Biologocal Synthesis of Tellurium Nanostructures by *Shewanella oneidensis* MR-1

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The use of nanostructured materials is becoming more widespread having unique physical and chemical properties. It is well known that biological systems can provide a number of metal or metal-containing particles in the nanometer size range. Dissimilatory metal-reducing bacteria, *Shewanella* spp. have received more attention on environmental remediation since they are capable of reducing many heavy metals and radioactive elements to immobilized forms and producing diverse nano-sized secondary minerals. The metalloid oxyanion tellurite(TeO_3^{2-}, Te(IV)) is highly toxic to most organisms and specific mechanisms explaining its toxicity are not well known to date. *S. oneidensis* MR-1 reduce Te(IV) to elemental tellurium [Te(0)] by direct-enzymatical and indirect-chemical mechanisms under anaerobic conditions. This reduction results in the formation of unique crystalline Te nanoarchitectures as end products. The Te(0) nanorods are formed intracellular and extracellular of the bacterial cells by bacterial direct reduction and Fe(II) mediated indirect reduction, respectively. These results suggest that the use of *S. oneidensis* MR-1 could present the biological potential for the remediation and recovery of novel biogenic Te(0) nanostructures in the environment and/or in industrial wastewater contaminated with tellurium species via an environmentally-friendly process.

Keywords: Shewanella, Tellurium nanostructure, biomineralization