



## Nanoparticle harvesting for microalgae used in heavy metal remediation

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Microalgae are photosynthetic microorganisms that can be found in both marine and freshwater environments. Microalgae are important biological resources that have a wide range of biotechnological applications such as bioenergy production and wastewater remediation. However harvesting microalgal biomass from diluted cultures is one of the bottlenecks for their industrial applications. Many separations methods such as centrifugation, filtration and flocculation have been developed for microalgae recovery. But there is still a great interest to develop new economic and efficient approaches for harvesting microalgae cultures. One of the new alternatives to overcome this limitation is the use of magnetic nanoparticles. In our lab we have successfully applied the use of the naked Fe<sub>3</sub>O<sub>4</sub> nanoparticles in the harvesting of *Chlorella vulgaris* with 94-100% efficiency. There is still a lack of studies regarding the use of these nanoparticles for the harvesting of microalgae in bioremediation processes.

In this study we have applied the use of Fe<sub>3</sub>O<sub>4</sub> nanoparticles for the harvesting of cultures of *Chlorella vulgaris* with adsorbed Zn in their cell walls. We have assayed the efficiency of this process in *C. vulgaris* cultures used for the bioremediation of Zn ions. Operations parameters such as nanoparticle suspension and dose, pH effect and Zn removal were assessed. The effect of the Zn adsorbed in the cell wall of the microalgae in the interaction of the nanoparticles with the microalgae that in last instance affects the harvesting efficiency was studied. The results of these experiments have put some light in the use of nanoparticles for heavy metal remediation by microalgae.

**Keywords:** microalgae, bioremediation, nanoparticles, harvesting.

1- A reference.