Rhizosphere-induced Selenium Precipitation for Possible Applications in Phytoremediation of Se Polluted Effluents

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Two bacterial isolates were obtained in axenic culture from the rhizosphere soil of Astragalus bisulcatus, a legume able to hyperaccumulate selenium. Both strains resulted of particular interest for their high resistance to the toxic oxyanion SeO_3^{2-} (selenite, Se^{IV}). On the basis of molecular and biochemical analyses, these two isolates were attributed to the species *Bacillus mycoides* and *Stenotrophomonas maltophilia*, respectively. Their capability in axenic culture to precipitate the soluble, bioavailable and highly toxic selenium form selenite to insoluble and relatively non-toxic Se⁰ (elemental selenium) was evaluated in defined medium added with 0.2 or 0.5 mM Se^{IV}. Both strains showed to completely reduce 0.2 mM selenite in 120 h, while 0.5 mM Se^{IV} was reduced up to 67% of the initial concentration by *B. mycoides* and *S. maltophilia* increased the kinetics of selenite reduction, thus improving the efficiency of the process. A model system for selenium rhizofiltration based on plant-rhizobacteria interactions has been proposed.

Key words: Bacterial Reduction, Selenite, Wastewater Rhizofiltration