

Polychlorinated biphenyls degradation by soil microbiota upon stimulation of root exudates.

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Phyto-rhizo-remediation is a promising technology for pollutant clean-up provided by the plant holobiont, composed by the host plant and its associated microbiome. Through root exudation, the plant nurtures and shape the structure and functionality of the microbial communities inhabiting the root system. The complex interactions between the plant host and the microbiome are poorly understood, in particular in contaminated environments where the pollution stress induces specific root exudation profiles that could have a role in the activation of the microbial degrading metabolism.

The study will be applied to the site of Brescia-Caffaro, one of the largest sites in Europe contaminated by polychlorinated biphenyls (PCBs).

The project aims to sort out the time-spatial synergistic interplay within the plant holobiont components and the geochemistry of rhizosphere micro-niches supporting microbial degradation. The research will combine the: i) set up and application of bacterial biosensors to examine topology and dynamics of activation of the PCB degradation pathways upon stimulation by identified plant root exudates; and ii) sensing the plant modulated chemical micro-habitats through microsensor/sensor devices during plant-microbe interaction under PCBs stress.

The project outcomes will provide a comprehensive understanding of the plant holobiont applied to environmental biotechnology, focusing on the the role of root exudates as boost of soil microbiome degradative potential.

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