



## Biodegradation of Organic Compounds from the Radioactive Waste by Different Bacterial Consortia

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### Introduction

The research and development program in reprocessing of low burn-up spent fuel elements began in Brazil in 70's, originating the lab-scale hot cell, known as CELESTE located at IPEN-CNEN/SP. The program was ended at the beginning of 90's. Part of the radioactive waste generated mainly from the analytical laboratories is stored at the Waste Management Laboratory, and is constituted by mixture of aqueous and organic phases.

The following compounds: dodecane, ethyl acetate and tributyl phosphate were identified in the radioactive aqueous waste by chromatography/mass spectrometry (HS-GC/MS).

The aim of this work is to verify different consortia capability to degrade dodecane, ethyl acetate and tributyl phosphate. The level of degradation was performed by gas chromatography.

### Results and Discussion

For this work two consortia were isolated from different samples: sediment from Bertioga mangrove and an organic waste from a lysimeter, which contained an americium source.

Enrichment cultures were prepared by adding 1 g of sample in mineral salt medium with 0.05% of ethyl acetate and hydrocarbons as carbon source.

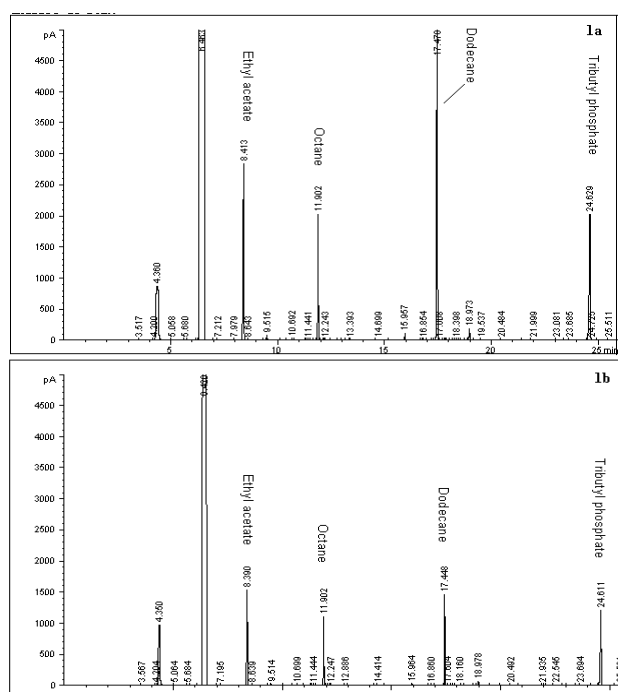
Biodegradation experiments were performed in 50 mL glass vials containing 8mL of mineral medium, 1 mL of carbon source mixture (dodecane, ethyl acetate and tributyl phosphate, 5000ppm each) and 1 mL of inoculum. Incubations were performed for 4 days at 28 °C under rotative shaking.

The results showed dodecane was easier to degrade compare to ethyl acetate and tributyl phosphate.

The level of degradation of ethyl acetate and tributyl phosphate was higher at the sample from the Bertioga sediments.

This sediment was collect from an oil-spilled area and its bacterial consortium showed potential for degradation.

The level of degradation can be observed by comparing the control chromatogram (figure 1a) and the chromatogram after the biodegradation experiment (figure 1b). Octane (1000ppm) was used as internal standard.



**Figure1.** Control Chromatogram (figure 1a) and chromatogram after the biodegradation experiment (figure 1b)

### Conclusions

Biodegradation analysis showed that consortia selected from Bertioga mangrove sediment had better degradation rate and among others, dodecane is easier to degrade

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