

Bacterial Activity in Heavy Metals Polluted Soils: Metal Efflux Systems in Native Rhizobial Strains

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The negative effect of high levels of heavy metals on the activity of soil microorganisms is well-known. However, some microorganisms survive even in high levels of heavy metals, and the microbial activity can therefore, help to recover these polluted soils. Microbial metal uptake in contaminated soils has to be tightly regulated to avoid toxic effects for the cells. These mechanisms of metal resistance are frequently associated to transport-related membrane proteins that mediate bacterium's direct metabolic interactions with the complex soil and aquatic harsh environments. This study reports the identification of gene clusters in rhizobial strains that are regulated by heavy metals, particularly chromium. A DNA fragment was amplified from *R. leguminosarum*, and *in silico* analysis of the sequence obtained revealed a putative protein homologue to a cation/multidrug efflux pump component (GenBank DQ398937). Another amplified DNA fragment, with 960 bp, has strong homology with anion ABC transporters (GenBank ZP.002212691) and a peptide ABC transporter (GenBank NP.766950), was identified in *Mesorhizobium loti* (GenBank DQ398941) and *Sinorhizobium meliloti*. Using Chromosome Walking technique, a single product from *Sinorhizobium meliloti* was cloned and sequenced. This new fragment enlarged more 302 bp to the initial sequence corresponding to the ABC transporter, confirming homology with an ATPase from PP superfamily (GenBank ZP.00197146.1).

Keywords ABC transporter, chr, heavy-metal resistance, metal efflux system, multidrug transporter, Rhizobia

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