

# Treating Oily Wastewater in Kurdistan Refineries and Oilfields

using Low Cost Adsorbents

**Diyar Salahuddin Ali**

**Salahaddin University –Science College – Chemistry Department**

**Diyar.ali@su.edu.krd**

The oil refineries in Kurdistan-Iraq unavoidably create large volumes of oily wastewater; thus ecologically adequate removal of oily wastewater is a challenge to the oil treatment. These days, more consideration has been focused around the treatment methods of oily wastewater. The water source here, which has been used for evacuating salts in the desalting unit in the Erbil treatment facility, is 6m<sup>3</sup>/hour. Oil companies in Kurdistan-Iraq do not apply modern techniques to remove contamination from wastewater, especially some specific materials like free and dissolve organic wastewater. Hazard appraisal methodologies are significant apparatuses for preventing any risks to human beings. However, the wrong application of these methodological instruments can impede its right usage. My project aims at treating oily wastewater in Kurdistan refineries using some low-cost materials acting as adsorbents. I carried out tests at three different locations in Kurdistan: Erbil, Sulaimaniah and Khurmala.

No one denies the benefit of oil refineries companies in economic development. However, the nature of their work, such as crude oil production, oil spills, petrochemical industry, oil refinery, lubricant and cooling agents, causes environmental problems. Chemical environmental pollution, including oily wastewater, is one of the most pressing ecological issues worldwide because of its high risks to the biological environmental system. is one of the most squeezing ecological issues made by production in oil fields. Oily wastewater contains harmful materials, such as polyaromatic hydrocarbons and paraffinic hydrocarbons that have detriment effects on plants and wildlife: fish, birds and vertebrate, cause cancer to humans. The treatment of slick wastewater is essential to protect a wide range of life from any possible risks. Therefore, my project focused on the treatment of wastewater by using raw materials such as clays and oil shale as a new and low-cost adsorbent to deal with the free and dissolvable oil portion from oily wastewater.

This method includes, first using these materials individually in the laboratory and if they give the desired results, they were used more extensively in subsequent trials. Three different types of wastewater contaminated with oil from several sources (Erbil refinery, Bazyan refinery, and Khurmala oilfield) were picked for testing the low coast adsorbent materials. Using different

techniques like TOC for determination of dissolved organic carbon, FT-IR for determine the adsorption of organic compounds on the surface clays and shale samples, also using same technique to get the significant bands of the organic fraction, XRD also used for determine type of minerals in the clay and shale samples and SEM were used for material surface analysis. 50 samples was taken for this work, some were excluded for not being valid.

During the implementation of the project I encountered several problems, the most of which are: First, the difficulty of obtaining the samples from oil refineries companies due to security reasons; secondly, the unavailability of the advance techniques for the characterization for characterization the oil shale and clay samples in the university, so I had to rely on personal relationships with commercial companies to do that; thirdly, extraction of clay from a depth of 30-50 cm.

The experiments of using clay and oil shale to treat wastewater caused by the use of water by oil refining companies were satisfactory. In addition to that some factors that have influence on the free oily wastewaters were tested, such as temperature and contact time; adsorption isotherm was used in these tests.