

# CHARACTERISATION OF PINK BIOLOGICAL PATINA IN CALCAREOUS STONE



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## INTRODUCTION

São João de Almedina church is integrated in Machado de Castro National Museum, located in Coimbra (Portugal). The interior walls the church present a pink patina in several different areas. This walls are made from a sedimentary calcareous stone, of light colour. The texture is compact, with finest grain. The surface is homogeneous and smooth showing the typical hardness of calcite.

## OBJECTIVES

The aim of this research is to characterise the biological colonization found in the interior walls of São João de Almedina Church and to determine the main biodeterioration agents.

## METHODOLOGY

Three different areas, of the internal walls of the church, were selected: one area without pink patina (Area 0) and two areas with patina (Area A and B). In order to determine the colour parameters of the patina and the difference between stone with and without patina, colorimetric measurements were taken. Samples for the qualitative determination of the microorganisms were also collected.

## RESULTS AND DISCUSSION

The determination of the colourimetric parameters, CIELab, (Table 1) allowed the distinction between Area 0 and Areas A and B.

The biodiversity is greater in the areas A and B, where the pink patina is present (Table 2). In Area 0 only a few bacteria and yeast were found. Moreover, most of the microorganisms identified in areas A and B were fungi Deuteromycetes.



Area 0	Area A	Area B
Bacteria Yeast	Bacteria  <i>Prototheca</i> <i>Penicillium</i> <i>Fusarium</i> <i>Cladosporium</i>	Yeast <i>Prototheca</i> <i>Penicillium</i>  <i>Aspergillus</i> <i>Chrysosporium</i> <i>Leothalium</i>

	Area 0			Area A			Area B		
	L*	a*	b*	L*	a*	b*	L*	a*	b*
Average	86.18	1.75	10.70	72.15	10.63	13.80	69.20	9.24	13.34
Standard deviation	1.95	0.58	2.52	3.91	2.40	2.10	2.50	2.04	1.42

TABLE 1 –Color parameters

TABLE 2 - Microorganisms identified in the t3 areas.

This study indicates that the pink patina is most probably due to fungal activity. It was also noticed that *Penicillium* and *Prototheca* were the only identified microorganisms occurring in both, area A and B). According to the obtained results, it seems that the pink colouration is due to fungal activity on the stone.

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