



Phytoremediation technology and importance of plants

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Abstract

Plants provide us food, fibre, wood, cosmetics etc. Phytoremediation technology is the use of green plants to remediate heavy metals, contaminants from soil, air, water and environment. Anthropogenic activities, industries, household activities make water, soil impure. Water, Soil near industries and mining are more impure as compared to planted areas. Plants that removes heavy metals are *Solanum lycopersicon*, *Helianthus annuus*, *Eichhornia crassipes*, *Brassica juncea*, *B. nigra* etc. Heavy metal remediation is higher where plants are there. *Aloe vera*, bamboo, *Chrysanthemum*, *Azadirachta indica*, etc plants as well as trees purifies air. Phytoremediation technology consists of processes and Mechanisms to remediate heavy metals and other contaminants. Phytofiltration-Accumulation of pollutants, heavy metals in harvestable biomass ie shoots. Phytostabilization-Limiting the quality and bioavailability of pollutants in soil by plant roots. Phytovolatilization-Conversion of pollutants to volatile kind and their succeeding biomass to the atmosphere eg by transpiration. Phytodegradation-Degradation of organic pollutants or compounds by plant enzymes among plant tissues. Rhizofiltration- By roots. Rhizodegradation-Degradation of organic compounds within the rhizosphere by rhizospheric microorganisms. Phytodesalination-Remediation of excess salt from saline soils by halophytes. Phytofiltration-Sequestration of pollutants heavy metals from contaminated water by plants. Phytomining-Production of a metal by growing high biomass plants that accumulate high metal concentrations, a number of these plants are natural hyperaccumulator's.

Keywords: Phytoremediation, plants, heavy metals, *Helianthus*, *Eichhornia*

Introduction

Phytoremediation technology is the use of green plants and associated microorganisms to remove heavy metals and contaminants from air, water, soil and environment [1-6]. Phytoremediation technology, by processes and Mechanisms helpful in remediation of heavy metals and contaminants.

Phytoremediation consists of the processes Phytoextraction, Phytostabilization, Rhizofiltration, Phytovolatilization, Phytodegradation, Phytodesalination, Phytofiltration, etc. Plants like *Solanum lycopersicon*, *Eichhornia crassipes*, *Brassica juncea*, *B. nigra*, *Helianthus annuus* are used for

water and soil, heavy metal remediation, *Aloe vera*, *Chrysanthemum*, Bamboo, *Azadirachta indica*, *Moringa oleifera* used for air purification. So, plants are very important for the life of living beings and environment.

Material and Methods

Plants are taken in pots, heavy metals like Pb, Chromium, Cadmium are dropped in the form of Pb (NO₃), K₂Cr₂O₇, CdCl₂ and Observed for few day's, week and months and then observed under AAS ie atomic absorption spectrophotometer.

Table 1: Remediation of heavy metals

<i>Helianthus annuus</i> (Sunflower)	Root length in cm	Shoot length in cm
Control	8	60
10 ppm chromium	11	58
Remediation	15	63

Table 2: *Brassica juncea* Cadmium treated

<i>Brassica juncea</i> Cadmium treated	Biomass
	9 to 11 increases

Table 3

BCF	4>1
TF	>1

Table 4: Importance of plants

	Plants as heavy metal remediation	Plants as air purifier
1	<i>Solanum lycopersicon</i> , <i>Brassica juncea</i> (Mustard).	<i>Aloe vera</i> , <i>Azadirachta indica</i> , Bamboo, <i>Moringa oleifera</i> , <i>Chrysanthemum</i>
2	<i>Helianthus annuus</i> , <i>Eichhornia crassipes</i>	<i>Mentha aquatica</i> (cleans water), <i>Eichhornia</i> etc.
	Checks soil erosion	

