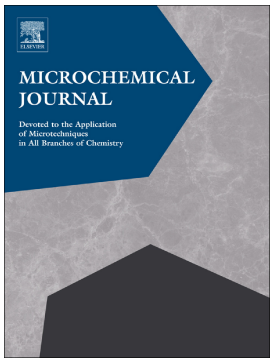

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The green grass was never green: how spectroscopic techniques should have assisted restoration works

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ABSTRACT

This paper presents the results of a multidisciplinary research based on the use of different diagnostic techniques for the study of wall paintings that belong to the late Gothic period and are preserved in the church of Saint Stephen in Ribera de Valderejo (Álava, Basque Country). Portable Raman and X-ray fluorescence spectroscopy measurements carried out in-situ allowed to characterize the plaster composition, the colour palette used by the artists and the materials employed during the restoration works in recent times. The analyses were focused especially on some areas that appear unusually grey. Apparently, the results obtained by both techniques seem to be contradictory and it was necessary to perform a selective sampling in some areas of interest which were analyzed in the laboratory. Raman spectroscopy and scanning electron microscope, coupled with energy dispersive X spectroscopy, applied on the cross-section of micro samples, made possible to clarify some important issues, showing the inadequacy of the restoration works carried out in previous years and the presence of a potentially dangerous material too (magnesium arsenate), whose use was not documented. The results demonstrated the importance of using diagnostic tools for the identification of the materials belonging to Cultural Heritage, especially before restoration works in order to choose the most appropriate methodology and to respect the original appearance of the paintings.

Keywords: Raman spectroscopy, EDXRF, SEM-EDX, wall paintings, pigments, conservation state

Introduction

In the past years some restoration works have been carried out without a careful study of materials. In fact, the restorers have been focusing for a long time on visual observation and on their experience. Unfortunately, this approach has caused incorrect diagnoses and, accordingly, the application of unsuitable procedures to the artworks.[1]

The wall paintings belong to a category of artworks particularly at risk since they are generally preserved in-situ, and therefore, their conservation depends both on the stability of the original