

Does birch vegetation influence the bioavailability of metals in U mining affected substrate? A mesocosm experiment

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Large areas within Europe show a metal contamination of the soil and the water phase (e.g. surface and ground water). That pollutions are often caused by former and actual mining activities. For cleansing of these sites after termination of the mining phytoremediation is a possible tool. It uses plants and microbes either for extraction of metals from soil (Phytoextraction) or to stabilize them in the soil (Phytostabilization). The latter causes a decrease of mobility, bioavailability and also toxicity of the metals.

The 'Kanigsberg' study site in eastern Germany represents a case example for mining influenced areas. Besides other impacts of the former mining the area shows residual metal contamination in soil and water. After the ending of the mining, the site was reforested with various tree species for remediation. Furthermore succession by birch trees started. To estimate the benefit of such a remediation strategy a better understanding of the processes occurring at the plant-soil-interface on reforested heaps is essential. Therefore mesocosm pot experiments were set up. Four 45 l pots filled with homogenized heap material from the study site were equipped with instrumentation for acquisition of physico-chemical soil parameters as well as for soil water sampling in various depths. Three pots were cropped with autochthonous birch trees, the fourth serves as an unplanted control.

In the ongoing experiment periodically soil water sampling is scheduled to monitor trends in electrical conductivity, pH and metal concentrations. Furthermore the mycorrhiza of the autochthonous birches in field and in the pots is investigated by morphologically and genetically identification.

The results from the first vegetation period indicate a decrease of metal loads as well as an increase of pH in the soil water of the planted pots compared to the unplanted control.