

# Bioremediation of Pollutants

From Genetic Engineering to Genome Engineering

Edited by  
**Vimal Chandra Pandey**  
**Vijai Singh**



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**From Genetic Engineering to Genome  
Engineering**

*Edited by*

***Vimal Chandra Pandey***

**Department of Environmental Science,  
Babasaheb Bhimrao Ambedkar University,  
Lucknow, India**

***Vijai Singh***

**Department of Biosciences, Indrashil University,  
Rajpur, India**



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# Dedication

Dedicated to our beloved families

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# Recent advances in phytoremediation using genome engineering CRISPR–Cas9 technology

5

*Pallavi Saxena<sup>1</sup>, Nitin Kumar Singh<sup>2</sup>, Harish<sup>1</sup>, Amit Kumar Singh<sup>3</sup>,  
Siddhartha Pandey<sup>4</sup>, Arti Thanki<sup>5</sup> and Tara Chand Yadav<sup>6,\*</sup>*

<sup>1</sup>Department of Botany, Mohanlal Sukhadia University, Udaipur, India, <sup>2</sup>Department of Environment Science and Engineering, Marwadi University, Rajkot, India, <sup>3</sup>Department of Biochemistry, University of Allahabad, Allahabad, India, <sup>4</sup>Department of Civil Engineering, Chalapathi Institute of Technology, Guntur, India, <sup>5</sup>Department of Environment Science and Engineering, Marwadi University, Rajkot, India, <sup>6</sup>Department of Biotechnology, Indian Institute of Technology, Roorkee, India

\*Corresponding author

## 5.1 Introduction

Technological advances made by humans have been phenomenal ever since man adopted technology. The development pace has jumped by leaps and bounds, since the industrial revolution in England during the 17th century, but it also created a Frankenstein called pollution which continues to engulf the Earth and its environment. Over the years, pollution has been continuously rising with major forms being in the air, water, and soil, which has had many health and well-being implications for humans. Among others industrial activities, human activities such as mining, burning of fossil fuels, industrial waste, and massive usage of agrochemicals are the main stream sources of contamination nowadays (Wuana and Okieimen, 2011). The scientific community had been at odds in finding a solution for mitigating its ill effects, without hampering the development trajectory. The term phytoremediation refers to the cleaning act of pollutants with the help of plants. Basically, it is a technique to restore soil fertility and to cleanse the soil. Today more than 500 plant species are reported to have appreciable phytoremediation potential (Krämer, 2010). Besides, it also helps in mitigation of soil erosion along with for the maintenance of biodiversity, sequestration of carbon, and increased biomass production. Furthermore, it also helps in restoration of natural flora and fauna resulting in formation of surmising landscapes. Phytoremediation is an ecofriendly, solar energy driven, and cost-effective approach in comparison to the conventional methods,