

THE USE OF MOLECULAR MARKER FOR IDENTIFICATION OF OIL POLLUTION IN MALAYSIAN MARINE MUSSELS

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Introduction

Oil spills in the Straits of Malacca has occurred frequently in the past few decades. The Straits of Malacca is one of the busiest waterways in the world. It is a major route for transporting crude oil to East Asia and North East Asia. For the health of the environment, it is very important to determine the exact source of these minor and major spills. In the past analyses of oil samples, oleanane (hopane molecular marker) have been detected (Eganhouse, 1997). Oleanane is very specific to East Asian oil. Therefore, one of the objectives of this study is to look for this specific hopanes in the mussels. Marine mussels is an excellent organisms to uptake the oil residues reaching coastal areas over long period of time (Moldowan and Peters, 1993). They are immobile species; persistent to high level of pollution; large population for repeated samplings and important seafood, among others.

Materials and Methods

Mature adult population of mussels (25 individuals) were sampled and tissues removed. The tissues were homogenised and extracted. The extracts was purified and fractionated using silica gel column chromatography. Fractionated components were analysed by capillary GC-MS for hopanes.

Results and Discussion

Oleanane were found in mussels samples. Oleanane is one of the types of hopanes that can be used as marker molecule for petroleum source for the Straits of Malacca. However, our past analyses of lubricating oil (BP and Petronas, Malaysia) did not reveal the presence of oleanane. Our present assumption is that, BP and Petronas may not use local petroleum source for the lubricating oil, hence the absence of oleanane. The use of pentacyclic triterpanes and oleanane has been suggested for biomarkers for source identification of oil pollution in Malaysia.

Conclusions

Pentacyclic tripterpanes (hopanes) is extremely useful tool for source identification of oil pollution in Malaysian coastal environments.

References

- Eganhouse, R.P. 1997. "Molecular Markers and Environmental Organic Geochemistry: An Overview", in R.P. Eganhouse, ed., *Molecular Markers in Environmental Geochemistry*, American Chemical Society, Washington D.C. p.1-20.
- Moldowan, J.M. and Peters, K.E. 1993. "The Biomarker Guide: Interpreting Molecular Fossils in Petroleum and Ancient Sediments", Prentice-Hall, Englewood, N.J.