

POLYCYCLIC AROMATIC HYDROCARBON (PAH) CONTAMINATION IN THE SEDIMENTS OF EAST COAST PENINSULAR MALAYSIA

Md Suhaimi Elias*, Ab. Khalik Wood, Zaleha Hashim, Wee Boon Siong, Mohd Suhaimi Hamzah, Shamsiah Abd. Rahman, Nazaratul Ashifa Abdullah Salim and Ariffin Talib

Analytical Chemistry Application Laboratory, Industrial Technology Division, Malaysia Institute For Nuclear Technology Research (MINT), Bangi, 43000 Kajang, Selangor

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Abstract

The polycyclic aromatic hydrocarbons (PAHs) are pollutants of concern due to their persistent in the marine ecosystem, thus its can cause long-term adverse effect to the marine life. In this study the concentrations of PAHs in east coast Peninsular Malaysia sediments were determined. About ten stations along the east coast of the coastal area were selected to collect sediment samples using grab sampler. The PAHs from the sediment samples were soxhlet extracted using mixture of hexane and dichloromethane (DCM). Fractionation was done using the silica-alumina column. About 17 compounds of the PAHs were determined using the Gas Chromatography-Mass Spectrometer (GCMS model QP5050A). The Σ PAHs was found in range between 0.26 μ g/g to 0.59 μ g/g dry weight. The data from the study signified that the main source of PAHs in the sediment of the east coast peninsular Malaysia is originated from the pyrolytic source.

Abstrak

Pencemaran polisiklik aromatik hidrokarbon (PAH) di beri perhatian disebabkan oleh sifatnya yang gigih dalam ekosistem marin, ia boleh menyebabkan kesan buruk kepada kehidupan marin dalam jangka masa panjang. Pengukuran kepekatan PAH dalam sediment di pantai timur Semenanjung Malaysia dijalankan dalam kajian ini. Sepuluh lokasi telah dipilih disepanjang kawasan pantai timur untuk diambil sampel sedimen menggunakan pensampel cangkup. PAH daripada sampel sedimen dijalankan ekstraksi soxhlet menggunakan campuran heksana dan diklorometana (DCM). Pemisahan dilakukan menggunakan turus silica/alumina. 17 sebatian PAH ditentukan dengan menggunakan Gas Kromatografi-Spektrometer Jisim (GC-MS model QP5050A). Σ PAH yang diperolehi adalah diantara 0.26 μ g/g hingga 0.59 μ g/g berat kering. Data daripada kajian ini menunjukkan punca utama pencemaran PAH di dalam sedimen diperairan pantai timur Semenanjung Malaysia berasal dari sumber pirolitik.

Introduction

Polycyclic aromatic hydrocarbons (PAHs) are of concern because they are widely distributed in the environment and many of them have toxic and carcinogenic properties [1-5]. PAHs are common organic contaminants and generally generated from the natural and anthropogenic processes. They can be introduced into the marine environment by various ways such as oil spill, urban runoff, domestic and industrial wastewater discharges.

Many research works on the organic geochemistry of PAHs has been done in order to understand their origins and some criteria have been developed to distinguish between different sources of PAHs from natural or anthropogenic. According to the formation mechanism, anthropogenic PAHs can be classified as pyrolytic and petrogenic. Pyrolytic PAHs are formed as a consequence of incomplete fuel combustion whereas petrogenic PAHs are mainly derived from the crude oil or unburned fuel and its refined products.

The major activities along the east coast Peninsular Malaysia area are fishery, tourism activities and petroleum production. Study on PAHs contents along the east coast off Peninsular Malaysia is still limited. In this present study, organic contamination (PAHs) were selected because they are important to the public health and also for base linedata and/or information. The goal of this work was to determined the concentration of PAH compound in the sediment and assess the possible source of these compounds whether anthropogenic or biogenic.