

Bioremediation of pesticides-contaminated soil and water

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Pesticides are a part of modern agriculture that helps in obtaining a healthy yield of crops. Approximately 1-5% of total applied pesticides get used up by the targeted pests, the remaining unused pesticides enter into the ecosystem, with their ultimate sink being in soil and water. Their effect on non-target species and the environment is huge. As the pesticides persist in the environment and cause biomagnification throughout the food chain and biochemical cycles prompting a temperamental ecosystem, their management has become a significant global issue. Concerning agriculture, ecological well-being, and quality of life, many methods have been developed so far to manage pesticides efficiently. Traditional methods of pesticide detoxification, such as landfill or incineration generate secondary contamination as a result of leaching of pesticides into surrounding soil and groundwater. Since pesticides are complex, more adaptable and sturdy techniques need to be utilised, which can effectively produce desired results. With this, bioremediation came into existence, which is a novel method to overcome the problem of contamination of soil and water occurring as a result of pesticides. The intrinsic bioremediation where microbes that already exist are not adequate to degrade the pesticides makes use of genetically modified microorganisms and plants for pesticide detoxification. It is more constructive and ecofriendly in contrast to traditional, physical and chemical methods, which result in partial or complete bioconversion of organic pollutants to microbial biomass and stable non-toxic end products. The various techniques incorporated include bioaugmentation, bioparging, biostimulation, indigenous bioremediation, bioaccumulation, soil treatment, land cultivating, bioreactors, bacterial, fungal and phytoremediation. Bioremediation renders more advantages than the traditional methods and also has gained more importance in recent times.

Keywords: Pesticides, Biomagnification, Biogeochemical cycles, Ecosystem, Bioremediation, Ecofriendly

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