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Characterization of the interior and exterior coating materials from 18th and 19th century of Casa do Moscadim. Case Study

Casa do Moscadim is a 18th-19th century manor house located in Chamusca, Portugal. Three main construction and decorative periods can be identified in the house: 1760s (construction of the original building and first period of mural paintings and tile decorations); 1790s (second decorative campaign); and 1880s (third decorative campaign). The architecture, construction type and materials are representative of the historical periods, building typology and region in which it is located. In its interior, the tile panels from the 18th and 19th centuries stand out, bonded with air lime mortars, generally in the most important rooms and in the staircase, as well as mural paintings from these periods. The tiles come from the royal factory "Real Fábrica do Rato". All these aspects contribute to giving the house a notable cultural and historical value.



Figure 1a. Casa do Moscadim: general view of the façade.

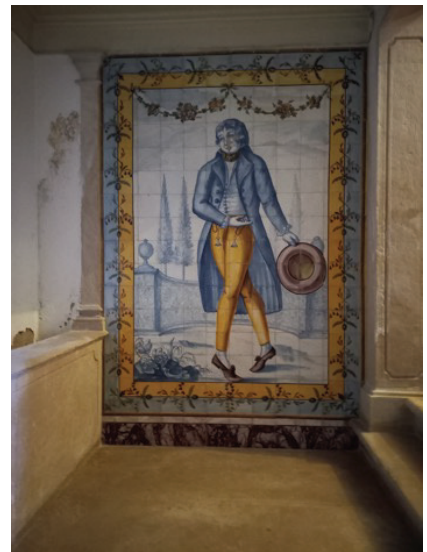


Figure 1b. Casa do Moscadim: detail of an interior panel of glazed tiles at Moscadim staircase.

The house had some constructive interventions over the centuries which contributed to its preservation over generations. Presently, the house needs maintenance over again. The use of materials and techniques similar to the original ones and compatible with the existing ones will contribute to a greater longevity of the House's original identity and its overall durability.

This study was based on the will to develop, with Casa do Moscadim, a project that would constitute an example of the need to study the original materials before beginning any architectural restoration and

rehabilitation intervention, of an historical heritage building. An initial characterization of the materials applied in the coatings is essential, both for historic registration and interpretation and for a future conservation.

To identify the coating materials of Casa do Moscadim, several mortar samples were collected and analysed in laboratory. The samples included several coats of render mortars, tile laying mortars and decorative gypsum plasters. In the interior of the house, samples from two interior rooms were characterized (Breakfast room and Dinner room) and from the staircase wall (Moscadim Staircase). From the façade two samples were collected and analysed, including from the wall socle.

Chemical, mineralogical, physical and mechanical tests were carried out on the samples collected. The chemical and mineralogical characterization tests included X-ray diffraction, thermogravimetric and differential thermal analysis, as well as chemical analysis tests to determine the determination of the content and grain size distribution of the sand. For the physical and mechanical characterization, modulus of elasticity test, water absorption test and compressive strength tests were performed.

The results of the chemical and mineralogical characterization indicated that all the interior mortars (both plasters undercoats and tile laying mortars) were composed by similar materials: dolomitic lime as binder and siliceous sand as aggregate¹. Finishing plasters were composed by lime (Breakfast Room)¹ or lime and gypsum (Moscadim Staircase)¹, with compositions typical of traditional Portuguese decorative gypsum plasters of the period². The render mortar from the façade was the richest in lime content of the whole, possibly to better resist the external environment, and the topcoat applied was composed by dolomitic lime¹.

The physical and mechanical performance of the interior mortars depended on the samples analysed. The test results are summed up in Table 1. In general, the samples richer in binder presented superior mechanical characteristics and lower water absorption³, but in some cases this relationship was reversed, probably due to degradation caused by water and the presence of salts or by movements of the substrate, or even by aspects related to the application³. However, it is considered that their mechanical and physical performance is appropriate for this type of coatings, with the exception of the most degraded samples.

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1 Santos Silva et al. 2024.

2 Freire et al. 2019.

3 Veiga et al. 2024.

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