



# BioRemid2019

*2<sup>nd</sup> International Meeting  
on New Strategies in  
Bioremediation Processes*

**BOOK OF ABSTRACTS**



PORTO | 24-25<sup>th</sup> October 2019

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**Specialized degrading granules effective for bioaugmentation of Aerobic Granular Sludge reactor treating 2-fluorophenol in wastewater**

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### Abstract

The amount of industrial chemicals being released into the environment has increased. Indigenous microbial communities in wastewater biotreatment processes are not always effective in removing xenobiotics. This work aimed to evaluate the feasibility and efficiency of a promising bioaugmentation strategy in an aerobic granular sludge (AGS) system continuously fed with 2-fluorophenol (2-FP). Bioreactor performance in terms of phosphate and ammonium removal and 2-FP degradation was evaluated.

Granules were produced using extracellular polymeric substances (EPS) extracted from AGS as a carrying matrix and a 2-FP degrading strain, *Rhodococcus* sp. FP1. Afterwards, the produced granules were introduced in the reactor. Shortly after addition, the produced granules broke down into smaller fragments inside the bioreactor, but 2-FP degradation occurred. After 8 days of bioaugmentation, 2-FP concentration inside the reactor started to decrease, and stoichiometric fluorine release was observed 35 days later. 14 Days after the bioaugmentation, phosphate and ammonium removal efficiency improved ca. 36% and 48%, respectively. However, complete phosphorous and ammonium removal was never achieved while the reactor was fed with 2-FP.

The persistency of *Rhodococcus* sp. FP1 in the reactor was followed by qPCR. *Rhodococcus* sp. FP1 was detected 1 day after in the AGS and up to 3 days after bioaugmentation at the effluent. Nevertheless, the degradative ability remained thereafter in the granules. Degrading strain could have persisted even if at lower numbers. Horizontal gene transfer could have happened from the 2-FP degrading strain to indigenous microbiome as some bacteria isolated from the AGS, 3 months after bioaugmentation, degraded 2-FP.

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