

Preface

In recent years, there has been increasing concern over public health threat presented by the introduction of different pollutants in the environment due to anthropogenic activities to a greater extent and natural processes to some extent. Many countries all over the world are currently facing severe problems as these pollutants are haemotoxic, carcinogenic, immunotoxic and teratogenic. There has been an increasing interest in the human health and environmental risk of pollutants present in solid waste or effluent generated by anthropogenic activities. Remediation of polluted sites by applying various physical, chemical, thermal and biological techniques is in practice.

The first international conference on ‘Sustainable Energy and Environmental Challenges’ (SEEC-2017) was organized under the auspices of ‘International Society for Energy and Environmental Sustainability’ (ISEES) by the ‘Center of Innovative and Applied Bioprocessing’ (CIAB), Mohali, held from 26 to 28 February 2017. ISEES was founded at IIT Kanpur in January 2014 with the aim of spreading knowledge in the Fields of Energy, Environment, Sustainability and Combustion. The Society’s goal is to contribute to the development of clean, affordable and secure energy resources and a sustainable environment for the society and to spread knowledge in the above-mentioned areas and awareness about the environmental challenges, which the world is facing today. ISEES is involved in various activities such as conducting workshops, seminars and conferences in the domains of its interest. The Society also recognizes the outstanding work done by the young scientists and engineers for their contributions in these fields by conferring them awards under various categories.

This conference provided a platform for discussions between eminent scientists and engineers from various countries including India, USA, South Korea, Norway, Malaysia and Australia. In this conference, eminent speakers from all over the world presented their views related to different aspects of energy, combustion, emissions and an alternative energy resource for sustainable development and cleaner environment. The conference started with four mini-symposiums on very topical themes, which included (i) New Fuels and Advanced Engine Combustion, (ii) Sustainable Energy, (iii) Experimental and Numerical Combustion and

(iv) Environmental Remediation and Rail Road Transport. The conference had 14 technical sessions on topics related to energy and environmental sustainability and a panel discussion on 'Challenges, Opportunities and Directions of Technical Education & Research in the Area of Energy, Environment and Sustainability' to wrap up the three-day technical extravaganza. The conference included 2 plenary talks, 12 keynote talks, 42 invited talks from prominent scientists, 49 contributed talks and 120 posters. A total of 234 participants and speakers attended this three-day conference, which hosted Dr. V. K. Saraswat, Member NITI Ayog, India, as a chief guest for the award ceremony of ISEES. This conference laid out the road map for the technology development, opportunities and challenges in this technology domain. The technical sessions in the conference included Advances in IC Engines and Fuels; Conversion of Biomass to Biofuels; Combustion Processes; Renewable Energy: Prospects and Technologies; Waste to Wealth—Chemicals and Fuels; Energy Conversion Systems; Numerical Simulation of Combustion Processes; Alternate Fuels for IC Engines; Sprays and Heterogeneous Combustion of Coal/Biomass; Biomass Conversion to Fuels and Chemicals—Thermochemical Processes; Utilization of Biofuels; and Environmental Protection and Health. All these topics are very relevant for the country and the world in present context. The Society is grateful to Prof. Ashok Pandey for organizing and hosting this conference, which led to the germination of this series of monographs, which included 16 books related to different aspects of energy, environment and sustainability. This is the first time that such voluminous and high-quality outcome has been achieved by any Society in India from one conference.

The editors would like to express their sincere gratitude to the authors for submitting their work in a timely manner and revising it appropriately at short notice. We would like to express our special thanks to the reviewers for reviewing various chapters of this monograph and providing their valuable suggestions to improve the manuscripts. We acknowledge the support received from various funding agencies and organizations for the successful conduct of the first ISEES conference SEEC-2017, where these monographs germinated. These include Department of Science and Technology, Government of India (special thanks to Dr. Sanjay Bajpai); TSI, India (special thanks to Dr. Deepak Sharma); Tesscorn, India (special thanks to Sh. Satyanarayana); AVL India; Horiba, India; Springer (special thanks to Swati Mehershi); CIAB (special thanks to Dr. Sangwan).

Remediation of polluted sites by various bioremediation technologies is a viable option as conventional physico-chemical methods for remediation seem technically as well as economically challenging. Bioremediation is non-invasive and could be cost-effective in the removal of organic as well as inorganic pollutants present in waste. Green processes by the use of microorganisms or plants are considered as ultimate mechanism for pollutant removal. Hence, bioremediation processes are referred to as eco-friendly, efficient, economically feasible and versatile for pollutant remediation.

This monograph is intended for environmental scientists, microbiologists and biotechnologists. We hope that the book would be of great interest to the professionals, postgraduates and research students involved in research work in the field

of waste bioremediation. The main objective of this monograph is to promote a better and more accurate understanding of waste bioremediation besides recent advances and challenges in clean technology development for sustainable development of environment. The book shall include chapters on different aspects of waste bioremediation either solid or liquid both from within India and internationally. Some of the topics covered shall include Organic carbon and pollutants reduction through composting; Polycyclic aromatic hydrocarbons from petroleum oil industry activities; Effect on human health and their biodegradation; E-waste management: Bioremediation; Role of microbial consortia in bioremediation of textile recalcitrant compounds; Bioreduction of hexavalent chromium using moderate thermophilic and thermophilic microorganisms; Bioprocesses for sulphate removal from wastewater; Microbial transformation of heavy metals; Bioremediation of Lithium-ion battery (LIB) waste; Biodigester technology for eco-friendly disposal of night soil; Anaerobic digestion: Factors affecting anaerobic digestion process; Energy recovery with microbial fuel cells; Bioremediation and bioelectricity; Microbial depolymerisation; Mechanism and action of *Aureobasidium pullulan* on biosorption of metals; Bioremediation of leachates; Effectiveness of plant growth promoting rhizobacteria in phytoremediation of chromium-stressed soils and so on.

Gandhinagar, India
Lausanne, Switzerland
Chennai, India
Kangra, India
Johor Bahru, Malaysia

Sunita J. Varjani
Edgard Gnansounou
G. Baskar
Deepak Pant
Zainul Akmar Zakaria

Waste Bioremediation

Varjani, S.; Gnansounou, E.; Gurunathan, B.; Pant, D.;
Zakaria, Z.A. (Eds.)

2018, XII, 384 p. 65 illus., 39 illus. in color., Hardcover

ISBN: 978-981-10-7412-7