

## Smartphone applications in mural painting analysis: distinguishing pigments based on smartphone colorimetry

Mural painting has been a decorative motive throughout history. As usual in Cultural Heritage, their investigation is based on non-invasive analytical methods. XRF fluorescence spectrometry and Raman or Infrared spectroscopies are the main instruments that are applied in this field to gain an understanding on their composition, especially in terms of the nature of the coloured pigments. In this context, this contribution develops the advances that our group has carried out using new technologies to create innovative analytical approaches. These intend to help in the research and conservation endeavours of these historical samples by implementing affordable and easy-to-use methods that yield reliable information. In this case, smartphones were studied as colorimeters, so different characterization methods were studied and compared in terms of colour reproduction. To that end, mural painting replicas were prepared and painted using 12 inorganic pigments (covering 4 hues -red, yellow, green and blue- with 3 pigments per hue). Their colour was captured with the smartphone, and the RGB data was readily transformed and corrected to CIELAB descriptors. Using this information, different chemometric models were trained and tested to check their predictive potential. The results demonstrated outstanding predictive potential of the optimised models, with low errors of prediction.

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