Influence of organic acids on heavy metals mobilization in the soil suspension

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Introduction

Our research was aimed to demonstrate the efficiency of organic acids on the induced heavy metal mobilisation [1, 2].

Three organic acids were tested on the mobility of lead, zinc and cadmium in soil suspension of cambisol under the cultivation soil and meadow. Acetic, tartaric and citric acids were used in concentration 5, 25 and 250 $mmol.kg^{-1}$ soil. Their influence on heavy metals concentration in solution, changes of soil fraction binding and pH changes were determined.

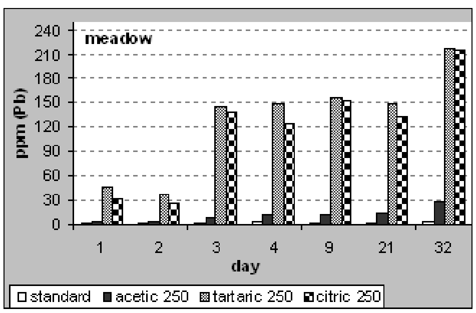

Figure 1: Dynamic changes of lead water content during the experiment period

Results and Discussion

Citric acid was the most effective on arable soil for lead and cadmium. Zinc was the most mobilized on arable soil by tartaric acid. Tartaric acid was more effective on meadow especially for lead [Fig.1]. Water soluble content of lead increased 2-6 fold, the same fraction of cadmium increased 2-5 fold and water soluble zinc only 2 fold after the acids application. The highest changes in release of metals were determined for Pb > Cd > Zn. The stability of pH value for all variants were not expressively changed during the experiment period.

Only the highest concentration of tartaric and citric acids demonstrate the possible ability to induced rhizofiltration.

[1] Schwab (2008) *Chemosphere* **72**, 986-994. [2] Chuan (1996) *Water, Air and Soil Pollution* **90**, 543-556

Microbial mechanisms of energy conservation, carbon transfer and detoxification in deep-sea extreme environments

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Early studies of deep-sea extreme environments (e.g., deep-sea hydrothermal vents and cold seeps) revealed the critical role of free-living and symbiotic microorganisms in sustaining the productivity of these ecosystems. More recently, experimental strategies that integrate biogeochemical and genomic analyses with physiological studies of pure cultures, are providing new information on the mechanisms used by different classes of bacteria to conserve energy, transfer carbon and detoxify harmful chemicals. In my laboratory, we are using such integrated approaches to investigate the microbial colonization of newly formed vents on the East Pacific Rise (EPR) at 9°N, following the 2005-06 seafloor eruption. Besides the well-established role of *Epsilonproteobacteria* as the dominant and active fraction of the chemosynthetic microbial communites, our studies are revealing a possible role for heterotrophic bacteria that can use alternative carbon sources, such as *n*-alkanes, and could play a role in the detoxification of heavy metals. We propose a model in which chemosynthetic and heterotrophic microbial processes, such as energy conservation and carbon transfer mechanisms along with the mobilization and detoxification of toxic heavy metals, may lead to the colonization of newly formed vents.