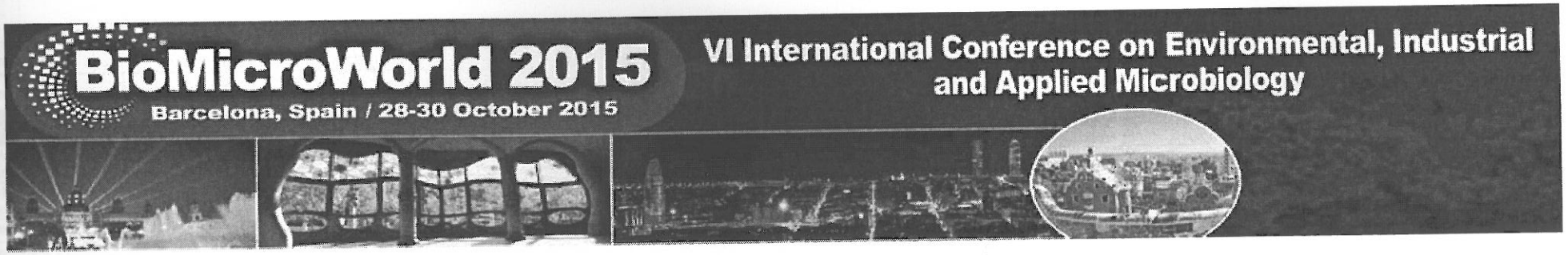

Book of Abstracts

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Biodegradation potential of the soil bacterial community from a polluted site in the northern of Portugal

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Halogenated aromatic compounds are environmental pollutants of great concern due to their widespread use and persistence in the environment. The environmental fate of fluorinated organics has been subject of less attention comparing to chlorinated and brominated compounds, despite the fact that, in general, fluorinated chemicals are prominent xenobiotics and have low biodegradability [1].

Soil microbes play a vital role in degradation of xenobiotic compounds. Soil microbes and enzymes promptly respond to environmental changes and therefore reflect biological changes induced by pollution. Most of experimental studies about microbial degradation have been conducted for a particular xenobiotic compound, even though most of the polluted sites are contaminated with a range of pollutants. In this study, the potential of the soil bacterial community from a polluted site (Estarreja) for the biodegradation of a range of fluoroaromatic compounds was evaluated. The establishment of enrichments with fluoroaromatic compounds was used as a strategy to achieve this goal. Carbon-fluorine cleavage evidenced by the release of fluoride into the culture media was used to assess biodegradation of the substrates. The amount of fluoride released varied between ca. 16 and 62%. The DGGE method was used to investigate community dynamic changes occurring in the course of the enrichments. Soil samples clustered together, forming a separate branch from enrichments. It was noted that the original microbial community from soil changed by adding the fluoroaromatic compounds, and the bacterial community diverged differently during the enrichments. Such changes may be attributed to the adaptation of the communities to the fluoroaromatics supplementation. PCR amplification with primers specific for monoxygenase gene fragments was used to assess the presence of genes for the degradation of aromatic compounds. An expected PCR fragment was found in the DNA directly extracted from soil samples. BLAST-analysis showed 94% similarity with enzyme toluene 4-monooxygenase from *Dechloromonas aromatica* RCB (CP000089.1). This sequence revealed the presence of one open reading frame (ORF). The function of the ORF was deduced from sequence homology to genes in the GenBank database (NCBI, USA) identified by Blast searches. Likewise, the translated protein sequence was compared with sequences in the non-redundant (nr) protein sequence database (NCBI, USA). BlastP analysis confirmed that the translated sequence is closely related (99% sequence identity) to methane/phenol/toluene hydroxylase from *Dechloromonas aromatica* RCB (WP_011289544).

These results provide evidence that the soil from the contaminated area of Estarreja is a rich source of degradative microbial strains, making it especially interesting for the isolation of novel organisms and enzymes that can be applied to biological treatment technologies to degrade recalcitrant organofluorine pollutants of serious environmental concern.

Keywords: Biodegradation; fluoroaromatic compounds; bacterial community; oxygenase.

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Biodeterioration in wooden churches from Romania. Case study: The church from Amarasti, Vâlcea County

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The wooden church from Amărăști, Vâlcea County, Romania dates from the eighteenth century (1766-1767) an has inscriptions, decorative sculptures and mural painting inside. It was painted in al fresco techniques: mort rich in lime paste with vegetable debris has been placed on the chipped beams; colors were applied on the w and uncarbonated substrate. The main goal is to evaluate status of conservation of the wood from microbiologic point of view in order to establish a strategy for decontamination and to find new compatible materials f restoration.

Technical examination of wooden structure has been done *in situ* and in laboratory. Wooden samples have bee analyzed by optical microscopy to put in evidence fungal mycelium and by microbiological methods to cou colony forming units (CFU), to isolate biodeteriogens and to get pure cultures.

Analysis performed revealed morphological changes found on the mortar and on the pictorial layer as follow debris, dust, cracks, black, gray and white spots as well as efflorescence. Materials characteristics such as t percentage of aggregates, pores, specific minerals, pore and grain size allowed a better analysis of t composition, technology and deteriorations produced by fungi. Examination of samples and cross sections samples extracted from the mortar provided information about the thickness of the intonaco layer, crypt efflorescence which enlarged the pores, white efflorescence recently formed.

Wood morphology examination showed many cracks, loss of wooden material, fragmentation in geometric shapes, softening, atmospheric deposition coating, mycelium and fruit bodies. On the porch, the wood fragmented in geometrical shapes, it is soft with white or brown stripes (Fig.1). Microscopical examinati revealed mycelium and dry hyphae. Based on these observations, we suppose that biodeteriogens could b basidiomycetes. Viability test was negative and in consequence pure cultures were not obtained. On the pre na loss of timber could be seen as well as light brown mycelium and basidiocarps. Microscopic examinati confirmed the presence of fungal mycelium and basidiocarps of *Antrodia sinuosa*. Viability test was positive an pure cultures were isolated. Filamentous fungi and *Antrodia sinuosa* are the main biodeteriogens of the wood an a chemical treatment is proposed before to start restoration.

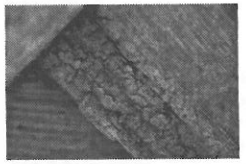

Fig.1.Fragmented wood

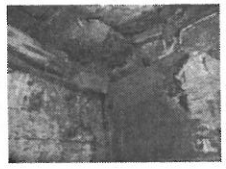

Fig.2.Loss of timber

Fig.3.*Antrodia sinuosa* mycelium

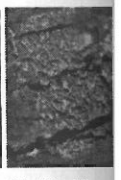

Fig.4.Basidiocar

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Keywords: biodeterioration; microbiodeteriogens; wooden church; fungi; mural painting; frescoes

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[1] Park MS et al (2014) Re-evaluation of the genus *Antrodia* (*Popypolares*) in Korea. Mycrobiology 42 (2): 114-119