SCIENCESPRINGDAY

FACULDADE DE CIÊNCIAS E TECNOLOGIA
UNIVERSIDADE NOVA DE LISBOA

Department of Conservation and Restoration

Biodeterioration of glazed wall tiles

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Objectives

Biodeterioration is any undesirable change in a material caused by the vital activities of living organisms. Microorganisms are capable of inducing aesthetical, physical and chemical damages. This study aims to provide:

- **A comprehensive overview of the biodeterioration of glazed ceramic wall tiles (Azulejos)**
- **To develop mitigation and prevention methodologies through the evaluation of biocides and the use of protective films.**

Methodology

•Identification of microbial communities involved in the biodeterioration carried out by culture and molecular methods, light microscopy, confocal laser scanning microscopy, and scanning electron microscopy.

•Analysis of biodeterioration patterns in real samples.

•Characterization of ancient tiles and reproduction of the glaze for artificial colonization experiments.

•Use of TiO_2 nanoparticles and TiO_2 - SiO_2 sol-gel coatings as a preventive treatment to avoid biological colonization.

Expected Results

• Characterization of microbial communities capable of colonizing this inorganic substrates. Bacteria, cyanobacteria, algae and fungi were identified on Pena National Palace tiles.

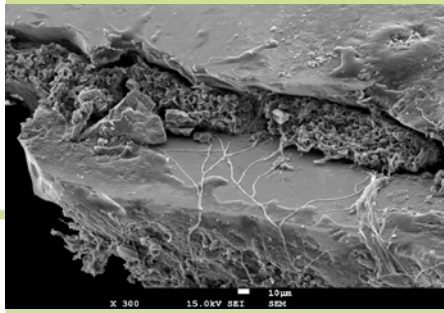
• Understanding the glazes biodeterioration processes made by algae and fungi. Are this microorganism capable of chemical and/or physical biodeterioration?

• Evaluating if the protective coatings are suitable for glazed cultural heritage assets. If there can be a balance between the ethical principles of conservation-restoration and the coatings efficiency.

Biological colonization on Casa da Pesca (Oeiras) tiles.

Picture of a reproduction of the white glaze in front of an original tile

Artificial inoculation with fungi on reproduced glazes.



FESEM images of microorganisms growing on a glaze fracture.

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