

Scientific Paper:

Eng. Life Sci. (2020) 20, 160-167

Increasing ibuprofen degradation in constructed wetlands by bioaugmentation with gravel containing biofilms of an ibuprofen-degrading *Sphingobium yanoikuyae*

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Abstract:

The aim of this study was to investigate the removal of ibuprofen in laboratory scale constructed wetlands. Four (planted and unplanted) laboratory-scale horizontal sub-surface flow constructed wetlands were supplemented with ibuprofen in order to elucidate (i) the role of plants on ibuprofen removal and (ii) to evaluate the removal performance of a bioaugmented lab scale wetland. The planted systems showed higher ibuprofen removal efficiency than an unplanted one. The system planted with *Juncus effusus* was found to have a higher removal rate than the system planted with *Phalaris arundinacea*. The highest removal rate of ibuprofen was found after inoculation of gravel previously loaded with a newly isolated ibuprofen-degrading bacterium identified as *Sphingobium yanoikuyae*. This experiment showed more than 80 days of CW community adaptation for ibuprofen treatment could be superseded by bioaugmentation with this bacterial isolate.

Keywords: constructed wetlands, ibuprofen, *Juncus effusus*, *Phalaris arundinacea*, *Sphingobium yanoikuyae*