

Non-Invasive Analysis of Alhambra's Plaster Stucco Using Portable XRF Spectroscopy

This study presents a non-invasive analysis of a plaster stucco from Alhambra, by means of portable X-ray fluorescence spectroscopy (XRF). The portability of the equipment allowed for *in situ* analysis at the sculpture reserve of the Faculty of Fine Arts, University of Lisbon, preserving the artwork's conservation. Prior to the XRF analysis, portable microscopy and photography techniques were employed. The results revealed valuable insights into the stucco composition (relation Ca/Sr) and its pigments. Lead was detected in the white coloring areas, suggesting lead white pigment. The red section exhibited the presence of lead and mercury, indicating the use of vermilion pigment. Actual gold, along with lead, was found in the gold area, potentially signifying the use of gold leaf. Cobalt was detected in the blue portion, suggesting the use of cobalt blue pigment. Although the specific pigment in the black portion could not be identified, potassium and chlorine were present, implying the use of bone black pigment. This non-invasive analysis approach, using portable equipment, microscopy, and photography, provided valuable compositional insights into the stucco's pigments while preserving the artwork's integrity and location.

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