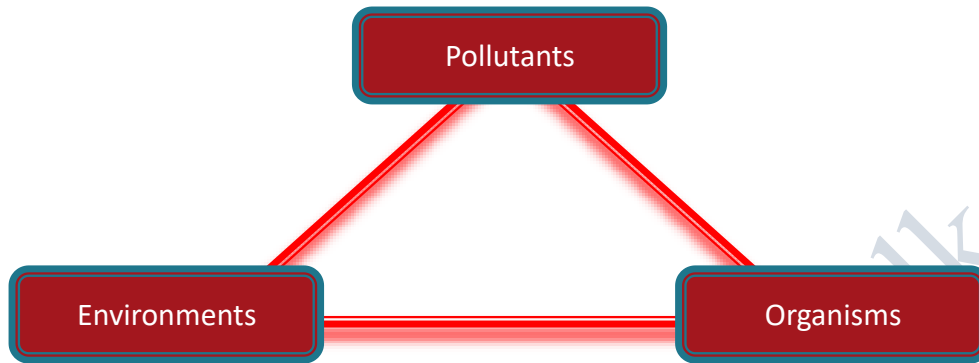


Methods and applications of Bioremediation

- ▶ Bioremediation is a triple-corners process:

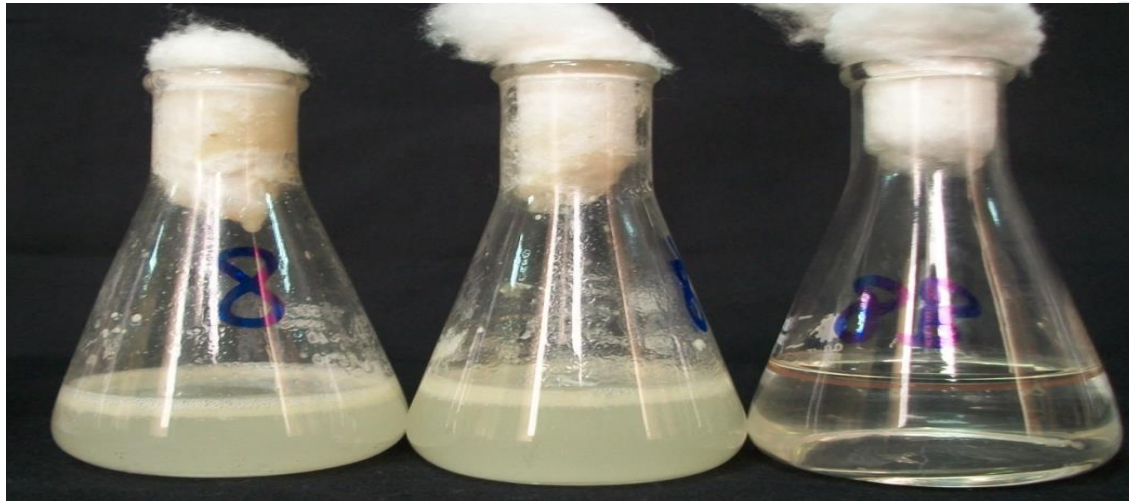


Stages of a biodegradation:

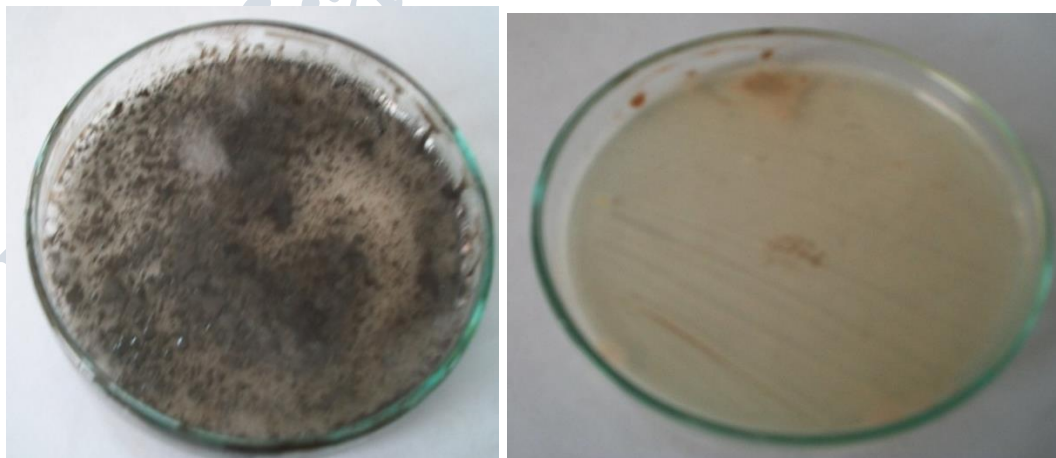
- 1- Isolation of the microorganism
- 2- Purification of the obtained isolates
- 3- Identification of the microbial isolate
- 4- Optimization of the biodegradation conditions
- 5- Determination of the biodegradation efficiency
- 6- Identification of the biodegradation products.
- 7- Cell or enzyme immobilization
- 8- Enzyme identification

1- Isolation of the microorganism

Isolation of bacteria and fungi is performed on Mineral Salt Medium (MSM) supplemented with the pollutant to be biodegraded as a sole source of carbon (enriched technique). This medium can be used as liquid or solid.



Soil pollutant Control
Isolation of petroleum biodegrading bacteria from soil and petroleum pollution.



Isolation of fungi (A) and bacteria (B) from the pollutant on solid MSM

The medium has a pH 7 is preferred for isolation of bacteria, while pH 4.5– 5.5 for fungi.

2- Purification of the obtained isolate

This is simply performed by streaking of a loop of the MSM microbial culture or by pouring dishes technique.

The used medium is solid MSM supplemented with the pollutant as a sole source of carbon.



Purification by pouring



Purification by streaking

3- Determination of biodegradation efficiency and products:

- a- Spectrophotometer.
- b- HPLC
- c- GC/MS

4- Using the redox indicator 2,6-dichlorophenol indophenol (DCPIP).

- The principle of this technique is that, during the microbial oxidation of the carbon source, electrons are transferred to electron acceptors such as O_2 , nitrates and sulphate.
- DCPIP is an electron acceptor.
- The efficiency is determined by observing the color change of DCPIP from blue (oxidized) to colorless (reduced).

5- Cells and Enzymes immobilization:

