ABSTRACT

This research work investigates the painting technique adopted by Giovanni del Biondo in the polyptych *Annunciation and Saints* (1385), exhibited at Galleria dell’Accademia, in Florence, in Italy. The research interest of this painting is its peculiar matt appearance, remarkably different from those painted by coeval artists, active in Florence.

In February 2013, the twisted columns of the carpentry were temporarily removed. Below, it was revealed a clean painted surface, free of any brownish layer that was noticed in the rest of the painting surface. Integrated protocol by using different methodologies was followed both studying the superficial layer covering and identifying the materials in the different layers of the painting in order to discriminate the original painting technique from any possible restoration executed in the past.

Imaging techniques (i.e. UV fluorescence, IR and IR false colour) aimed to retrieve a general perspective concerning the external layer, palette, retouches and later additions, were combined with X-ray diffraction (XRF) and Fiber optics Reflectance Spectroscopy (FORS) in order to obtain information about the composition of the pictorial layers in a non-invasive way. As further step, eight micro-fragments were sampled from pre-existing *lacunae* in the right and central panels, collecting both the preparation and painted layers and documenting the surface at high magnification with digital portable microscopy (DM). Optical microscopy (OM) and ESEM-EDX analyses in cross-section aimed to the identification of both the constituting materials of preparation and the pictorial layers; organic compounds were analysed by means of FT-IR spectroscopy, Gas Chromatography/Mass Spectrometry (GC/MS) and pyrolysis-GC/MS analysis.

According to the data obtained, the preparation layer is composed by gypsum (CaSO$_4$.2H$_2$O) with some crystals of celestine (SrSO$_4$) mixed with animal glue. Indeed two preparation layers are distinguishable by the granulometry of gypsum (*gesso grosso* and *gesso fine*).

In the panel, all the blue areas are composed by lapis lazuli, which was mixed either with lead white or lead tin yellow in the various bluish and greenish hues. The only green area showing a different material is locted in the bottom
side of the central panel, where a copper-based green pigment was found. In the predella, the only blue area not consisting of lapis lazuli, is the robe of the Saint on the left side of the left part, as well as the retouched areas of the Madonna’s robe. For the red colour, cinnabar was used and, for some special effects, as in the robe of St Mary Madgalene minium was added to cinnabar.

The binding medium of the pictorial layer is egg yolk based, as confirmed by FT-IR and GC/MS analyses.

The gold leaves were applied on red Armenian Bole for the ground or directly on the pictorial layer for the decoration of mantles. Silver leaves, heavily tarnished, used for some details such as swords were also applied on Armenian bole.

The external layer is a mixture of animal glue and honey. The mixture of triterpenic dammar resin and animal glue, detected by py-GC/MS analysis can be linked with the old restoration executed in the beginning of 18th century.