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Ecotoxicological evaluation of wastewater in a municipal WWTP in Lisbon area (Portugal)

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ABSTRACT

Wastewater management has a central role in sustainable development, and, in this context, an integrated management of wastewater treatment plants (WWTP) can be important. WWTP discharge complex effluents and for a new strategy in environmental protection ecotoxicological evaluation should complement the usual chemical evaluation. The EU project WW4Environment was set up for a WWTP located in Lisbon area and discharging into Tagus estuary (Portugal). One of the main objectives of the project is to optimize the management of the WWTP in terms of environmental impact. A battery of toxicity tests with organisms bearing different functions at the ecosystem level (the bacterium *Vibrio fischeri*, the alga *Pseudokirchneriella subcapitata*, the crustaceans *Thamnocephalus platyurus* and *Daphnia magna*, and the plant *Lemna minor*) was used to characterize the wastewater in the different treatment phases. *V. fischeri*, test organism for Microtox test, was the most sensitive species in WWTP samples evaluation. Microtox, Alga, and Daphnia tests were able to distinguish two levels of treatment and to assess toxicity removal efficiency. The results demonstrated not only that the treatment efficiently reduced wastewater toxicity, but also that the use of an ecotoxicological approach can contribute to the environmental management of the treatment plant.

Keywords: WWTP; Environmental management; Wastewater; Ecotoxicity; Treatment efficiency

1. Introduction

Half of the world's population lives in cities, most of which have inadequate infrastructure and resources to address wastewater management in an efficient and sustainable way. Inadequate infrastructure and management systems for the increasing volume of wastewater that we produce are at the heart of the wastewater crisis. Finding appropriate solutions will require innovation both to reduce the volume and

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