

6th International Conference on

GREEN ENERGY AND EXPO

August 29-31, 2018 | Toronto, Canada

Evaluation of concentration and origin of petroleum hydrocarbons in coastal sediment of babolrood in Caspian Sea

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Due to various human activities such as mining, refining, transport, and export of crude oil and related products, petroleum hydrocarbons penetrate into marine environment through either municipal sewage network or natural biological sources. These hydrocarbons penetrate into marine sediments and based upon the composition and discharging conditions, they damage the marine environment. In this research, a pollution assessment has been conducted on the river-bed sediments of the Babolrood River. Also, by the coastal area of the Caspian Sea near the mouth of the Babolrood River, the concentrations of total petroleum hydrocarbons (TPH) and polycyclic aromatic hydrocarbons (PAH) were measured through sampling. Three sediment samples were collected from the very end of the Babolrood River and ten sediment samples were collected from the coastal area of the Caspian Sea by the mouth of the Babolrood River where it is highly affected by the plume of the river. Afterward, the concentrations of a variety of petroleum hydrocarbon compounds were measured using gas chromatography. At the end of the Babolrood River, the total petroleum hydrocarbons concentrations vary between 294 to 367 ppm which set the pollution level at moderate to high. In the coastal area in which the samples were collected, the total petroleum hydrocarbons concentrations vary between 52 to 191 which set the pollution level at moderate to high. The measured value declines as getting away from the coast. Using a number of existing indicators, the origin of aliphatic and aromatic compounds, biological surface degradation and weathering of the sediment samples were investigated. The results show that the origin of the majority of petroleum hydrocarbons in the coastal area near the mouth of the Babolrood River, exposed to the plume of the river, is fossil-fuel sources. However, results from a single sample collected from the west side of the river mouth and outside the plume impact zone exhibits a biological origin for the petroleum hydrocarbons. In general, the obtained results demonstrate that the Babolrood River contains a substantial amount of oil pollutions. These oil pollutions at the end of the river and the coastal area next to the river mouth are caused by the pollution load from Babolrood city.

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