Influence of Arbuscular Mycorrhizal Fungus (AMF) on degradation of iron-cyanide complexes

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Soil contamination in the vicinities of former Manufactured Gas Plant (MGP) sites is a worldwide known environmental issue. The pollutants, in form of iron-cyanide complexes, originating from the gas purification process, create a risk for human health due to potential release of toxic free cyanide, CN(aq) and HCN(g), (aq).The management and remediation of cyanide contaminated soil can be very challenging due to the complex chemistry and toxicity of CN compounds. The employment of phytoremediation to remove or stabilize contaminants at a former MGP site is an inexpensive process, but can be limited through shallow rotting, decreased biomass, poor growing and the risk of secondary accumulation. However, this adaptation may be enhanced via arbuscular mycorrhizal fungi (AMF) activity, which may cooperate on the degradation, transformation or uptake of the contaminants.

We would like to present our preliminary results from the ongoing project concerning toxic substrate-AMF-plant relation, based on studying the site of a former MGP site. In situ experiments contributed to identifying those fungi that are likely to persist in extremely acidic and toxic conditions. Subsequently, commercially available Rhizophagus irregularis was grown in sterilized, un-spiked soil with the roots of the host plant Calamagrostis epigejos. Extracted roots and AMF hyphae were used in the batch experiment, were the potential of this association on degradation of iron-cyanide complexes, in form of potassium ferrocyanide solution, was assessed.