

A Comprehensive Review on Health Hazards and Challenges for Microbial Remediation of Persistent Organic Pollutants

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Abstract : Persistent organic pollutants (POPs) have become a great concern due to their toxicity, transformation and bioaccumulation property. Therefore, this review highlights the types, sources, classification health hazards and mobility of organochlorine pesticides, industrial chemicals and their by-products. Moreover, with the signing of Aarhus and Stockholm convention on POPs there is an increased demand to identify and characterise such chemicals from industries and environment which are toxic in nature or to existing biota. Due to long life, persistent nature they enter into body through food and transfer to all tropic levels of ecological unit. In addition, POPs are lipophilic in nature and accumulate in lipid-containing tissues and organs which further indicates the adverse symptoms after the threshold limit. Though, several potential enzymes are reported from various categories of microorganism and their interaction with POPs may break down the complex compounds either through biodegradation, biostimulation or bioaugmentation process, however technological advancement and human activities have also indicated to explore the possibilities for the role of genetically modified organisms and metagenomics and metabolomics. Though many studies have been done to develop low cost, effective and reliable method for detection, determination and removal of ultra-trace concentration of persistent organic pollutants (POPs) but due to insufficient knowledge and non-feasibility of technique, the safe management of POPs is still a global challenge.

Keywords : persistent organic pollutants, bioaccumulation, biostimulation, microbial remediation

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