

Bioremediation of Hydrocarbon and Some Heavy Metal Polluted Wastewater Effluent of a Typical Refinery

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Abstract : Environment free of pollutants should be the concern of every individual but with industrialization and urbanization it is difficult to achieve. In view of achieving a pollution limited environment at low cost, a study was conducted on the use of bioremediation technology to remediate hydrocarbons and three heavy metals namely; copper (Cu), zinc (Zn) and iron (Fe) from a typical petroleum refinery wastewater in a closed system. Physicochemical and microbiological characteristics on the wastewater sample revealed that it was polluted with the aforementioned pollutants. Isolation and identification of microorganisms present in the wastewater sample revealed the presence of *Bacillus subtilis*, *Micrococcus luteus*, *Staphylococcus aureus* and *Staphylococcus epidermidis*. Bioremediation experiments carried out on five batch reactors with different compositions but at same environmental conditions revealed that treatment T5 (boosted with the association of *Bacillus subtilis*, *Micrococcus luteus*) gave the best result in terms of oil and grease content removal (i.e. 67% in 63 days). In addition, these microorganisms were able of reducing the concentrations of heavy metals in the sample. Treatments T5, T3 (boosted with *Bacillus subtilis* only) and T4 (boosted with *Micrococcus luteus* only) gave optimum percentage uptakes of 65, 75 and 25 for Cu, Zn and Fe respectively.

Keywords : boosted, bioremediation, closed system, aeration, uptake, wastewater

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