuk asid lemak C18:3n3, penunjuk bagi detritus bakau menunjukkan ianya wujud didalam semua sampel dan di semua lokasi. Keputusan kajian menunjukkan bahawa asal usul bahan organik di sistem air Kerteh di sungai Kerteh, lagun dan pelabuhan Petronas adalah dari sumber autochthonous sebagaimana keputusan analisis menunjukkan detritus bakau wujud dalam semua sampel dan di semua lokasi.