

THE DISTRIBUTION PATTERNS OF MICROBIAL AND ABIOGENIC
HYDROCARBONS IN SUBSEDIMENTED OF SINGAPORE MARINE
ENVIRONMENT

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THE DISTRIBUTION PATTERN OF ALIPHATIC AND AROMATIC
HYDROCARBONS IN SURFACE WATER OF SUNGAI KUANTAN,
KUANTAN, PAHANG.

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Adalah ini diakui dan disahkan bahawa laporan penyelidikan bertajuk:

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LIST OF ABBREVIATIONS / SYMBOLS

μL	microliter
%	percentage
cm	centimeter
g	gram
GC – FID	Gas Chromatography - Flame ionization Detector
GPS	Portable Global Position System
DCM	Dichloromethane
HCl	Hydrochloric Acid
IS	Internal Standard
L	Liter
LSC	Liquid-solid chromatography
s	second
min	minute
h	hour
mL	milliliter
mm	millimeter
Na ₂ SO ₄	Anhydrous Sodium Sulphate
°C	Celsius
AH	Aliphatic Hydrocarbons
TAH	Total Aliphatic Hydrocarbon
PAH	Polycyclic Aromatic Hydrocarbon
ppm	part per million
RF	Respond Factor

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ABSTRACT

Twenty four (24) individual aliphatic hydrocarbons (n -C₈ to n -C₃₂) and sixteen (16) individual polycyclic aromatic hydrocarbons (PAHs: 2- to 6-rings) were simultaneously measured in 24 surface water samples from eight (8) station along the Kuantan River. The total identified aliphatic hydrocarbons were in the ranged from 2.75 $\mu\text{g.L}^{-1}$ to 10.85 $\mu\text{g.L}^{-1}$ and C_{max} was observed mainly at C₂₅. The long chain (C>25) n-alkane prevailed in most stations and accounted for >80% of total identified aliphatic hydrocarbons. In general, the modal distribution showed no noticeable even/odd preference as reflected in CPI_{25 31} suggesting anthropogenic nature of the hydrocarbon as primary sources for the water. Meanwhile, the sum of PAH concentrations in surface water was observed in the ranged of none detected (ND) to 5.64 $\mu\text{g.L}^{-1}$ and was dominated by 2- to 3-rings (low molecular mass) and 4- to 6-rings (high molecular mass). Thus, from the PAHs distribution pattern and diagnostic ratio suggested a mixture of both petrogenic and pyrolytic in most of the station in Kuantan River samples. The hydrocarbons data from Kuantan River did not reached the alarming level and considered as in safety condition.

ABSTRAK

Dua puluh empat (24) sampel dari 8 stesen di sepanjang Sungai Kuantan telah dianalisa bersama dengan 24 spesis alifatik hidrokarbon ($n\text{-C}_8$ sehingga $n\text{-C}_{32}$) dan enam belas (16) spesis polisiklik aromatik hidrokarbon (PAHs). Jumlah alifatik hidrokarbon yang dikenalpasti berada dari julat $2.75\mu\text{g.L}^{-1}$ sehingga $10.85\mu\text{g.L}^{-1}$ dan kebanyakan karbon maksimum wujud pada C_{25} . Rantai panjang ($\text{C}>25$) n-alkana paling banyak dikesan dan mencatat hampir 80% daripada jumlah alifatik hidrokarbon yang dikenalpasti. Secara keseluruhan, jenis taburan n-alkane tidak menunjukkan perbezaan yang ketara. Indeks Penentuan Karbon (CPI₂₅₋₃₁) menjelaskan, taburan sedemikian menunjukkan kehadiran hidrokarbon anthropogen semulajadi sebagai sumber asas di dalam Sungai Kuantan. Jumlah PAHs yang dikenalpasti pula berada dari julat tidak dapat dikesan (ND) sehingga $5.64\mu\text{g.L}^{-1}$ dan didominasi oleh molekul yang mempunyai 2- hingga 3- gelang (jisim molecular rendah) dan 4- hingga 6- gelang (jisim molecular tinggi). Dengan ini, jenis taburan PAHs dan pecahan antara molecular-molekular mencadangkan kewujudan hasil percampuran sumber petrogenik dan sumber pyrolisis di kebanyakan stesen. Walau bagaimanapun, data hidrokarbon ini tidak mencapai tahap kritikal dan berada dalam keadaan yang selamat untuk diguna.