Enhanced Degradation of Endosulfan in Soil Using Lycopersicon esculentum L. (Tomato) and Endosulfan Tolerant Bacterium Strains

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Abstract : Endosulfan, an organochlorine pesticide is of environmental concern due to its apparent persistence and toxicity. It has been reported as contaminants in soil, air, and water and is bioaccumulated and magnified in ecosystems. The combined use of microorganisms and plants has great potential for remediating soil contaminated with organic compounds such as pesticides. The objective of this study was to evaluate whether the bacterial inoculation influences plant growth promotion, endosulfan degradation in soil and endosulfan accumulation in different plant parts. Lycopersicon esculentum L. (Tomato) was grown in endosulfan spiked soil and inoculated with endosulfan tolerant bacterial strains. Endosulfan residues from different parts of plants and soil were extracted and estimated by using gas chromatograph equipped with 63Ni electron capture detector (GC-ECD). The inoculation of bacterial strains into the soil with plants showed a beneficial effect on endosulfan degradation and plant biomass production. Maximum endosulfan (90%) degradation was observed after 120 days of bacterial inoculation in the soil. Furthermore, there was significantly less endosulfan accumulation in roots and shoots of bacterial strains inoculated plants as compared to uninoculated plants. The results show the effectiveness of inoculated endosulfan tolerant bacterial strains to increase the remediation of endosulfan contaminated soil.

Keywords : organochlorine pesticides, endosulfan, degradation, plant-bacteria partnerships