P-128 - A COMPARATIVE STUDY OF RARE EARTH METALS RECOVERY BY BACTERIA AND ALGAE.

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Background

This project aims the recycling of rare earth elements obtained from spent fluorescent lamps by the use of microorganisms in bioleaching and biosorption processes. Biosorption is the ability of some materials of biological origin to sequestrate or concentrate metals from aqueous solutions **(1)**. This mechanism presents some advantages over the chemical ones such as lower operation costs, reduction of chemicals and sludge to be deposit and higher efficiency in the detoxification of diluted effluents **(2)**. The specific aim of this work is to compare an algae and two bacteria in retaining different rare earth metals such as lanthanum, cerium, europium, terbium and yttrium.

Method

The metals entrapment is evaluated in batch assays using different bacteria as *Pseudomonas* and *Bacillus* strains, compared to the caption by the algae *Saccorhiza polyschides*. The toxicity effect of each metal and the biosorption capacity of the tested organisms are evaluated during their growth in previously established culture conditions. The algae samples were collected a year ago and very recently and dried before usage in metal solutions. Inductively Coupled Plasma, ICP technique was applied to measure the metal concentrations in all samples.

Results & Conclusions

The uptake capacity for each metal is established for different tested conditions. The bacteria are grown in the presence of increasing concentrations of each metal and in bi-metallic solutions, presenting specific reactions towards the toxicity of each element. Although the seaweed usually reveals higher entrapment ability towards heavy metals, the tested bacteria present a promising behavior towards each rare earth element. Kinetics and maximum uptake are determined.

References & Acknowledgments

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