Removal of Diclofenac by constructed wetlands planted with *Phragmites australis* and *Typha* spp.

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In the modern society, an ever increasing number of pharmaceutical active compounds (PhACs) is used for the treatment and prevention of various diseases. Ingested drugs are only partially absorbed by the organisms and studies have shown that the excreted compounds are only partially removed in the sewage treatment plants (STPs) [1].
Diclofenac is a non-steroidal anti-inflammatory drug taken to reduce inflammation and as an analgesic reducing pain in certain conditions. In several studies, it was detected in surface water, thus indicating incomplete degradability of this substance in STPs. Despite the low concentrations detected (ng/L - µg/L), those studies have shown damaging effects of this and other pharmaceutical compounds on the aquatic ecosystems [2].
Subsurface flow constructed wetland systems (SSFs) are low cost wastewater treatment systems, usually used to provide a form of secondary or tertiary treatment for wastewaters. Depuration in SSFs is achieved by the concerted action between plant rhizomes, microorganisms and the support matrix components. SSFs' efficiency can be significantly improved by optimization of the operation conditions which is achieved by careful selection of the support matrices, plants and microorganisms used.
The aim of the present work was to evaluate the efficiency of SSF microcosms planted with *Phragmites australis* and *Typha* spp plants, to remove diclofenac from contaminated water. The wastewater samples were collected from a STP located in Évora-Portugal.
In order to optimize the role played by the support matrix, light expanded aggregates (LECA) and cork, a very common material in Alentejo, were tested. Two different assays were performed, in winter and summer time, using doped wastewater, to evaluate the removal rates of diclofenac by the SSF systems. The quantification of diclofenac was achieved using HPLC-UV with a reversed phase column. [3].
The study results show that constructed wetlands can be an alternative system for removing diclofenac from contaminated water.

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