EFFECTS OF OXIDATION AGENTS ON TO A CONTAMINATED MATRIX NATURAL MICROFLORA

VLIV OXIDAČNÍCH ČINIDEL NA PŘIROZENOU MIKROFLÓRU KONTAMINOVANÝCH MATRIC

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Abstract:

The study deals with the study of in-situ chemical oxidation (ISCO) as a remediation technology method and possibility of coupling ISCO with biological cleanup. Principle of ISCO is the application of oxidizing agent into the contaminated zone and the subsequent destruction of the contaminants by oxidation processes. Adverse conditions for soil biota caused by ISCO, involves particularly a change of pH and oxidation potential. On the contrary, ISCO enhances microbial processes on contaminated site by reducing concentration of toxic substances, by increasing bioavailability of substrate, by production of bio-available and bio-degradable substances, by production of oxygen for aerobic biological transformation of contaminants. Experiments verified the effect of different concentrations of potassium permanganate on microflora commonly occurring in soil sample. Further reinoculation experiments of soil which was contacted with an oxidizing agent were designed and conducted, aimed to describe the possibility of soil reinoculation within the real decontamination intervention. The most important finding of this work is following: Heterogeneous system in the time slot following the sterilization the aqueous phase with potassium permanganate is a noticeable surge of culturable microorganisms in all the samples treated with permanganate. This surge is the most intensive in the sample which was treated with the most concentrated permanganate solution. Detected microorganisms are apparently released from the soil environment into the aqueous phase after the decrease of the most intensive oxidative stress. The most intensive increase in biomass in the sample with the highest original concentration of permanganate can be explained by enrichment of the aqueous environment by the fission products of humic substances, and possibly by other products of passed redox processes, which evidently do not inhibit the growth. Contrawise this products can support the growth and reproduction of microorganisms, eventually act as a primary substrate.

Keywords:

In-situ chemical oxidation, potassium permanganate, bioremediation, train technologies