

Index

A

- Agriculture
 - BFBF, 48
 - solid wastes, 164
- Agroecosystems sustainability, 197, 198
- AgRPL44*, 224
- Air pollutants, 56
- Alkaliphilic fungi, 221
- American Association of Textile Chemists and Colourists (AATC), 70
- Arbuscular mycorrhiza (AM)
 - AMF spores, 192
 - benefit, 196
 - external mycelium, 192
 - extraradical hyphae network, 192
 - fossil evidence and DNA sequence, 191
 - heavy metal, 195
 - host plant, 191
 - hydraulic conductivity, 194
 - hyphae network, 195
 - mineral nutrients, 194
 - osmotic adjustment, 194
 - PGPR, 195
 - plant growth and productivity, 193
 - root colonization, 195
 - vegetative mycelium, 192
- Arbuscular mycorrhizal fungi (AMF), 189
- Arbuscules, 192
- Arsenic (As)
 - Aspergillus niger*, 29, 31
 - Aspergillus sydowii*, 30, 31
 - mangrove ecosystem, 28
 - methylation, 28
 - removal, 28
 - Rhizopus* sp., 30
 - yeasts, 31

- Artificial mycorrhizae inoculum, 198
- Aspergillus niger*, 225
- Aspergillus penicillioides*, 221
- Azo dyes, 79, 87, 89
- Azoreductases, 82

B

- Batik
 - painting, 90
 - reactive dyes, 90
 - wastewater, 91
 - wastewater treatment, 90
 - water use, 91
- Beauveria bassiana* (Bals.) Vuill., 8, 9
- Bioaccumulation, 78
- Biodegradation
 - demolition solid waste, 165
 - petroleum hydrocarbons, 165
- Biofertilizers, 48, 189, 205
- Biofilm
 - affecting factors
 - horizontal gene transfer, 43
 - hydrodynamics, 42
 - physicochemical properties, 41, 42
 - quorum sensing, 43
 - topography of surface, 41
 - and biocontrol, 46
 - cells, 39
 - definition, 39
 - developmental steps, 41, 42
 - ecological advantage
 - agriculture, 46
 - colonization, 46
 - defense, 45
 - genetic traits, 46

- Biofilm (*cont.*)
 metabolic cooperation, 45
 nutrient availability, 45
 PGPR, 40
 quorum sensing, 46
 regulation
 architectural structure, 45
Bacillus subtilis, 44
 EPS, 44
 maturation, 44
 osmolarity, 43
 Biofilm biofertilizer (BFBF), 48
 Biogas production, 94
 Biomedical solid wastes, 158
 Biopulping, 93
 Bioreactor and operation mode, 88, 89
 Bioremediation
 advantages, 183, 184
 coal wastes, 163, 164
 definition, 137, 171
 fruit and food industry (*see* Fungal bioremediation)
 solid wastes, 166
 Biosorption, 8, 9, 22, 27, 30, 78, 140, 141, 177, 178
 Brown rot fungi, 175
- C**
 Cadmium, 136
 Carbon dioxide emissions, 3
 CCHA, 226
 Cellulases, 163, 164, 167
 Cellulolytic enzymes, 177
 Cellulose, 225, 226
 Chemical time bombs (CTBs), 134
 Chlorinated aromatic compound
 degradation, 181
 Chlorinated insecticides
 DDT, 121
 endosulfan, 121, 122
 LDS, 122
 NADPH, 121
 PCP, 123
 Chromium
 biological removal, 25
 Doehlert experimental design, 27
 EPA, 25
 FTIR analysis, 26
 fungi, 26
 pseudo-second-order model, 26
 removal techniques, 25
Yarrowia lipolytica, 27
- Citric acid cycle, 224
 Cleaner environment, 184
 Climate change, 3
 Common effluent treatment plant (CETP), 23
 Contamination
 environment, 137
 of groundwater, 4
 PAH, 142
 soil degradation, 4
 soil resources
 heavy metals, 5
 soil biota, 5
 Crude oil, 133, 141, 144
 Crude oil biodegradation, 179, 180
- D**
 Date palm production
 AM colonization, 200
 AMF species, 200
 mycorrhizal fungi
 artificial inoculation, 202
 desert ecosystems, 201
 post-acclimatization, 202
 root systems, 201
 saline soil, 204–207
 water stress, 203, 204
 oasis ecosystem, 198, 199
 pseudomantle, 200
 RIZ, 199
 root colonization, 201
 seeds, 199
 DDT, 121
 Dead Sea, 221
 Decolorization and degradation
 azoreductases, 82
 enzymes, 95
 fungal biofactories
 aeration and agitation, 86
 carbon sources, 84
 dye concentration, 86
 dye effluents, 83
 inoculum, 87
 mineral salts, 85
 nitrogen sources, 84
 pH, 85
 temperature, 85
 fungi, 79
 haem peroxidases, 78
 home-made textile industry, 90, 91
 laccases, 83
 peroxidases, 79, 81, 82
 white-rot fungi, 79–81

