

Source identification of hydrocarbons in surface sediment of the Persian Gulf in Bushehr province using *n*-alkane biomarkers

Mehdi Dashtbozorg¹

Alireza Riyahi Bakhtiari^{2*}

Mohammad Reza Shushizadeh³

Lobat Taghavi⁴

1. Student of Environmental Science, Science and Research Branch, Faculty of Natural Resources and Environment, Islamic Azad University, Tehran, Iran

2. Department of Environmental Sciences, Faculty of Natural Resources and Marine Sciences, Tarbiat Modares University, Noor, Iran

3. Department of Medicinal Chemistry, Marine Pharmaceutical Science Research Center, Ahvaz Jundishahpour University of Medical Science, Ahvaz, Iran

4. Department of Environmental Science, Science and Research Branch, Faculty of Natural Resources and Environment, Islamic Azad University, Tehran, Iran

***Corresponding author:**

Riahi@modares.ac.ir

Received date: 2020.01.16

Reception date: 2020.03.05

Abstract

This study aimed to determine the origin of hydrocarbons in surface sediment of the Persian Gulf coasts in Bushehr province using *n*-alkane biomarkers in 2018. For this purpose, 8 main stations and 3 points from each main station were selected for sampling. The samples were collected from surface sediments (0-5 cm) at 24 selected points of coastal zone of Bushehr province. Experiments in this study were performed on each sample with 3 replications. The results showed that the highest clay content was found in Bahregan port sediment sample (62%) and the lowest in Naiband sediment sample (28%), the highest silt content in Mond sediment sample (34%) and the lowest in Genaveh port sediment sample (23%) and the highest amount of sand in the sediment sample of Asalouyeh port (45%) and the lowest in the sediment sample of Bahregan port (13%). Total organic matter (TOM) content was also determined in sediment samples 18.8 (AP-3) - 264.4 (GP-2) mg/g dry weight (mean=47.7±52). The results of measurement of *n*-alkanes by gas chromatography (GC-MS) showed that the highest *n*-alkanes belonged to Genaveh-2 (GP-2) with 220626 µg/g dry weight and the lowest to Asalouyeh-3 (AP-3) with 404 µg/g dry weight. One-way ANOVA showed that the amount of total organic matter and *n*-alkane compounds in sediments of different stations was significantly different ($P < 0.05$). The amount of *n*-alkanes in the studied sediments showed that they are highly contaminated according to the international criteria. To determine the source of *n*-alkanes from CPI indices (0.1-2) and biomarkers such as Pr/Ph (0.1-2), Pr/*n*-C₁₇ (0.4-3.6), Ph/*n*-C₁₈ (0.2-3.7), LMW/HMW (0.1-1.5) and U/R (10.3-75.1) were used. The results showed that the hydrocarbons in the surface sediments of the study area are of petrogenic origin, which may be due to oil leakage from crude oil pipelines, leakage from petroleum exploitation platforms, oil tanker traffic and other factors.

Keywords: Source identification, Biomarkers, *n*-alkane, Surface sediment, Persian Gulf.