

Phytoremediation: Methods and Reviews, N. Willey (Ed.). Humana Press, Totowa, NJ (2007). 49 pp., Price: US\$ 135.00, ISBN: 1-588-29-541-9

Chemically contaminated soil poses a major problem for industrialized countries. Nowhere is this problem more important than in the United States, but the book illustrates that contamination is not confined to this country. Indeed, it is worldwide. No fewer than 69 scientists from 15 countries have contributed 31 distinct reports for this book which is the 23rd in the publisher's Methods in Biotechnology series.

Soil cleanup is expensive. Most often it is accomplished by excavating, removal and disposal of the contaminated material in a landfill or alternatively (on rare occasions) by incineration. Phytoremediation offers an attractive, economical alternative in many cases.

The author of the first paper in the book describes the topic as follows: "Phytoremediation is an emerging technology that uses certain plants to clean up soil, water, and air contaminated with environmental pollutants such as polychlorinated biphenyls (PCBs) through degradation, extraction, or immobilization of contaminants. This technology has been receiving attention lately as an innovative, cost-effective, and long-term alternative to the more established engineering methods used at hazardous waste sites."

Phytoremediation, however, is not limited to PCB contamination. Numerous other chemicals have been attacked by this process. This incomplete list includes: PCBs, metals (lead and arsenic), radionuclides, phenol, persistent organics, petroleum, perchlorates, herbicides, and low molecular weight acids.

The list of contaminants removed by phytoremediation is wide ranging. I compiled it by leafing through the text. However, it probably is not complete as plants take up an amazing number of chemicals. The authors note, by the way, that the plants must tolerate and accumulate the pollutant to be effective.

The key to the technology is the ability of plants to degrade, take up or tolerate exposure to pollutants. Why they can do this is now almost within the grasp of researchers. If perfected, the use of plants to remediate contaminated soil will give us an innovative, cost-effective cleanup system.

The chapters are grouped under the four following major headings:

1. Manipulating phenotypes and exploiting biodiversity;
2. Manipulating contaminant availability and developing research tools;
3. Current research topics in phytoremediation;
4. Contexts and utilization of phytoremediation.

The papers give a great deal of technical information about plant growth, attenuation and contaminant uptake. Each paper is full of fundamental technical information on plant growth and remediation potential. However, the book is not, in my opinion, a "primer" for remediation engineering as noted by the editor. It is, rather, an excellent resource for fundamental research on the topic.

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