Republic of Yemen

Sana'a University
Faculty of Petroleum and Natural Resources

الجمهورية اليمنية

جـامعة صنعـاء
كليـــة البترول والموارد الطبيعية

A report on the discussion of the Msc. thesis submitted by
Researcher/ Moheeb Abdu Othman Al Saleh

On Saturday, Nov,22, 2023, a public discussion was held at the Faculty of Petroleum and Natural Resources of the master's thesis submitted to the Department of Environmental Sciences by student Moheeb Abdu Othman Al Salehi, entitled "Study on Biodegradation of Petroleum Hydrocarbons in the Coastal Seawater Hodiadah Yemen." Under the supervision of Professor Dr. Nabil Abdo Ahmed Al Shwafi. The discussion committee was composed of:

1.ProfessorDr.Bassim Shaif Al Khirbash - Sana'a University - Internal Examiner - Chairman
2. Professor Dr. Nabil Abdo Ahmed Al Shwafi - Sana'a University, main Supervisor - member
3. Dr. Majed, Ali Abdullah Al Edressy, Hodiedah University, external Examiner - member

During which the student reviewed the most prominent results included in his study, and highlighted the results Determination and the Concentrations of Total Aliphatic Hydrocarbons N-Alkanes (TPH) and Identification of Petroleum-Degradation Bacteria in Surface water from The Red Sea Coast of Al-Hodeida City, Yemen. Abstract attached.

ABSTRACT

The present study was conducted to Determination and the Concentrations of Total Aliphatic Hydrocarbons N-Alkanes (TPH) and Identification of Petroleum-Degradation Bacteria in Surface water from The Red Sea Coast of Al-Hodeida City, Yemen. Four stations representing this coast was based on oil pollution discharge and Sampling was carried out on two seasons winter and summer during the year of 2021 and 2022. Samples were collected during the months of December 2021 and July 2022. The study of the hydrographical parameters of coastal seawater, Evaluate the concentration of TPH, Identifying the microbial composition prevalent in seawater polluted with oil and measuring its ability to consume hydrocarbons provided an idea of the hydrocarbon's pollution and the type of Petroleum-Degradation Bacteria in the investigated area.

The hydrographical parameters are: temperature, salinity, Hydrogen Ion Conc. (pH) and dissolved oxygen. The results obtained reflect the effect of the warm subtropical zone of the Red Sea coast of Yemen, seasonal variation, irregular topography,

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anthropogenic activities, as well as runoff from surrounding land and sewage discharge at these sites.

Concentrations of TPH were 9400.5 ug/l at Al-Hodeida harbor to 2409.7 ug/l at Al-Hodeida Power Plant in winter and from 4880.9 ug/l at Al-Hodeida Port to 1109.1 ug/l at Al-Hodeida Power Plant in summer, the highest concentration was observed at Al-Hodeida harbor, followed by Corniche of Al-Hodeida and Fishing port. These results reflect the TPH inputs from direct discharge of boats with two-stroke engine and the deposition of fuel combustion of boats and vehicles, boating activities, leakage of petroleum or the unscrupulous disposal of engine oil from boats and ferries, oil leakage during unloading the crude oils and its products yet, human errors, negligence and harbor traffic contribute effectively to the petrogenic pollution, sewerage, stormwater drains, and runoff from industrial (including Fishing port, and Al-Hodeida Harbor) as well as the residential and commercial areas. The seasonal variation of total petroleum hydrocarbons (TPH) was significantly lower in summer than in winter. The possible explanation of higher concentrations during winter is that total hydrocarbons discharge was greater than in summer also, temperature, the photo-oxidation, The intense solar radiation and evaporation is higher in summer.

Petroleum degrading bacterial counts in surface seawater (PDBCs) was from 1.10 x 10^3 CFU/mL and 2.94 x10^3 CFU/mL, high counts were obtained in summer. The bacteria isolated were belonged to an Aeromonas Hydrophila complex. Aeromonas Hydrophila Complex was capable of using 11% of 1997.169 ppm concentration used crude oil, in 15 days under laboratory conditions at 25 ◦C with Bushnell-Haas media.

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