Biogeochemical processes in the rhizosphere of *Populus euramericana Dorskamp* involved in the phytosabilization of Cd, Pb and Zn in contaminated technosol with N addition

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Introduction

The study of rhizosphere-related processes on mobility, availability and toxicity of trace metals in soils is a major challenge to understand their ecodynamic in the context of phyroremediation or natural attenuation of contaminated soils.

Material and methods

Surface soils were sampled from a metallophyte grassland contaminated with Cd, Pb and Zn located at Mortagne-du-Nord (North France) [1]. A plant growth experiment with poplar woody stem cuttings was conducted with forty-five pots for 35 days with 2 N treatments (NH_4^+, $NO3^-$) and an untreated control soil. Rhizospheric soil pore water (SPW) pH, dissolved organic carbon (DOC) concentration, metal concentrations in SPW and their uptake by *Populus euramericana Dorskamp* were determined.

Results and discussion

Rhizospheric SPW pH decreased gradually with NH4+ addition and increased with NO3– addition up to one unit. DOC increased with time up to 6 times, the highest increase occurring with NH4+ fertilization. An increase in the metal concentrations in the rhizospheric SPW was observed for NH_4^+ addition whereas the opposite was observed for the control soil and NO_3^- fertilization. Metals were mostly accumulated in the rhizosphere and N fertilization increased the accumulation for Zn and Pb while Cd accumulation was enhanced for NH_4^+ addition.

Conclusion

Collectively our results suggest metal stabilization by Populus euramericana Dorskamp rhizosphere with NO_3^- fertilization.