

# BIOTECHNOLOGY IN ENVIRONMENTAL MANAGEMENT

## Editors

Dr. T.K. Ghosh  
Dr. T. Chakrabarti  
Dr. G. Tripathi

43553

628:579.6-Vol.1



43553

Ghosh, T. K.

**A.P.H. PUBLISHING CORPORATION**  
5, ANSARI ROAD, DARYA GANJ  
NEW DELHI-110 002

# CONTENTS

<i>Preface</i> .....	v
<i>About the Editors</i> .....	vii
<i>Contributors</i> .....	ix
<b>A Horizons of Biotechnology</b>	
1 The Microbial Dimension of the Environment .....	1
<i>Bernhard Zechendorf</i>	
2 Biosensors as Tools in Environmental Biotechnology : A Review .....	25
<i>Shelley Bhattacharya, Sutapa Sen, Sonali Roy and Anirban Bhattacharya</i>	
3 Sequestration of Carbondioxide (CO <sub>2</sub> ) by Enhancing Carbonic Anhydrase Enzyme Through External Zn Fertilization .....	43
<i>K. Krishnamurthi, S Saravana Devi &amp; T. Chakrabarti</i>	
4 Deciphering Herbicide Resistance of Isoproturon in <i>Phalaris minor</i> .....	59
<i>A. K. Gaur, M.K. Tripathi, Sandeep Arora and D.P.Mishra</i>	
5 Veterinary Biotechnology for a Richer Environment .....	83
<i>K. A. Sirothia, A. R. Sirothia and N. H. Fuke</i>	
6 Heat Shock Protein Expression in Fish and Shellfish : Environmental Perspectives and Health Management .....	95
<i>A.K. Pal and S.C. Mukherjee</i>	
7 Exploitation of Biotechnology for Human Welfare .....	117
<i>Sunita Dutta, Abhijit Dutta and P.N.Pandey</i>	
<b>B Bioenergy and Biofertilizer</b>	
8 Bioenergy: A Potential Alternative Energy for Sustainable Environment .....	123
<i>A. G. Murugesan, John Ruby and N. Sukumaran</i>	
9 Vermicomposting as a Biotechnological Tool for Recycling Organic Wastes .....	135
<i>G. N. Chattopadhyay</i>	
10 Earthworm : A Tool for Environmental Biotechnology .....	147
<i>G. Tripathi</i>	
11 Activated Biocomposting of Sugar Mill Press Mud and Partially Treated Distillery Spent Wash - Processed to Quality Compost for Sustainable Agriculture .....	163
<i>Bijaya Ketan Sarangi, Aruna Golait, Sunita Kanungo and Tapan Chakrabarti</i>	

**C Aquaculture**

- 12 Biotechnological Manipulation and the Future of Aquaculture ..... 179  
*Bidhan C. Patra*
- 13 Conservation & Eco-Friendly Cultural Technology in Fisheries ..... 215  
*S. P. De*
- 14 Application of Biotechnologies in Coastal Aquaculture and its Environmental Management :  
A Brief Review ..... 251  
*T. Rajyalakshmi*
- 15 Treatment and Recycling of Domestic Sewage through Aquaculture ..... 297  
*T.K. Ghosh*
- 16 Application of Biotechnological Tools for Aquaculture Practices in the Pits (Khadan) of  
Abandoned China Clay ..... 313  
*MinesBasudev Mandal & Bidhan C Patra*
- 17 A Review on Microbial Products for Disease Management and Improved Production in  
Aquaculture ..... 325  
*Devaraja T.N. and Gayathri D.*
- 18 Environmentally Sustainable Management Techniques for Sewage-fed Aquaculture ..... 339  
*Subhendu Datta and A. K. Pal*
- 19 Pollution Due to Aqua-Feed and it's Management ..... 351  
*N.P.Sahu*
- 20 Hybridoma Technology in Aquaculture Health Management with an Emphasis on *Aphanomyces*  
*invadans*, the Causative Agent of Epizootic Ulcerative Syndrome in Fish ..... 361  
*Gayathri Devaraja and TN Devaraja*
- 21 Pesticide Residue in Fish and its Regulation ..... 375  
*A. K. Pal and Subhendu Datta*

**D Cleaner Technology**

- 22 Biotechnological Applications of Cyanobacteria in Development of Clean Technologies  
for Environmental Management ..... 389  
*Mecnakshi Banerjee*
- 23 Microbial Desulphurization of Coal Containing Organic Sulphur - An Overview ..... 407  
*R.A. Pandey*
- 24 Microbial Detoxification of Chlorinated Aromatic Compounds ..... 427  
*M. Suresh Kumar*
- 25 Fish Processing in India – an Overview ..... 447  
*B. A. Shamasundar*

**E Bioremediation**

- 26 Biotechnology towards Assimilative Capacity and Health of Aquatic Ecosystem ..... 477  
*T.K. Ghosh, A.V. Kulkarni and T. Chakrabarti*
- 27 Exploitation of Microbial Diversity for Bioremediation Using Genetic Tools ..... 505  
*Naveen Kumar, Rekha Sharma, Bharani Kumar, S.P.S.Ahlawat & Dinesh Pandey*
- 28 Remediation of Aquaculture Environment : A Biotechnological Approach ..... 513  
*G. K. Sehgal and H.S. Sehgal*
- 29 Microbial Bioremediation of Heavy Metals ..... 529  
*P. W. Ramteke*
- 30 Genotoxicity Risk Assessment of Hazardous Chemicals and Wastes ..... 563  
*K. Krishnamurthi, S. Saravana Devi and T. Chakrabarti*

**F Waste Management**

- 31 Development of New Materials Based on Agro and Industrial Wastes Towards Ecofriendly Society ..... 583  
*Kestur Gundappa Satyanarayana, Luiz Pereira Ramos\* and Fernando Wypych*
- 32 Reduce, Reuse, Recycle and Recover: Biotechnological Approach in Management of Solid Waste of Fruit and Vegetable Processing Industries ..... 625  
*D. B. Satpute, Pratima N. Shastry and D. M. Dharmadhikari*
- 33 Biotechnological Application for an Effective Management of Liquid and Solid Wastes ..... 653  
*A. G. Murugesan and John Ruby*
- 34 Biotechnological Practices for Sustainable Livestock Production and Waste Management ..... 677  
*Ajoy Mandal, P.K.Sahoo and T.K.Dutta*