

Detoxification of Olive Mill Wastewaters Using a Packed-Bed Batch Reactor

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Olive oil production is a traditional agricultural industry in Mediterranean countries and Portugal is one of the ten major producers. This industry generates an effluent, olive mill wastewater (OMW), which does not undergo any treatment and, usually, is stored in evaporation lagoons or spread on the land. Disposal of olive oil mill wastewaters is a serious environmental problem due to its high organic loading, presence of polyphenols and tannins, high content in suspended solids and acidity, which contributes to its ecotoxicity.

In this work, a biological treatment system: a packed-bed batch reactor was applied to a Portuguese OMW using its autochthon microbial population as inoculum. Thus, the biodegradation potential of OMW' microorganisms naturally present in these wastewaters was assessed monitoring several physico-chemical parameters along the process. Ecotoxicity tests (*Pseudomonas putida* growth inhibition test and *Vibrio fischeri* growth inhibition test) were carried out to follow the detoxification capacity of the system as well as its potential to be used in the treatment of this type of agroindustrial effluent.

In this aerobic treatment, an active microbial community with high degradation ability for the OMW organic load was detected, accounting for 80%, 71% and 61% removal of COD, TSS and phenols, respectively. In addition, a significant decrease in the chronic toxicity of the treated OMW to both bacteria, *V. fischeri* (62.8%) and *P. putida* (64.3%), was also observed after 140 days of treatment, highlighting the detoxification potential of the system studied.

Keywords: OMW; detoxification; packed-bed batch reactor; ecotoxicity tests.