MICRO-RAMAN ANALYSIS OF MINIATURES: THE FOUNDATION DOCUMENT OF “COLEGIO DE SANTA CRUZ”, VALLADOLID (SPAIN)

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Abstract: This work reports the micro-Raman analysis of the precious miniatures illuminating the manuscript signed by Cardinal Mendoza in 1483 at the foundation of the University College of Valladolid. The pigments used were identified and analysed. Results were compared with those obtained in other miniatures from the Xth to XVIth Centuries.

The need for non-destructive techniques to identify pigments and their mixtures and binders has led to an important use of Raman spectroscopy as a powerful and specific tool for detailed (micro and macro) analysis of materials used in the art and artistic artefacts. The beauty of the miniatures as well as the difficulty in designing and applying the colours have attracted the attention of researchers in the study of illuminated manuscripts for many years. Raman spectroscopy has been used in several studies of important manuscripts [1-5] proving its unique capabilities as a specific, sensitive and completely non-destructive technique for identification of pigments and substrates in these materials.

The first document that made reference to the University of Valladolid dates from 1293. In this document, King Sancho IV claims a model for a University similar to that of Alcala de Henares. Nevertheless, the origin of the University is somewhat uncertain. Probably, the lack of financial resources in the General Study of Palencia allowed the transfer of professors and students to Valladolid at the time of King Alfonso VIII. It is also known that “Particular Studies” existed in Valladolid that became “General Studies” by virtue of “bula in supreme specula” the Papal bull of Pope Clement in 1346, providing the University with the necessary economic resources. It was in 1417 that, with the authorization of Pope Martin V, the University of Valladolid finally becomes a true University, teaching Theology, Medicine and Arts (Grammar and Logic).

These studies stressed the need for the creation of institutions that gave lodging to the students, especially if they were from other cities. Cardinal Mendoza established the “Colegio de Santa Cruz” following the example of Cardinal Gil Carrillo de Albornoz and of Archbishop Diego de Anaya y Maldonado, founders of the Colegio of San Clemente in Bologna and of the San Bartolomé in Salamanca, respectively, with a common desire to providing study for students without financial resources. The College at its foundation met all the expenses of their students. Cardinal Pedro González de Mendoza edited and signed the document of the foundation of the “Colegio de Santa Cruz” in Vitoria, on November 21, 1483. This document contains the rules governing the relationships with the University and the Council and also its internal rules.

The miniatures contain several representations. Among these the Cardinal with two Bishops and two students receiving the document is the most important (Fig.1). The palette is dominated by the red and red-brown colours. Also blue, green, white and black are present.

An in-situ micro-Raman spectroscopy study was performed on these miniatures using a Hololab 500 spectrometer from Kaiser Optical System illuminated with the 785nm laser excitation. The power on the samples was kept under 2 mW in order to avoid damage.
Most of the pigments were identified from their Raman spectrum. Red consists of very pure cinnabar, blue is mainly azurite, although in some parts lazurite was also detected. Orange was identified as pure minium and white is made with lead carbonate. The flesh colour of the human faces is made using different mixtures of cinnabar and lead white, which can be estimated from the Raman spectra. These results are compared with those obtained in other manuscripts of the Valladolid University library ranging from Xth to XVIth Centuries. From these data, the evolution of material preparation as well as the pigment application technique is considered and discussed.

Fig. 1. Raman spectra of several pigments in the main miniature of the foundation document of the University College of Valladolid. From top to bottom: spectrum of azurite; a mixture of cinnabar and lead white; and pure cinnabar.

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