



### *Short Communication*

# Phytoremediation: Solution for the Biggest Issue of the Day

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## INTRODUCTION

Population continues to grow at an exponential speed, with projections predicting that in 2050 it will reach 9 billion. An accumulation of soil, water and air emissions would eventually be caused by the intensive agriculture and manufacturing processes required to sustain such a huge number of citizens. Per year, contamination is estimated at 62 million deaths, 40 percent of the worldwide number, while the World Health Organisation (WHO) has confirmed that about 7 million people are killed each year by the air they breathe. With an estimated 70 percent of toxic waste pumped into nearby water courses, water supplies fare no better. Per year, the planet produces 1.3 billion tonnes of rubbish, much of which is deposited in landfill sites or poured into the oceans. We must stop this exponential growth of soil, water and air pollution; fortunately, the solution may be plants. Plants have ability to stabilize, remove, transfer, and/or destroy pollutants from soil, water and air. Plants are currently used in procedures known as 'phytoremediation' for washing up pollution treatment.

## Types of Phytoremediations

**Rhizosphere biodegradation:** Plants release substances in soil which serves as nutrition for certain microbes. Microbes flourish with this nutrition enhance biodegradation.

**Phyto-stabilization:** few plants release some natural compounds those immobilize pollutants rather than degrading them.

**Phyto-extraction/accumulation:** by using their nutrient uptake ability plants absorb the toxins along with water and nutrients. In this process the pollutants do not destroyed but stored in shoots and leaves of the plant. This process is used mostly for metal-containing wastes. The metals accumulated in aerial parts of the plant, are either smelted for the metal recycling or are thrown as a precarious waste.

**Rhizofiltration:** The process is similar to phyto-extraction but the medium of plant growth is water rather than soil. This process is utilized for groundwater treatment.

**Phyto-volatilization:** As the term itself suggests plants uptake contaminants along with water and release in air through leaves.

**Phyto-degradation:** Similar to biodegradation through microbes plants also decompose certain pollutants.

**Hydraulic Control:** In this process, large trees like cottonwood and poplar pumps out ground water when their roots reach down into water table and make a thick root mass that sucks up huge volume of water. Poplar trees evaporate ground water at a rate of about 30 gallons/day/tree, while cottonwood absorbs at a rate of 350 gallons/day/tree.

### **LIMITATIONS AND CONCERNS**

1. Fate of accumulated and degradation by-products is major concern because it may transfer to animals and water bodies and/or ground water through food chain.
2. Disposal of plant harvests can release heavy metals in the soil or water if they contain higher levels.
3. Penetration level of pollutants limits phytoremediation. Plants root length and volume determines the treatment zone.
4. As plant growth is affected by season and climate, success of phytoremediation also depends on location, season and the climate.
5. Higher concentration of contaminants may cause harm to plants itself.

6. Phytoremediationlike Phyto-volatilization only transfer contamination from one medium to another.
7. The process requires large land area.

### **CONCLUSION**

Phytoremediation is an evolving technique that helps cleanse toxic contaminants from the soil and water sources. Phytoremediation will offer a low-cost and safe path for developed countries' economies to change. Phytoremediation, by community-based planning, is one of the most effective and feasible alternatives for poor farmers. In order to exploit this technique on a wide scale and obtain adequate protection in a productive way and make the Earth a more beautiful place to live, further study and expertise is needed.