



MASTER THESIS PROJECT

# THE STUDY OF ISOLATED BACTERIA FROM SEDIMENT IN BIODEGRADATION OF PRIORITY AND EMERGING MICROPOLLUTANTS

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## Summary

Priority and emerging micropollutants are commonly introduced and found in aquatic ecosystem and organisms over the decades as the increase of human consumptions. However, the study of micropollutants is still insufficient due to the difficulties in detecting their low concentrations in the environment or in organisms, as well as their degradation pathways. The main aim of this study is to investigate the degradation potential of sixth strains isolated from Capbreton Canyon sediment for biodegradation test of priority and emerging micropollutants; PAH, Atrazine (pesticide), HHCB and AHTN (musks), OC and OD PABA (sunscreens), ketoprofen and oxazepam (pharmaceuticals). The influence of the micropollutant concentration level on the microbial growth and on the degradation potential have been evaluated as well as the kinetic of the degradation and the transformation products formed during the process. *Rhodococcus sp.* 23 AHTN G14 and *Bacillus sp.* 35 OD PABA G14 were found efficient in the biodegradation of priority and emerging micropollutants during the screening test, then were selected to study the different concentrations of the micropollutants. The sunscreen OD PABA at 1 ppm was almost completely degraded by *Rhodococcus sp.* 23 AHTN G14 with the remaining of concentration only  $\pm 1\%$ . Similar result was obtained by *Bacillus sp.* 35 OD PABA G14 able to remove  $\pm 99\%$  of 1 ppm of the musk HHCB. There was no toxicity found for both strains except with the exposure of ketoprofen at 30 ppm and 60 ppm. The kinetic degradation of HHCB at 1 ppm was determined for *Bacillus sp.* 35 OD PABA G14, able to produce HHCB-Lactone identified as a transitional metabolite. Both *Rhodococcus sp.* 23 AHTN G14 and *Bacillus sp.* 35 OD PABA G14 were able to consume OD PABA and HHCB as their carbon source, respectively. These findings provide important knowledge on these bacteria which can then be used in treatment processes or for remediation strategies.

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