[P-E.62]

## Bioleaching of hexavalent chromium from soils using *Acidithiobacillus thiooxidans*

Bruna Fonseca*, Joana Rodrigues, Ana Queiroz, Teresa Tavares

*Institute for Biotechnology and Bioengineering, Centre for Biological Engineering, University of Minho, Portugal*
*Keywords:* Bioleaching; Hexavalent chromium; *Acidithiobacillus thiooxidans*; Soils

The continuous and growing degradation of the environment, due to several anthropogenic activities, is a main concern of the scientific community. Consequently, the development of low cost techniques to clean air, water and soils are under intense investigation. In this study, the focused problem is the soil contamination by hexavalent chromium, which is known for its several industrial applications - production of stainless steel, textile dyes, wood preservation and leather tanning - its high toxicity and mobility.

Bioleaching has been presented as a low cost effective technique to decontaminate soils polluted with heavy metals. Sulphur oxidizing bacteria, like *Acidithiobacillus thiooxidans*, were already applied with this technique as they produce sulphuric acid, lowering the pH and promoting the dissolution of heavy metals. On the other hand, it also known that polythionates, generated during the oxidation process, have high reducing power. Considering this information and since few studies have been made concerning the bioleaching of hexavalent chromium from soils, this work pretended to investigate this matter.

Specifically, eighteen Erlenmeyers flasks (250 mL) with a working volume of 150 mL, containing 10% ($^{V}/_{V}$) of inoculum (*Acidithiobacillus thiooxidans* DSM 504), 90% ($^{V}/_{V}$) of growing medium (DSM 35) and 3% ($^{W}/_{V}$) of contaminated soil were agitated in a rotary shaker, at 150 rpm, for 70 days. Also three controls were undertaken by sterilizing the soil and/or suppressing the inoculum. Two operation temperatures - 26 °C and room temperature - and different levels of soil contamination were evaluated within this work. Finally, the composition, richness and structure of soil microbial communities, before and after the contamination/decontamination processes, were assessed through denaturating gradient gel electrophoresis (DGGE), of the amplified 16S rRNA gene fragments of the DNA extracts of the soil samples.

This study presented bioleaching as a competitive technique in soil cleaning, as it is efficient and inexpensive.

doi:10.1016/j.jbiotec.2010.09.084