- Degradation
 atrazine, 127
 butachlor, 126
 chlorinated aromatic, 181
 chlorpyrifos, 125
 DDT, 121
 dye, 182
 glyphosate, 127
 herbicide, 182
 insecticide, 183
 malathion, 125
 nitroaromatics, 181
 PAHs, 180
 PCP, 124
- Dioxines, 172
- Doehlert experimental design, 27
- Domestic effluent pollution, 55
- Dry and wet processing, 74, 75
- Dye
 classification, 70, 72, 73
 concentration, 86
 decolorization, microbial enzymology, 77
 degradation, 21, 182
 organic colours, 70
 removal, 22, 70
 wastewater treatment, 73–77
- E**
- Effluents
 decolorization and detoxification, 20
 mass spectrometric scan analysis, 20
- Endoglucanases, 225
- Endomycorrhiza, 191
- Endophytes
 fungi-aided phytoremediation
 airborne spores, 139
 AM, 139
 biosorption, 140
Microsphaeropsis sp. LSE10, 141
 REMI, 140
 phytotoxicity, 138
 rhizosphere, 138
- Endophytic fungi
 biosorption, 140
 heavy metals, 139
 PAH, 143
- Energy-dispersive X-ray spectroscopic (EDX), 28
- Environment, agriculture effect
 carbon dioxide emissions, 3
 climate change, 3
- eutrophication, 2
- pollution
 groundwater, 4
 soil degradation, 4
 soil resources, 5
 water pollution, 1
- Environmental pollution
 air pollutants, 56
 definition, 54
 organic and inorganic, 53
 removal process, 53
 risk factors, 54
 soil pollutants, 58
 types, 55
 water pollutants, 57
- Environmentally sound technologies (ESTs), 137
- EnvZ/OmpR signaling system, 43
- Eutrophication, 2
- E-Wastes, 163
- Ex situ remediation, 173
- Exoglucanases, 225
- Extracellular polymeric substances (EPS), 39
- Extremophilic fungi, 223
- F**
- Fourier-transform infrared (FTIR), 112
- Fungal biomasses, 7
- Fungal bioremediation
Beauveria bassiana (Bals.) Vuill., 8, 9
Paecilomyces lilacinus (Thom) Samson, 9, 10
 pollution, soil degradation, 10
 recalcitrant toxic compounds, 17, 18
Trichoderma sp., 7, 8
- Fungal classification
 ascomycetes, 55
 basidiomycetes, 57
 deuteromycetes, 58
 zygomycetes, 57
- Fungal communities, 112–114
- Fungal dye decolorization, 78
- Fungi
 environmental indicator (*see* Fungal bioremediation)
 pollutants remediation, 60
 white-rot and brown-rot, 61
- G**
- Genetically engineered microorganisms (GEM), 7, 145

