

Thesis

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SUMMARY

The presence of pharmaceutical residues in the environment poses a serious threat to aquatic life as well as other non-target organisms. The fate of many of these pharmaceuticals in the environment has not been thoroughly investigated. Diclofenac and ibuprofen are among these pharmaceuticals, which are widely consumed around the globe with significant bioactivity that are considered to be persistent pollutants. The biodegradation of these compounds has been studied in this project in order to assess the fate of these pharmaceuticals in the environment. An easily degradable carbon source was added in these biodegradation experiments to optimize co-metabolism as a removal mechanism. In the first experiment for evaluation of microbial biodegradation capabilities resazurin screening assay was conducted as a preliminary test, which is widely used to assess the microbial activity and metabolism. Eight bacteria which were isolated from selectively enriched samples were used to determine if the selected drugs were biodegradable, and also to identify the level of activity which was measured according to their absorbance value. It was demonstrated that biodegradation occurred for both studied compounds with diclofenac showing more resistant to the biodegradation.

It appeared the bacteria *Sphingomonas* sp. KM-8 showed a particular ability to degrade 50.8% of ibuprofen. Regarding diclofenac degradation, *Rhizobium petrolearium* IBU-8 and *Pseudomonas stutzeri* DIC-3 showed the highest degradation rates of 33.0% and 33.5%, respectively, which were all confirmed by HPLC analysis.