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Technical development of geomicrobiological fixation of heavy metals in soils and sediments by biosorption and bioreduction –case histories in Korea

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Conventional physicochemical technologies to remediate heavy metals-contaminated soil have many problems such as low efficiency, high cost and occurrence of byproducts. Recently biological stabilization technology is getting more and more attention. The advantage of this technology is that toxic metals can be stabilized for long time with no necessity of retreatment. The objective of this research is to develop geomicrobiological stabilization technologies of heavy metals by biosorption and oxidation/reduction in contaminated soil and sediment. Geochemical characteristics of heavy metals such as concentration and speciation in contaminated soil were investigated. Environmental conditions for effective biosorption were also investigated. It was successful to form biofilm in soil. Biofilm had great heavy metal biosorption capacity. Bioreduction efficiency of hexavalent chromium by indigenous bacteria was evaluated in various conditions.. From now on, it is necessary to prove applicability of this technologies to contaminated sites and to establish highly effective, low-cost and easy bioremediation technology.