H

- Haloalkaliphilic fungi, 220–222
- Halophilic fungi, 220, 221
- Heavy metal pollution, 92
- Heavy metals
 - arsenic, 135, 136 (*see also* Arsenic (As))
 - cadmium, 136 (*see also* Chromium)
 - contamination, 134
 - lead (Pb), 135
 - mercury, 135
- Herbicide degradation, 182
- Herbicides
 - atrazine degradation, 127
 - glyphosate degradation, 127
 - phenylamide compounds, 125
- High-osmolarity glycerol (HOG1), 223
- Hydrocarbon contamination, 165
- Hydrocarbon degradation
 - crude oil biodegradation, 179, 180
 - mushrooms
 - bioconversion, 179
 - biodegradation, 178
 - biosorption, 178–179
- Hydrocarbon pollution, 133, 141, 142
- Hydrothermal As biosequestration, 31
- Hyperaccumulators, 137, 138

I

- Incineration, 120
- Industrial pollutants, 154
- Industrial solid wastes
 - bioremediation, 161, 163
 - E-waste, 163
 - leather waste treatment, 162
 - mycoremediation, 161–163
- Inoculum, 61, 87
- Insecticides
 - chlorinated compounds, 121–123
 - degradation, 183
 - organophosphorus, 123, 125
- In situ remediation, 172

L

- Laccases, 83, 160, 167
- Lead (Pb), 135
- Lignin degrading system (LDS), 122
- Lignin peroxidase (LiP), 23
- Lignin-degrading enzymes (LDEs), 19
- Lignin-modifying enzymes (LMEs), 19
- Ligninolytic enzymes
 - oxidases, 176
 - peroxidases, 176

- Ligninolytic fungal degradation
 - brown rot fungi, 175
 - soft rot fungi, 175
 - WRF, 174
- Lignocellulases, 167
- Long-term drought (LTD), 204

M

- Magnaporthe oryzae*, 224
- Marasmiellus trojanus*, 10
- Marine-derived fungi
 - Aspergillus niger*, 22
 - Bhavnagar coast, 29 (*see also* Mycoremediation)
- Mercury, 135
- Microbes
 - endophytic bacteria, 144
 - PAH, 143
 - petroleum-polluted soils, 144
 - rhizospheric interaction, 143
- Microbial bioremediation, 154
- Microbial enzymology, 77–78
- Microbial treatment, 6
- Microorganisms, 59, 61, 62, 73, 189
- Mineralization, 63
- Mining solid wastes, 159
- Morphological investigations
 - SEM, 107, 108
 - SPM, 108, 109
- MoRPL44*, 224
- Municipal solid waste, 160
- Mycobiota, 112
- Mycofiltration, 62
- Mycoremediation
 - advantages, 154
 - arsenic, 27–30, 32
 - biogas production, 94
 - biopulping, 93
 - chromium, 25–27
 - definition, 171
 - disadvantages, 166
 - dye degradation, 21
 - effluents, 19, 20
 - ex situ remediation, 173
 - fungal biodegradation, 155
 - heavy metal pollution, 92
 - in situ remediation, 172
 - inoculum, 61
 - LDEs, 19
 - match industry, 161
 - mycofiltration, 62
 - mycorrhizal fungi, 59, 61
 - nutrient capture, 157

- PAHs, 63, 64, 93
- paper and pulp industrial waste, 162, 163
- polyethylene, 59, 155
- saline-alkali soil, 219, 228
- synthetic dyes
 - decolorization, 19
 - health risks, 18
 - textile dyes, 19
 - toxicity testing, 21
- Mycorrhizal fungal degradation, 175
- Mycorrhizal symbiosis, 195
- Mycorrhizas
 - AM (*see* Arbuscular mycorrhiza (AM))
 - AMF, 190
 - endomycorrhiza, 191
 - mycelium, 190
 - plant/fungus combination, 191
 - symbiotic structure, 191
- Mycorrhizoremediation, 178, 183

- N**
- Nakhla hamra (NHH) and Tijib, 206
- Nicotinamide adenine dinucleotide phosphate (NADPH), 121
- Nitroaromatics, 181

- O**
- Organophosphorus insecticides, 123, 125
- Osmolality, 44
- Outdoor corrosion
 - environmental conditions, 105
 - metals, 107
 - mycobiota, 105
 - polyaniline, 106
 - total metal mass loss, 106, 107

