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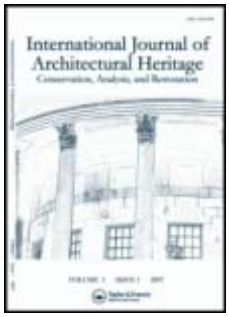


# MATERIAL CHARACTERISATION AND BIODEGRADATION ASSESSMENT OF MURAL PAINTINGS – THE RENAISSANCE FRESCOES FROM SANTO ALEIXO CHURCH, SOUTHERN PORTUGAL

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## Abstract

The aim of this work was the material characterisation of wall paintings and biodegradation assessment, including the analysis of microbial growth and the effect of microbial proliferation, in view of their conservation. The methodology was applied to the study of frescoes dated from 1531, located in the ancient parish church of Santo Aleixo, Southern Portugal. The combined use of optical microscopy, SEM-EDS and A-XRD showed that the painting palette is composed of red and yellow ochres, malachite, azurite and bone black. The pigments do not show signs of chemical deterioration, except malachite that punctually have transformed to black copper oxide (tenorite). The microbiological study allowed the

identification of several bacterial strains (eg Gram+ cocci, Gram+ bacilli, *Actinomycete*s sp.), yeast strains and filamentous fungi of the genera *Penicillium*, *Cladosporium*, *Aspergillus* among others the microflora present in the paintings.Their metabolic activity is the main responsible for the physical disruption of paint layers and underneath mortars. The combined approach using SEM analysis and enzymatic dehydrogenase measurement allowed the evaluation of microflora proliferation and the biodeterioration diagnosis of the mural paintings. Additionally, the effect of some commercial biocides was evaluated for the main predominant strains in order to select the most efficient biocide.

**Keywords:** Multi-analytical methodology, pigment characterization, biodegradation activity
assessment, dehydrogenase measurement, mural paintings