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PLANT–MICROBE INTERACTIONS IN PCB CONTAMINATED SOIL

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Abstract

Plant-microbial interactions in the rhizosphere offer very useful means for clean-up of environments contaminated with recalcitrant organic compounds such as PCB. The microorganisms raise the availability of the compounds and the plants help in the extraction and removal of such compounds and supply nutrients for microorganisms. Secondary metabolites released by plants could play a significant role in cometabolic degradation processes.

This work is focused on studying the influence of caffeic acid and naringine, as compounds belong to secondary metabolites, on microbial diversity and degradation in the PCB contaminated soil planted by tobacco (*Nicotiana tabacum*) and horseradish (*Armoracia rusticana*). Cultivated microorganisms were isolated from rhizosphere after 4 months cultivation. The potential PCB degraders, microorganism which were able to grow on mineral medium with biphenyl as sole carbone source, were identified by MS MALDI-TOF. Genus *Arthrobacter* was mostly found and then *Pseudomonas* and *Burkholderia* in soil samples of both plants. All these bacteria belong to well-known PCB degraders. The total DNA was isolated from all soil samples and noncultivated bacteria were identified after 16S rRNA analysis. The wide range of PCB and chlorobenzoates degrading bacteria were found (*Rhizobium*, *Sphingomonas*, *Achromobacter*, *Burkholderia*, *Arthrobacter*, *Microbacterium*, *Alcaligenaceae*). For a better understanding what kind of bacteria were really actively involved in PCB degradation the SIP (Stable Isotope Probing) method was employed. The change of PCB content in different soil samples was followed. The significant decrease of PCB content in horseradish samples was measured after four months cultivation.

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