REMOVAL OF HEAVY METALS FROM REAL ELECTROPLATING EFFLUENTS USING A BREWER'S YEAST STRAIN OF *SACCHAROMYCES CEREVISIAE*

M.D. Machado[1,2], H.M.V.M. Soares[2], **E.V. Soares**[1,3]

[1]Bioengineering Laboratory, Chemical Engineering Department, Superior Institute of Engineering from Porto Polytechnic Institute, [2]REQUIMTE-Department of Chemical Engineering, Faculty of Engineering of Porto University, Porto, [3]IBB-Institute for Biotechnology and Bioengineering, Centre for Biological Engineering, Universidade do Minho, Braga, Portugal

Background: The release of heavy metals in aquatic systems due to the discharge of industrial wastewaters is a matter of environmental concern. The use of yeast cells has been raised as an alternative to the conventional technologies.

Objectives: To evaluate the feasibility of flocculent brewing cells of *S. cerevisiae* to remove several metals from real electroplating effluents.

Methods: Flocculation was assessed using a sedimentation test. The occurrence of structural or molecular changes in the yeast cells during heat treatment (at 45ºC), were evaluated using fluorescence, scanning electron microscopy and infrared spectroscopy. Heavy metals concentrations were determined by atomic absorption spectroscopy with flame atomization.

Conclusions: Yeast cells were able to sediment in the presence of most of the heavy metals, as well as in the industrial effluents. Cells inactivated at 45ºC maintained the sedimentation characteristics and showed a higher degree of heavy metal removal than the live cells. Effluents containing Cu, Ni and Zn (effluent A) or Cr, Cu and Ni (effluent B) were used. In both effluents, pH was adjusted to 6.0; in effluent B, Cr(VI) was previously reduced to Cr(III). Subsequently, effluents were treated with a serial batch of heat-inactivated yeast biomass. After the third batch, metal concentrations were lowered to below the legal limits of discharge; removals ≥ 89%, were attained for all metals. The usefulness of using heat-inactivated flocculent brewing cells for detoxifying complex industrial effluents loaded with several heavy metals was demonstrated. This approach combines an efficient metal removal with a fast and off-cost yeast separation.