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Bioremediation of nickel from electroplating wastewaters

Manuela D. Machado[1,2], Mónica S. Santos [1], Helena M.V.M. Soares [#1], Eduardo V. Soares [#2,3]
(1) Faculty of Engineering of University of Porto, REQUIMTE- Department of Chemical Engineering, Porto. Portugal, (2) ISEP-Polytechnic Institute of Porto, Department of Chemical Engineering, Porto, Portugal (3) University of Minho, Center of Biological Engineering , Braga, Portugal ,
email: manuela.machado@fe.up.pt

A difficulty of applying microbial biomass for heavy metals remediation lies with a rapid and efficient separation of the biomass from the reaction mixture. The proposed industrial applications of biosorption use various forms of immobilized biomass, which is very expensive when used in large scale. A practical alternative may involve the use of flocculating cells, which have the ability of interact between them and flocculate.

Flocculent cells of *Saccharomyces cerevisiae*, a by-product from fermentative industry, were used as biosorbent for removing nickel from an electroplating effluent.

The treatment of the effluent was carried out in a stirred batch system, with 12 g dry weight/l of non-viable flocculent cells of *Saccharomyces cerevisiae*, killed at 45 °C.

Chemical characterization (total heavy metals, total inorganic ligands and total and organic carbon concentrations) of the electroplating effluent was performed.

The efficiency of the overall system was studied using a real effluent containing 15 ppm of nickel. Most of nickel biosorption occurred in the first stage of accumulation; the second and third stages acted as polishing steps that pushed down the final concentration of nickel to values below the legal values for water discharge (2 ppm), which corresponds to a global nickel removal of about 90 %.

In conclusion, our results evidence that the use of flocculent cells of *Saccharomyces cerevisiae* could be a new and promissory alternative in the treatment of industrial wastewaters loaded with heavy metals, since it is a low cost biosorbent, which combines an efficient removal of the metals with an inexpensive and rapid separation of biomass from the reaction mixture after contact. In addition, it is not necessary to acquire new equipment. It is possible to profit equipment that already exists in industries to treat effluents (like sedimentation tanks).

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Corresponding authors: evs@isep.ipp.pt; hsoares@fe.up.pt.