

The Use of the Reed *Phragmites communis* and Associated Microbial Community for the Development of a Bioremediation Process

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The aim of this study was to evaluate the role of microorganisms-host plant relationships in bioremediation processes and to enhance the efficacy of such processes. Rhizomes of *Phragmites communis* inhabiting a heavily contaminated environment were collected, and cultivated in laboratory soil systems. Haloorganic compounds (chloro-, nitro- phenols) are supplied to the soil-plant systems and biodegradation is monitored. Plant roots were analysed for the adsorption and degradation of the target compounds, when deprived of microbial activity. Disappearance of the substituted phenols was quantified by HPLC and chloride release monitored.

In parallel, chloro- and nitro- aromatic degrading consortia were isolated from the rhizosphere of *Phragmites communis* collected from the same site. Batch enrichments were established using the haloaromatic compounds. Isolated consortia were able to degrade mixtures of such pollutants. A granular activated carbon (GAC) biofilm column for the degradation of a model compound, 4-chlorophenol, was established using an isolated consortium. To improve this process, a second natural biofilm is being established on a GAC column using microbial communities extracted from rhizosphere samples by differential and dispersion centrifugation techniques.