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Ballroom C

Removal of heavy metals using cells of *Saccharomyces cerevisiae* as a green technology

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Anthropogenic activities are largely responsible for the release of heavy metals in the environment. Unlike organic pollutants, heavy metals are not degraded and remain indefinitely in the ecosystem, which poses a different kind of challenge for remediation.

Municipal sanitary sewers are not designed to treat toxic wastes, such as industrial effluents containing heavy metals. Thus, heavy metals should be removed in a “previous step”, from these metal-laden effluents before they are released into the water body or sent to a municipal treatment plant. Conventional physicochemical technologies are not environmental friendly, fully efficient or present very high costs when applied to large volume of wastewaters containing low metal concentration (1-100 mg/l). The disadvantages of these available “best treatment technologies”, associated with the increase of environmental regulations, have compelled the search for alternative, low-cost and efficient processes for the detoxification of metal-bearing wastewaters.

The advantages and the current knowledge of the mechanisms of metal removal by yeast cells of *Saccharomyces cerevisiae* will be presented. The use of live or dead biomass and the influence of biomass inactivation processes or the modification of the yeast surface on the metal accumulation characteristics will be outlined. The importance of the physico-chemical characteristics of the effluents and the role of chemical speciation as a tool for predicting and optimising metal removal will be highlighted. The use of yeast cells as the only treatment process of real effluents or in a “polishing” step, after the chemical treatment of the raw effluent to remove the bulk of the metal will be presented. The problem of biomass separation, after treatment of the effluents, and the use of flocculent characteristics of yeast cells, as an alternative process of cell-liquid separation, will also be discussed. The convenient management of the contaminated biomass and the advantages of the selective recovery of heavy metals in the development of a closed cycle without residues (green technology) will be presented.