

MADONNA COL BAMBINO E I SANTI ZACCARIA E GIOVANNINO (MUSEO POLDI PEZZOLI) BY LOTTO: NON INVASIVE SCIENTIFIC ANALYSES SUPPORTING RESTORATION

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Child Jesus, in the arms of Mary, blessing St. John presented to him by his father Zechariah, who holds a scroll on which he had written the name of his son, "Iohannes est nomen eius" (Fig. 1). The painting (oil on canvas, 48.8 x 63.3 cm) was executed in 1546, according to the records of the workshop of Lorenzo Lotto, along with another version of the same subject, during a temporary return of the artist in Venice [1].

Lotto was one of the leading Venetian-trained painters of the earlier 16th century; the soft light and delicate colours of this work are typical of the maturity of the painter, with a carefully designed intersection of gestures and slightly asymmetrical composition, giving the idea of movement.

The canvas was recently restored (C. Beccaria) and, on this occasion, strictly non-invasive *in situ* scientific examination was aimed to support the restoration work on previously clean areas of the painting on about fifteen points on different shade of colours.



Fig. 1. Measuring points on “Madonna col Bambino e i Santi Zaccaria e Giovannino” by Lorenzo Lotto.

The analyses presented in this work, namely ED-XRF (Energy Dispersive X Ray Fluorescence) and FORS Fiber Optics Reflectance Spectroscopy) in the Visible and Near Infrared (NIR), allowed to determine the pigments and have been related to Infrared Reflectography, Infrared False Colour and UV Fluorescence images to get a complete picture about the techniques and the material used by the master. The association of energy dispersive

XRF analysis with visible reflectance spectroscopy generally gives good results, as the former is used to detect chemical elements – and thus to deduce the related pigments – of the layer sequence down to the ground level, while the latter can only detect the pigments of the most external layer [2].

EDXRF analyses have been performed with a portable spectrometer (Assing Lithos 3000) equipped with a low power X-ray tube with Mo anode and a Peltier cooled Si-PIN detector. A Zr transmission filter (100- μ m thickness) between the X-ray tube and the sample guarantees a quasi-monochromatic radiation at Mo Ka energy ($E = 17.4$ keV), with a 4-mm diameter collimator. The irradiated area on the sample is about 59mm². The distance between the sample and the X-ray tube is 1.4 cm; the same applies for the distance between the sample and the detector. The working conditions are 25 kV and 0.3mA and measuring time was 30 seconds.

FORS measurements in the Vis-NIR range were carried out using an Ocean Optics HR4000 spectrophotometer with linear CCD-array(360-1000 nm, 2.5nm resolution) in the reflection mode; spot on the sample is about 5 mm². The system is equipped with a plastic holding probe able to apply a 45°x:45° sampling geometry.[3, 4].

Taking advantage of the large research project related to the remarkable exhibition about Lotto held in 2011 in Rome [5,6], results obtained were compared to the gathered palette of the artist, also considering the period of production and the account book draft by Lotto himself.

Come as no surprise that red areas are vermilion and lakes mixtures, depending on the aimed shade, and white lead with different amounts of iron oxide and vermilion for skin tones. The Virgin Mary's blue mantle is azurite with no over-layered lapis lazuli and S. Zechariah's yellow-orange cloak is obtained by orpiment. The ubiquitous presence of lead and iron let us infer the presence of a coloured preparation, as typical of this author [7]

A peculiar feature of this little masterpiece is a lengthwise interruption in the lower part of the painting, as if it should have been extended. Looking for answers, we investigate areas of the same colours both upon and under the discontinuity, obtaining, as expected, different responses in the matter of pictorial layers. Namely, while Zechariah red robe only shows different proportions of the same pigments, the skin tones show a lack of vermilion and a presence of litharge typical of Lotto's complexions and the mantle of the Virgin Mary loses the presence of lakes giving place to red ochre.

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