Phytoremediation

❖ Introduction

Phytoremediation is the use of plants to clean up pollution in the environment, especially at hazardous waste sites. Plants can take up and accumulate toxic metals in their leaves where they can be disposed of easily. Organic pollutants can be taken up by plants and degraded by plant metabolic activities. The action of bacteria associated with plant roots may be useful in the control of pollutants.

❖ **Advantages of phytoremediation**

1- Phytoremediation does not require expensive equipment or highly-specialized personnel, thus, it is relatively easy to implement

2- Phytoremediation can be used either as an *in-situ* or *ex-situ* application.

3- It is also known as green technology and proper implementation make it eco-friendly and aesthetically pleasing to the public.

4- It is capable of permanently treating a wide range of contaminants in a wide range of environments.

❖ Applications

Phytoremediation has been applied to or proposed for cleanup of many types of hazardous wastes, including toxic metals and man-made organic compounds.

1- Metals

Certain plants can take up large amounts of some toxic heavy metals from the soil. For example, some trees adapted to growth on serpentine soils in the South Pacific, which are naturally high in nickel, take up the metal and concentrate it in their tissues, so much that the sap of the trees is a bright blue.

2- Organic material

a- **Soluble Compounds**

The most important and widespread of groundwater pollutants are the chlorinated hydrocarbons, such as trichloroethylene. Plants can take up these carcinogens and break them down to harmless products such as chloride and carbon dioxide.

b- Insoluble Compounds (hydrophobic)

Less soluble organic pollutants include polyaromatic hydrocarbons (PAHs) and polychlorinated biphenyls, as well as the munition compound, TNT. Plants have a limited capability to take up these pollutants, but bacteria associated with their roots play a role in the degradation of many of these chemicals.