

Sunita J. Varjani · Avinash Kumar Agarwal  
Edgard Gnansounou · Baskar Gurunathan  
Editors

# Bioremediation: Applications for Environmental Protection and Management



Springer

# Contents

<b>1</b>	<b>Introduction to Environmental Protection and Management . . . . .</b>	<b>1</b>
	Sunita J. Varjani, Avinash Kumar Agarwal, Edgard Gnansounou and Baskar Gurunathan	
<b>2</b>	<b>Mathematical Modeling in Bioremediation . . . . .</b>	<b>7</b>
	Parthasarthy Vijay and Margavelu Gopinath	
<b>3</b>	<b>Evaluation of Next-Generation Sequencing Technologies for Environmental Monitoring in Wastewater Abatement . . . . .</b>	<b>29</b>
	P. Senthil Kumar, S. Suganya and Sunita J. Varjani	
<b>4</b>	<b>Genetically Modified Organisms and Its Impact on the Enhancement of Bioremediation . . . . .</b>	<b>53</b>
	Narasimhan Manoj Kumar, Chandrasekaran Muthukumaran, Govindasamy Sharmila and Baskar Gurunathan	
<b>5</b>	<b>Integration of Lignin Removal from Black Liquor and Biotransformation Process . . . . .</b>	<b>77</b>
	Krishnamurthi Tamilarasan, Periyar Selvam Sellamuthu and Baskar Gurunathan	
<b>6</b>	<b>Role of Nanofibers in Bioremediation . . . . .</b>	<b>99</b>
	Sekar Aiswarya Devi, Muthukumar Harshiny and Manickam Matheswaran	
<b>7</b>	<b>Bioremediation of Industrial Wastewater Using Bioelectrochemical Treatment . . . . .</b>	<b>115</b>
	N. Samsudeen and Manickam Matheswaran	
<b>8</b>	<b>Biosorption Strategies in the Remediation of Toxic Pollutants from Contaminated Water Bodies . . . . .</b>	<b>127</b>
	P. Senthil Kumar and K. Grace Pavithra	

<b>9</b>	<b>Bioremediation of Heavy Metals . . . . .</b>	165
	P. Senthil Kumar and E. Gunasundari	
<b>10</b>	<b>Pesticides Bioremediation . . . . .</b>	197
	P. Senthil Kumar, C. Femina Carolin and Sunita J. Varjani	
<b>11</b>	<b>Application of Microbes in Remediation of Hazardous Wastes: A Review . . . . .</b>	223
	Moni Kumari, Pooja Ghosh and Indu Shekhar Thakur	
<b>12</b>	<b>Phytoremediation Techniques for the Removal of Dye in Wastewater . . . . .</b>	243
	B. Bharathiraja, J. Jayamuthunagai, R. Praveenkumar and J. Iyyappan	
<b>13</b>	<b>Phenol Degradation from Industrial Wastewater by Engineered Microbes . . . . .</b>	253
	Ravichandran Rathna and Ekambararam Nakkeeran	
<b>14</b>	<b>Insect Gut Bacteria and Their Potential Application in Degradation of Lignocellulosic Biomass: A Review . . . . .</b>	277
	Rajesh Kumar Prasad, Soumya Chatterjee, Sonika Sharma, Pranab Behari Mazumder, Mohan G. Vairale and P. Srinivas Raju	
<b>15</b>	<b>Bioremediation of Volatile Organic Compounds in Biofilters . . . . .</b>	301
	Margavelu Gopinath, Rose Havilah Pulla, K. S. Rajmohan, Parthasarthy Vijay, Chandrasekaran Muthukumaran and Baskar Gurunathan	
<b>16</b>	<b>Bioremediation of Industrial and Municipal Wastewater Using Microalgae . . . . .</b>	331
	Baskar Gurunathan, I. Aberna Ebenezer Selvakumari, R. Aiswarya and S. Renganthan	
<b>17</b>	<b>Phytoremediation of Textile Dye Effluents . . . . .</b>	359
	Shanmugaprakash Muthusamy, Dhilipkumar Govindaraj and Karthik Rajendran	
<b>18</b>	<b>Role of Biosurfactants in Enhancing the Microbial Degradation of Pyrene . . . . .</b>	375
	Gauri Gupta, Avantika Chandra, Sunita J. Varjani, Chiranjib Banerjee and Vipin Kumar	
<b>19</b>	<b>Bioremediation of Nitrate-Contaminated Wastewater and Soil . . . . .</b>	387
	K. S. Rajmohan, Margavelu Gopinath and Raghuram Chetty	
<b>Author Index . . . . .</b>		411