Commentary

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An Overview on Phytoremediation

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Description

One of the serious concern in most of the countries is contaminated soil and water which is contaminated by heavy metals. Heavy metals which include copper, chromium, cadmium, lead nickel and zinc are the important environmental pollutants. This heavy metal contamination comes from anthropogenic activities. Heavy metals cause much toxicity around the world. According to a report that is released by U.S. environmental action group, the world's most polluted and contaminated places threaten the health of more than 10 million people in many countries. The contaminated soil is a great challenge for industrial, agriculture and urban territories. Traditionally for disposal of heavy metal wastes, soil has been used which require treatment to get rid of metal contaminant. Conventional methods of heavy metals have been used currently but it is very expensive and is not environmental friendly.

Although there are many regulatory steps which have been used so that release of pollutants in soil should be restricted or reduced but this is not sufficient to control metal contaminants in soil. To overcome these problems different approaches are used like biological, physical and chemical methods. These methods are used to remediate or to clean the soil for about last 20 years. These approaches have many drawbacks. These approaches are used but are not effective at all. It is very difficult to reduce the health risks but it is only possible by the removal of heavy metals from the soil.

To overcome all the limitations the safest method to remediate heavy metals from soil is Phytoremediation. Use of living green plants to ix, inhibit or adsorb contaminants and clean the contaminants from soil is known as Phytoremediation. In this method we basically use natural products to reduce the contamination, it also remediate the soils, sludge's, sediments and contaminated water by organic and inorganic contaminants. Phytoremediation is green or clean technology which is used to remediate heavy metals naturally or by using genetically modi ied plants. On the basis of economic imputations, the focus of Phytoremediation can be on three stages are extraction of metals on the basis of plants with financial benefit, risk mitigation (phytostabilization) and sustainable soil management in which Phytoremediation gradually raises soil fertility allowing for follow up crop growth with added economic value. This method is most effective, ecofriendly, have low cost, not labour intensive, and have high public acceptance, it also increases the soil fertility and efficacy without damaging the soil. It easily reduces the metal contaminants from soil.

On the basis of different uptake mechanisms Phytoremediation is divide into different modern technologies which includes phytoextraction, phytodegradation, phytostabilization, phytovolatilization and rhizofilteration.

The primary causes of heavy metal pollution are geological and anthropogenic activities. Anthropogenic activities may include metal pollution, including toxic waste, fuel processing, mining, smelting processes, military operations, use of agricultural chemicals, small-scale industries such as battery manufacturing, metal goods, metal smelting and cable industry, brick kilns, and coal combustion. Municipal waste also constitutes one of the main sources of heavy metal pollutants. Such waste is further used as landfills for irrigation purposes while sewage water is used. This waste also contains some nutrients which is useful for plants and may also contain some toxic materials. Some other sources of metal contaminants are the use of chemical fertilizers, pesticides and fungicides which are unsafe to use and also banned to some extent, biofertilizers are used in place of it.

Thus, Phytoremediation is one of the cost effective and eco-friendly methods which use green plants to remediate degrade or inhibit the heavy metal contaminants by different methods. This method stabilizes the environment. The harvesting of plant shoots will permanently remove the pollutants from the soil. Phytoremediation has no detrimental effect on soil fertility and structure as some of the technologies has such as acid extraction and soil washing. Phytoremediation is one of the best methods which are more effective, less costly and invasive remedial method.