The Malaysian Journal of ANALYTICAL SCIENCES ISSN 1394-2506

ALIPHATIC HYDROCARBONS IN SURFACE SEDIMENTS FROM SOUTH CHINA SEA OFF KUCHING DIVISION, SARAWAK

(Hidrokarbon Alifatik di Permukaan Enapan Laut Cina Selatan Bahagian Kuching)

Hafidz B. Yusoff[1], Zaini B. Assim[1*], Samsur B. Mohamad[2]

[1]Department of Chemistry,
[2]Department of Aquatic Sciences,
Faculty of Resource Sciences and Technology,
Universiti Malaysia Sarawak,
94300 Kota Samarahan, Sarawak

**Corresponding author: zaini@frst.unimas.my*

Abstract

Eighteen surface sediment samples collected from South China Sea off Kuching Division, Sarawak were analyzed for aliphatic hydrocarbons. These hydrocarbons were recovered from sediment by Soxhlet extraction method and then analyzed using gas chromatography equipped with mass spectrometer (GC/MS). Total concentrations of aliphatic hydrocarbons in surface sediments from South China Sea off Kuching division are ranged from 35.6 ug/g to 1466.1 ug/g dry weights. The sediments collected from Bako Bay, Kuching showed high concentrations of total aliphatic hydrocarbons. Several molecular indices were used to predict the predominant sources of hydrocarbons. Carbon preference index (CPI) value revealed widespread anthropogenic input in this study area (CPI= 0 to 4.1). The ratio of $C_{31}/C_{19}$and C_{29}/C_{31}indicated that major input of aliphatic hydrocarbon mostly transfer by lateral input to the marine environment than atmospheric movements. Generally, the concentrations of aliphatic hydrocarbons in sediment from South China Sea off Kuching division are generally higher compare to other area in the world.

Keywords: Aliphatic hydrocarbons, surface sediment, South China Sea, Soxhlet extraction, gas chromatography/mass spectrometer (GC/MS), carbon preference index (CPI)

Abstrak

Kajian telah dilakukan terhadap lapan belas enapan permukaan Laut Cina Selatan bahagian Kuching. Sampel enapan ini telah dianalisis bagi mengenalpasti kandungan hidrokarbon alifatik. Hidrokarbon alifatik daripada enapan telah diekstrak dengan menggunakan kaedah pengekstrakan Soxhlet dan dianalisis dengan menggunakan kromatografi gas/spektrometer jisim (KG/SJ). Jumlah kepekatan hidrokarbon alifatik adalah dalam julat 35.6 ug/g sehingga 1466.61 ug/g berat kering. Sampel enapan dari Teluk Bako menunjukkan kandungan hidrokarbon aliftik yang tinggi. Indek penanda hidrokarbon telah digunapakai untuk mengenalpasti sumber hidrokarbon. Indek kecenderungan karbon (IKK) menunjukkan taburan hidrokarbon antropogenik yang tinggi di kawasan kajian (IKK= 0 sehingga 4.1). NisbahC_{31}/C_{19} dan C_{29}/C_{31} menunjukkan kebanyakan sumber hidrokarbon alifatik dipindahkan secara lateral ke kawasan persekitaran marin. Secara umumnya, kandungan hidrokarbon alifatik di Laut China Selatan bahagian Kuching adalah tinggi berbanding dengan kawasan lain di seluruh dunia.

Kata kunci: Hidrokarbon alifatik, enapan permukaan, Laut China Selatan, pengekstrakan Soxhlet, kromatografi gas-spektrometer jisim (KG-SJ), indek kecenderungan karbon (IKK)

Introduction

Kuching is one of the most urbanized and developed areas in Sarawak. The term of development usually covers the usage of well-known energy of oil. Oil includes variety of compounds and elements such as aliphatic hydrocarbons that is potential for environmental hazard for ecosystem and human life. Aliphatic hydrocarbons are ubiquitous sedimentary contaminants due to their tendency to accumulate in sediments. Sedimentary aliphatic hydrocarbons have both natural and anthropogenic sources. The anthropogenic hydrocarbons in sediment originate mainly from petroleum residues but natural hydrocarbons produce by organism such as planktons, algae and bacteria or come