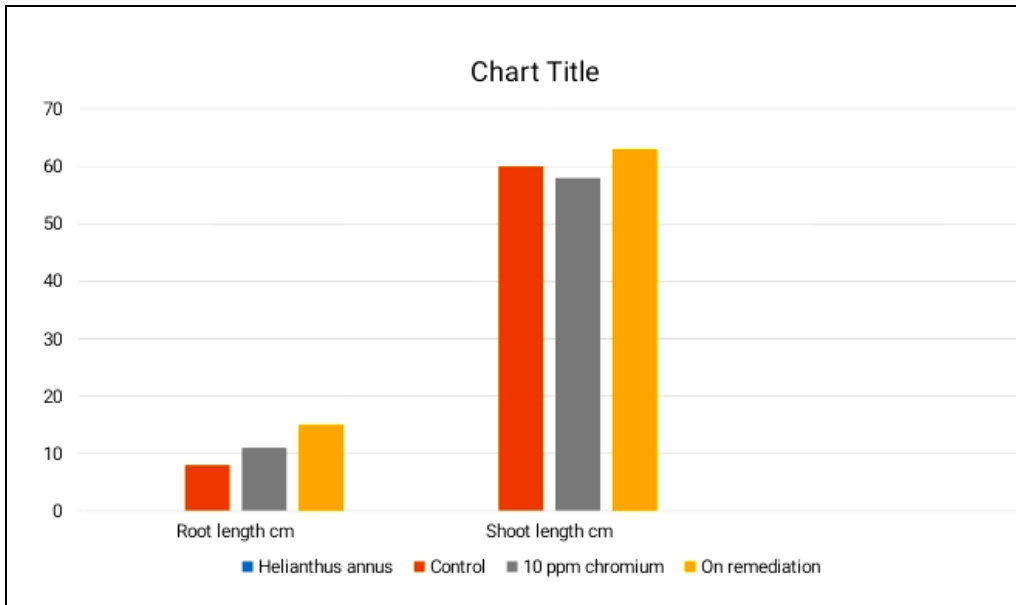


Fig 1: Helianthus annuus (Sunflower) treated with Chromium

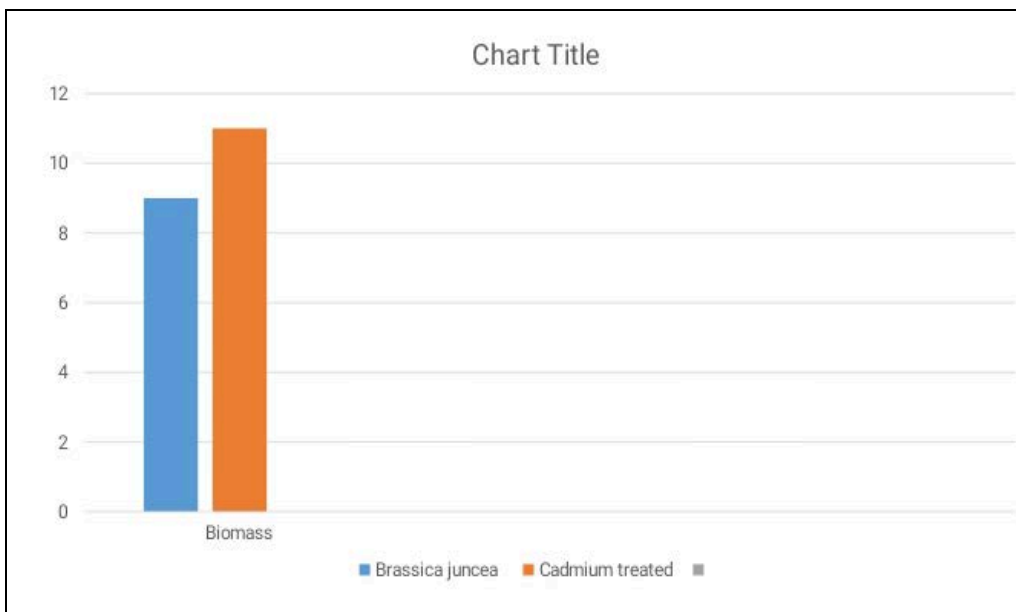


Fig 2: Brassica juncea (Mustard) treated with Cadmium

Results

Root, shoot length increases on remediation of heavy metals. Biomass increases of fresh plant. BCF>1 suggests the potential of plants for Phytoremediation.

Discussion

Phytoremediation technology is the use of green plants and associated microbes to reduce the concentration of contaminants from soil, air, water and environment. Plants are important for the life of living beings. Plants remediate heavy metals from soil and water, it purifies air, helpful in cleaning environment, maintains oxygen, carbon dioxide level. Decrease and then increase in root, shoot length suggests heavy metal remediation. Biomass increases because of heavy metal remediation. Heavy metal remediation plants clean soil by remediation. BCF>1 suggests the potential of plants for heavy metal remediation. So, these are the importance of plants with respect to Phytoremediation technology.

Conclusion

Plants has a wide importance. It remediates heavy metals and other contaminants from soil, air, water and environment. Purifies air, increases biomass, BCF>1 shows the potential of plants for Phytoremediation. Phytoremediation technology is helpful in reducing the concentration of contaminants from the environment by the use of green plants.

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