

Lab : 6

Soil Microbiology

Microbial decomposition of crude oil

There are many types of bacteria, fungi, and algae have the enzymatic ability to consumes petroleum hydrocarbons as the only source of carbon and energy and convert it into carbon dioxide and water, gas, as well as cellular materials, such as proteins and nucleic acids. This phenomenon have positive aspects where they can disposed of environmental pollution with oil and petroleum products.

These organisms play an important role in the treatment of oil pollution problem, dependent susceptibility microorganisms in the analysis of hydrocarbon compounds to the nature hydrocarbon compounds and proportions of oil and petroleum products, where crude oil contains hydrocarbon saturated, aromatic compounds and asphaltic an oxidized varying degrees by different microorganisms .

Such as bacteria:- *Pseudomonas* , *Nocardia* , *Polyangium* .

fungi :- *Aspergillus* .

yeast :- **Candida**.

Many factors affect the speed of analysis of the oil the most important : surface area exposed, the numbers of microorganisms , components and the type of oil , the time of exposure, aeration , temperature, nutrients , Ph and organism environment. the biodegradation of oil requires a suitable mixture of microorganisms , contact with oxygen and large amounts of nitrogen and phosphorus compounds and small amounts of other essential elements for the growth of all microorganisms.

To complete the analysis process efficiently required a mixture of different microbes, because oil is composed of a variety of hydrocarbons, therefore every microorganism specialist to analyze a specific type of hydrocarbon.

Procedure:

1- Distribute media a(mineral salts broth) at a rate of 50 ml in flasks (200 ml capacity) .

2- Add the oil 4% sterile with filtration (filter diameter of 0.45 M) and then inoculated flasks with 1g soil and leave some flasks without inoculated (control). The flasks closed to prevent volatilization of oil.

3- Incubated flasks in the incubator vibrating at 150 r/ min and a temperature of 28 C for 5 weeks ,then observe the growth , The oil drops in the broth have some changes; as reduced quantity, and discolored to dark, and looked great size because of microbial cells aggregate around it, microorganisms become in contact directly with the oil drops, which facilitates the transition of the drops and pass through the cell membrane to the cytoplasm.

As well as microorganisms growth led to mixing oil with salt components of the media ,then emulsified for short duration ,because the secretion of emulsified substances work to reduce the viscosity of the oil and then mixed with the aqueous phase.