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Biological Remediation of Explosive Residues

 Springer

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Dedicated to parents in heavenly abode

Preface

Cyclic nitramine explosives RDX, HMX, and CL-20 are commonly synthesized as most widespread conventional explosives. Their use in military munitions largely for the protection of national boundaries and mining operations, has resulted in widespread contamination of soil and water reservoirs. Residual explosives have the potential to move into soils as well as surface and ground water and affect various ecological and human receptors. Therefore, U.S. Environmental Protection Agency (USEPA) has included seven nitro-substituted explosives including TNT and RDX as priority pollutants. Labscale studies have revealed that TNT, RDX, and HMX are toxic to a wide spectrum of organisms including bacteria, algae, plants, earthworms, mammals, and humans. No doubt, traditional treatments of ammunition wastes, like open detonation and burning, adsorption onto activated carbon, photo-oxidation, etc., are not only costly, but also damaging the environment. Therefore, scientists are interested to develop an alternative technology based on microbes and plants which will be not only cost-effective, but also environment friendly.

In view of above facts, the editor has made his sincere efforts to compile the latest developments on biological remediation of explosive residues in an edited volume which will serve as a ready reckoner to the scientists, policy makers, teachers and students, and military personnel for the remedial measures to decontaminate the explosive residues in soils and waters by microbes and plants, alone or in combination.

In this endeavor, I would like to profusely thank all the contributors for their prompt response and active participation by contributing a review article on different aspects of biological degradation of explosive residues. I would also like to acknowledge my Ph.D. students associated with me Ms. Shweta Mishra, Mrs. Babita Kumari and Ms. Nitanshi Jauhri for their academic and technical support. Besides, untiring service, provided by Mr. Dilip Chakraborty in preparing the manuscript meticulously, is heartily acknowledged.

Lastly, I would also like to thank my family members: Mrs. Manorama Singh (wife), Ragini (daughter), and her kids Antra and Avantika and Pritish (son) for their inspiration, endurance, and moral support to me in this endeavor.

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