- P**
- Paecilomyces lilacinus* (Thom) Samson, 9, 10
- PAH degradation, 180, 181
- Peroxidases
 - LiP, 81
 - manganese, 81
 - VP, 82
- Pesticides
 - applications, 119
 - biodegradation, 128
 - bioremediation, 120
 - chemical treatment and volatilization, 120
 - contamination, 119
 - incineration, 120
- Petroleum biodegradation, 143, 144
- Phenol oxidases, 176
- Phytoremediation, 7, 75, 137, 142, 218
- Phytotoxicity, 138
- Plant growth-promoting rhizobacteria (PGPR), 40, 195
- Pollutants, 74, 75, 174
 - See also* Degradation
- Pollution
 - defined (*see* Environmental pollution)
 - solid wastes (*see* Solid wastes management)
- Polyamines, 205
- Polyaromatic hydrocarbons (PAHs)
 - aqueous phase, 63
 - biodegradation, 63
 - mineralization, 63
 - PVA, 64
- Polychlorinated biphenyls (PCBs), 171
- Polycyclic aromatic hydrocarbons (PAHs), 93, 142, 143, 171
- Polyvinyl alcohol (PVA), 64

- R**
- Reactive Blue 4 (RB4), 20
- Remazol brilliant blue R (RBBR), 21
- Response surface methodology (RSM), 20
- Restriction enzyme-mediated integration (REMI), 140
- Ribosomal protein L44 (RPL44), 224
- Risk factors, 114
- Root initiation zone (RIZ), 199
- Rubber solid waste, 159

- S**
- Saline-alkali soil
 - A. glaucus*, 224
 - cellulose, 225, 226
 - citric acid cycle, 224
 - D. hansenii*, 223
 - EhHOG*, 223
 - extremophilic fungi, 223
 - microbial application, 219, 222
 - MoRPL44, 224
 - mycoremediation, 219
 - S. cerevisiae*, 223
 - soil-inhabitant fungi, 219
 - T. lanuginosus*, 224
- Salinity-tolerant, 206
- Scanning electron microscopy (SEM), 107, 108

- Scanning probe microscopy (SPM), 108–109
 Soft rot fungi, 175
 Soil biota, 5
 Soil degradation, 4
 Soil fungal biosorption, 175
 Soil-plant pathogens, 195
 Soil pollutants, 58
 Soil salinity
 AM fungi, 205, 206
 date palm, 206
 microorganisms, 205
 osmotic stress, 205
 PGPR, 205
 salt stress, 204
 Soil salinization, 217
 Solid waste management
 agriculture, 164
 biodegradation, 165
 biomedical, 158
 bioremediation, 154
 fungal biodegradation
 mining, 158
 rubber, 159
 fungi and pollutants, 155–157
 garbage and rubbish, 160
 industrial wastes (*see* Industrial solid wastes)
 recyclable materials, 153
 xenobiotics, 159, 160
 Synthetic dyes
 decolorization, 19, 23
 health risks, 18
- T**
 Textile dyes
 marine-derived fungi, 21
 Pestalotiopsis sp. NG007, 23
 RB5, 22
 Textile wastes
 chemical and physical approaches, 70
 heavy metals, 71
 synthetic dyes, 71
 wet processing, 71
Thermomyces lanuginosus, 224
 Total metal mass loss, 106, 107
 Total petroleum hydrocarbons
 (TPH), 141
 Toxicity testing, 21
 Tricarboxylic acid cycle (TCA), 44
Trichoderma sp., 7, 8
- V**
 Versatile peroxidase (VP), 82
- W**
 Wastewater treatment
 azo dyes, 87–89
 batik, 90
 biological treatment, 70
 bioreactor and operation mode, 88, 89
 bioremediation, 78
 dye, 76
 forms, 71
 organic pollutants, 73
 technology, 73–77
 Water pollutants, 57
 Water stress, 203, 204
 Wavelength dispersive X-ray fluorescence
 (WDXRF), 109, 110
 White rot fungi (WRF), 174
 White-rot fungi, 79–81, 122, 127, 144
- X**
 Xenobiotics, 159, 160
 X-ray diffraction (XRD), 110, 112
- Y**
 Yeasts, 31