

## Optimization of a Bioremediation Strategy for an Urban Stream of Matanza-Riachuelo Basin

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**Abstract :** In the present work, a remediation bioprocess based on the use of a local isolate of the microalgae *Chlorella vulgaris* immobilized in alginate beads is proposed. This process was shown to be effective for the reduction of several chemical and microbial contaminants present in Cild&acute;&ntilde;ez stream, a water course that is part of the Matanza-Riachuelo Basin (Buenos Aires, Argentina). The bioprocess, involving the culture of the microalga in autotrophic conditions in a stirred-tank bioreactor supplied with a marine propeller for 6 days, allowed a significant reduction of *Escherichia coli* and total coliform numbers (over 95%), as well as of ammoniacal nitrogen (96%), nitrates (86%), nitrites (98%), and total phosphorus (53%) contents. Pb content was also significantly diminished after the bioprocess (95%). Standardized cytotoxicity tests using *Allium cepa* seeds and Cild&acute;&ntilde;ez water pre- and post-remediation were also performed. Germination rate and mitotic index of onion seeds imbibed in Cild&acute;&ntilde;ez water subjected to the bioprocess was similar to that observed in seeds imbibed in distilled water and significantly superior to that registered when untreated Cild&acute;&ntilde;ez water was used for imbibition. Our results demonstrate the potential of this simple and cost-effective technology to remove urban-water contaminants, offering as an additional advantage the possibility of an easy biomass recovery, which may become a source of alternative energy.

**Keywords :** bioreactor, bioremediation, *Chlorella vulgaris*, Matanza-Riachuelo Basin, microalgae

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