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# Phytoremediation: A Promising Technology of Environmental Pollution Control

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**Abstract**

Environment may be considered as our surroundings which includes everything around us. Environment pollution is a big threat to the healthy existence of humankind. Several methods are involve in amelioration however, some of them are not possible in some situations or not economically and environmentally practical in other situation , Thus phytoremediation is a promising green technology to control environmental pollution.

**Keywords:** Phytoremediation, contamination, toxic, amelioration.

## INTRODUCTION:

In view of the fact that the rise of the industrial revolution, mankind has been introducing various destructive compounds into the environment an exponential rate. In attendance of these compounds is the huge issue to concern. There are various types of contamination in the environment still in need of remediation and at present this challenge remains in the environment stable. Contamination in soil, groundwater, and in sediments are the global problem that causes adverse change in the environment. These are all induced by natural and human induced process. Modern agricultural largely uses fertilizers and pesticides to increase crop production and its protection. Excess of these substances harm soil, humans and environment effectively. There are diverse types of techniques to approve these contaminations but all are lots of costly and time consuming.

Therefore Phytoremediation is the favorable, eco-friendly and innovative process in which green plants are used for mitigation and removal of contamination from the contaminated soil, water and air (Salt et al., 1998; Meagher, 2000, Pulford and Watson, 2003). The first plant based technology was identified over 300 years past in Germany for municipal sewage treatment ((Susarla *et. al*, 2002) considering as this develop of plants is appropriate admired day by day. Phytoremediation engross in amelioration of

heavy metals, solvents, and hydrocarbons into the soil and as well as into the groundwater. Based on the research it is findings that, currently it can be promising to accept hazardous wastes with Phytoremediation efficiently. After an intensive research it is estimated that over the 400 plant species act as a hyper accumulator (Lasat, 2000; Ghosh and Singh, 2005). Behind conducting a number of experiments, several researchers originate that Phytoremediation to be a valuable amelioration approach.

The term Phytoremediation compost with two words where, Phyto means is plant and remediation is amelioration of contamination (EPA, 2000). Plants engross for Phytoremediation are highly accomplished to stand by high levels of contaminants and survive in the local climate. These plants are known as hyper accumulators; in fact they are able to remediate stresses which are held into the environment. In cooperation organic and inorganic pollutants can exist effectively remedied through Phytoremediation in a variety of media (soil, sediments, sludge, wastewater (Susarla et. al, 2002). Phytoremediation involve phytoextraction, phytodegradaton, phytovotalisation Rhizodegradation and Rhizofilteration to remediate (Huges et. al, 1997). Among of them Phytoextraction is the most probably used way of remediation of contamination.

In spite of all these measures, narrow problem is still followed at many times to root out from these types of contamination, so we should need to expand Phytoremediation by various processes.

**TYPES OF PHYTOREMEDIATION**:

**1. PHYTOEXTRACTION**: Phytoextraction is the most probably used way of remediation of contamination in which plants absorb translocation and store toxic contaminants from a soil matrix into their root and shoot system (Dushenkov et. al, 1995).

**2**. **PHYTODEGRDATION:** It is an emerging technology with very promising process in cleaning of hazardous wastages. In phytodegredation, involves translocation of organic toxics by enzymatic activity into simpler form with less toxicity (Schnoor 1997; Salt et al. 1998;Suresh and Ravishankar 2004).

**3. PHYTOSTABILIZATION**: - Phytostabilization is a cost effective and tremendous technique. It is an immobilization and an inactivation process where the plant can able to stabilize and inhibits the mobility of the heavy metals. Plants that involve in phytostabilization urge to have a superficial root zone for proper stabilization in contaminated soil.

**4. PHTOVOLATILIZATION**: - Phytovolatilization technique is a process in which plant and tree uptake organic compounds which is present in the dissolved form in the contaminated water and then released into the atmosphere. Phytovolatilization is an advanced technique. In spite of all that this method cannot be an Eco friendly (Kokyo, et. al, 2014).

**5. RHIZODEGRADATION**: - After years of intensive research rhizodegradation made the breakthrough discovery of specific contaminants that degrade in the rhizosphere (area of soil surrounding the roots of the plant).

**6. RHIZOFILTERATION**: Rhizofiltration filtrate pollutants from water and aqueous waste streams, such as agricultural runoff, industrial discharges, and nuclear material processing wastes (Salt et al. 1998; Suresh and Ravishankar 2004). Rhizofileration involves filtration of water through a mass of roots to eliminate toxic substances or excess nutrients. The pollutants remain absorbed in or adsorbed to the roots.

**ADVANTAGE OF PHYTOREMEDIATION:**

1. Phytoremediation is an attractive knowledge to many researchers and investigators because of Green and Eco friendly technology. Moreover plants introduced in phytoremediation insert a satisfied illustration aspect of the contaminated sites.
2. Phytoremediation act as a tremendous performance both in in situ and exsittu environment (Raskin, And Ensley, 2000).

**DISADVANTAGES OF PHYTOREMEDIATION:-**

1. Certain compounds, which do not easily undergo for remediation and persist in the environment for a long period. Thus, the phytoremediation technique has failed for removing of these compounds into the environment.
2. Dense and large area required to the phytoremediation. Plant species or varieties of one species that can follow for phytoremediation, can vary significantly in their efficiency.

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