

Detoxification and Biotransformation of Chlorinated Nitroaromatic Compounds by Bacteria

Pankaj Kumar Arora

Institute of Microbial Technology, India

Chlorinated nitroaromatic compounds are persistence environmental pollutants and introduced into the environment through industrial discharges, agricultural uses or improper waste disposal practices. These compounds are used in drugs, herbicides, pesticides, dyes, lumber preservatives, antioxidants, gasoline additives, corrosion inhibitors and other industrial chemicals. Examples of these compounds are chloronitrobenzenes, chloronitrophenols and chloronitrobenzoic acids. A number of chlorinated nitroaromatic compounds are toxic to living beings and adversely affect to human health due to their hematotoxicity, immunotoxicity, splenotoxicity, genotoxicity, hepatotoxicity, nephrotoxicity and carcinogenicity. United State Environmental Protection Agency (USEPA) has listed chlorinated nitroaromatic

compounds as 'priority pollutants'. Chlorinated nitroaromatic compounds are considered recalcitrant to microbial degradation due to electron withdrawing properties of chloro and nitro groups, therefore, a limited number of bacteria that utilized chlorinated nitroaromatic compounds as a sole source of carbon and energy could be isolated. However, few bacteria adopt detoxification mechanism to minimize the toxic effects of chlorinated nitroaromatic compounds and transform highly toxic chlorinated nitroaromatic compounds into less toxic compounds. The mechanism of detoxification initiates with reduction of nitro group of a chlorinated nitroaromatic compound and further proceeds via acetylation of reduced product. This mechanism of detoxification was observed in biotransformation of chloronitrobenzene and chloronitrophenol.

Biography

He had worked as an Assistant professor in the department of Botany in J. S. Hindu Post-Graduate Degree College, Amroha, Uttar Pradesh after qualifying prestigious CSIR-UGC-NET exam. After two years of teaching experience, he has moved to research and joined Institute of Microbial Technology, Chandigarh as a Research Scholar. He was awarded Junior Research Fellowship and Senior Research Fellowship by the Council of Scientific & Industrial Research (CSIR), India. During his PhD, he did work on microbial degradation of chlorinated nitroaromatic compounds. He has a few good publications in area of Environmental sciences in a short span of time and act as a reviewer for several reputed journals.