



Remediation of grey forest soils heavily polluted with heavy metals by means of their leaching at acidic pH followed by the soil reclamation by means of neutralization and bacterial manure addition

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Some grey forest soils in Western Bulgaria are heavily polluted with heavy metals (copper, lead, and zinc), arsenic, and uranium due to the infiltration of acid mine drainage generated at the abandoned uranium mine Curilo. This paper presents some results from a study about soil remediation based on the contaminants leaching from the topsoil by means of irrigation with solutions containing sulphuric acid or its in situ generation by means of sulphur-oxidizing chemolithotrophic bacteria in or without the presence of finely cut straw. These methods were tested in large scale zero suction lysimeters. The approaches based on S° and finely cut straw addition was the most efficient amongst the tested methods and for seven months of soil remediation the concentration of all soil contaminants were decreased below the relevant Maximum Admissible Concentration (MAC). Neutralization of the soil acidity was applied as a next stage of soil reclamation by adding $CaCO_3$ and cow manure. As a result, soil pH increased from strongly acidic (2.36) to slightly acidic (6.15) which allowed subsequent addition of humic acids and bacterial manure to the topsoil. The soil habitat changed in this way facilitated the growth of microorganisms which restored the biogeochemical cycles of nitrogen and carbon to the levels typical for non-polluted grey forest soil.