

REGATA

Rede Galega de Tratamento de Augas

Research Stays 2014

Isolation of microorganisms able to degrade emerging pollutants

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Objectives

The aim of this work was to isolate microorganisms able to degrade a wide range of emerging pollutants from several polluted soils. The ability to degrade of the isolated microorganisms was tested along the time and the scale up of the bioremediation process were performed.

Methodology

- Total organic carbon (TOC), X-ray fluorescence and granulometric assays were carried out, in order to characterize two different soils and their pollutants concentration.
- Aerobic and anaerobic cultures were carried out in flasks with 25 mL of medium containing the studied pollutants individually.
- Organic pollutants in liquid medium were determined by HPLC and volatile pollutants were determined by GC-FID.

Results

Table 1. Results for anaerobic degradation assays at 40 days.

Anaerobic Assays	Degradation (%) 40 days	
	Viana Soil	Estarreja Soil
PHE	77.1	0.7
IMI	1	39.3
BzE	25.2	32.2
cDCE	20.8	14.9

Table 2. Results for aerobic degradation assays at 4 days.

Aerobic Assays	Degradation (%) 4 days	
	Viana Soil	Estarreja Soil
PHE	81.4	97.4
IMI	2	39.3
BzE	30.4	32.2
cDCE	0.6	14.9

The degradation capacity of microorganisms present in two different polluted soils was evaluated along the time for 4 different pollutants: phenanthrene (PHE), imidacloprid (IMI), benzene (BzE) and 1,2-dichloroethane (cDCE). After 20 days the reduction of PHE was detected in Viana Soil, reaching the results show in Table 1 after 40 days.

On the other hand; aerobic assays were performed reaching best degradations results in a short period of time (Table 2).

Highlights

The isolation of a promising remediation bacteria was performed. These microorganisms show degradation ability in anaerobic and aerobic conditions for volatile pollutant as BzE and for polycyclic aromatic hydrocarbons as PHE.

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