# Biosorption of zinc by isolated consortia of microalga

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## INTRODUCTION

**Heavy metal pollution of water, air and soil has been one of the most difficult environmental problems - of a worldwide concern; hence, their removal and recovery is of great importance [1], as such type of pollution can produce many adverse biological effects (viz. structural changes in planktonic communities).**

**Classical physicochemical techniques aimed at heavy metal removal are generally expensive [2]. Conversely, biosorption via microorganisms has proven a potential option for said removal [1]. Microalgae have been found to be effective biosorbents, due to their tolerance to high metal concentrations and to their high binding affinity [2].**

**The aim of this study was to investigate the Zn biosorption capacity of a microalga consortium, previously isolated from a contaminated sediment.**

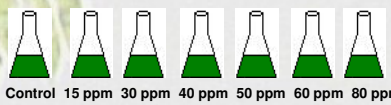
## MATERIALS AND METHODS

### Culture conditions

- ✓ **PHM modified medium (with 1 g/L Tris-HCl buffer)**
- ✓ **200 mL batch cultures (pH=6.0)**
- ✓ **Initial cell density: 1x10$^5$ cells/mL**
- ✓ **Temperature: 25±1ºC**
- ✓ **Continuous light intensity: 8.5 µmol m$^{-2}$ s$^{-1}$**
- ✓ **Orbital shaking: 120 rpm**
- ✓ **Metal: $Zn^{2+}$ (in the form of $ZnCl_2$)**

### Experimental procedures

**Four replicate flasks for each concentration**




**2 mL samples taken and centrifuged at 6000 rpm, for 15 min at 4 ºC**

**Supernatant analyzed by atomic absorption spectrophotometry for Zn content**

**Statistical analysis done**

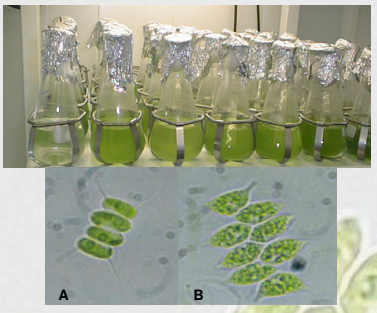



**Fig 1: Flasks containing the experimental media, and the microalga consortia (*Scenedesmus pleiomorphus* (A) and *Scenedesmus obliquus* (B))**

## RESULTS AND DISCUSSION

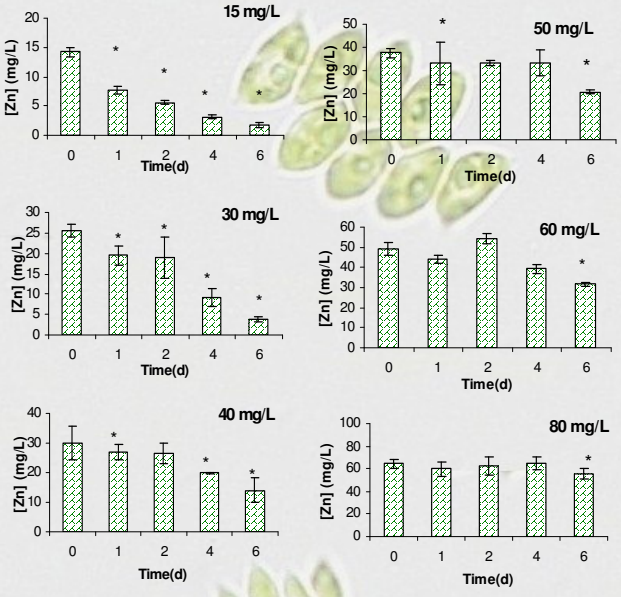
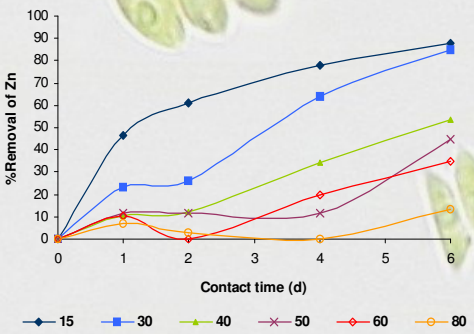



**Fig 2: $Zn^{2+}$ uptake at different initial levels of $Zn^{2+}$ ; *significantly different from control group (P<0.05).**

**Metal uptake at equilibrium was remarkably influenced by its initial concentration in the supernatant.**

**The higher the initial concentration of metal ion, the smaller the relative amount of metal ion taken up.**




**The highest percentage of Zn removal - 88%, was obtained for 15 ppm of Zn by 6 d of exposure.**

**Fig 3: Percent removal at different initial $Zn^{2+}$ concentrations, as a function of contact time.**

## CONCLUSION

- ✓ **Consortium cells can efficiently remove Zn from aqueous solution**

## REFERENCES

**[1] Kaewsarn, P. et al (2001). *Environ. Eng. Sci.* 18: 99-104**

**[2] Chong, A. M. Y. et al (2000) *Chemosphere* 41: 251-257**

## ACKNOWLEDGMENTS:

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