
THE TRIPTYCH OF THE HOLY SAVIOUR IN THE TIVOLI CATHEDRAL DIAGNOSIS, CONSERVATION AND RELIGIOUS REQUIREMENTS

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Abstract

The object of this work is the Holy Saviour triptych, an important religious panel painting dated back to the 12th century, at present stored in the Tivoli's Cathedral (Rome). The triptych has a great historical and artistic value closely linked to its devotional significance. In this study, original and additional materials were examined in order to provide a deeper understanding of the technique used and a greater awareness of how well preserved the object is, as well as an analysis of previous preservation and conservation interventions.

Due to the preciousness of the panel and to the great care taken by the religious community in its conservation, the diagnostic analysis for the characterization of the painting materials was carried out by non-invasive methodologies. In particular, the following investigation was performed: video microscope acquisitions, infrared reflectography, false colour infrared photography, X-ray fluorescence spectroscopy. The wooden support was carefully observed in the visible parts of the panels and a micro-sample, detached from the back of the central panel, was collected for the microscopic observation. The obtained results show the use of valuable materials and pigments like gold, vermilion, ultramarine blue. The study of the macroscopic and microscopic anatomical characters of the wood, allowed to identify it as chestnut in the three panels. This supports its dating also in comparison with another medieval panel.

Keywords: medieval triptych, panel painting, *Santissimo Salvatore* Tivoli, X-ray fluorescence spectroscopy, chestnut wood

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1. Introduction

A precious wooden triptych, named *del Santissimo Salvatore* (the Holy Saviour) is preserved in a niche, in the second chapel of the left side of the Cathedral of Tivoli (Rome), protected by a special glass and an alarm system (Figure 1).

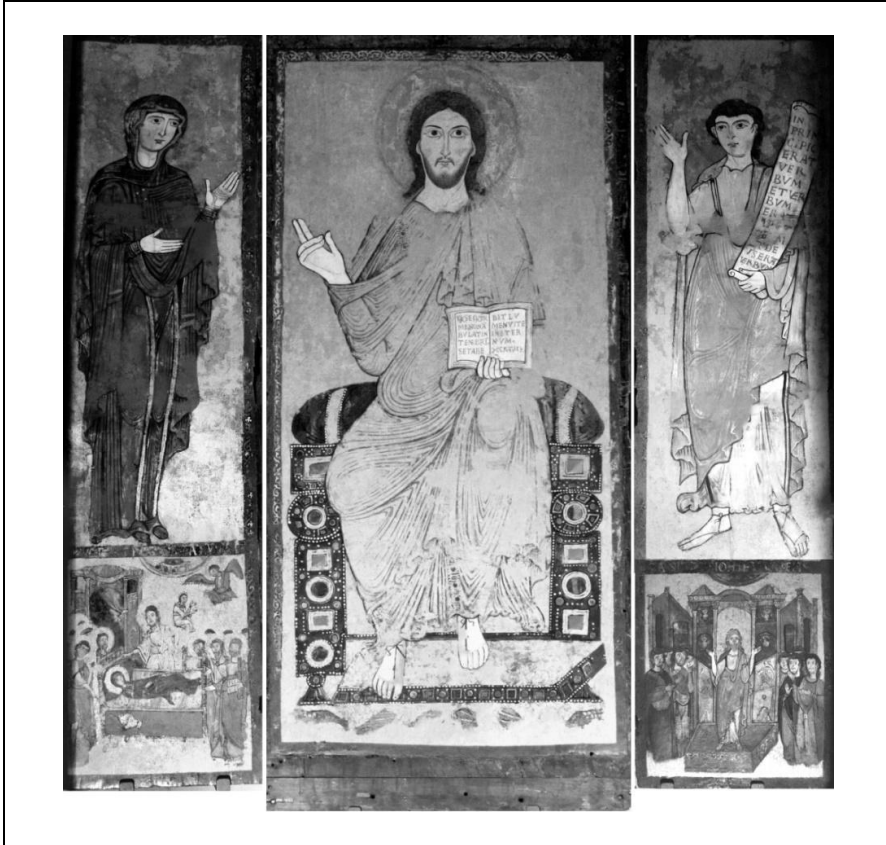


Figure 1. A composition of the different parts of the Holy Saviour triptych made to have a clear representation of the scenes.

The triptych consists of three panels: the central with the Christ figure and the lateral ones representing the Virgin *Advocata* (36.3x147.5 cm) and Saint John the Evangelist (36x147 cm) both as intercessors [1-2]. The two lateral figures are completed with the stories of their passing away to the afterlife, in particular: the *Dormitio Virginis* in the left panel and the Sermon of the Evangelist in the right one.

The image of the Holy Saviour in the central panel (75x160 cm), characterized by a golden background, shows the stylistic, technical and cultural expression of the Lateran *Acheropita* (the Christ icon kept in the *Sancta Sanctorum* chapel in the Basilica of San Giovanni in Laterano in Rome that is

believed to be the authentic image of Christ's face created by San Luca). For this reason the work can be considered a processional icon [3-4]. In fact, during the Middle Ages, especially in the Lazio region, several panels with the face of Christ, inspired by the Lateran icon, were created. These panels were later turned into triptych structures, characterized by the Christ panel in the centre and two saints by the sides. In particular, the Virgin and Saint John the Evangelist in the triptych of Tivoli show the outstretched hands in the act of *Deesis*, a typical Byzantine iconography usually characterized by the figure of Christ between the Virgin and Saint John the Baptist [1-2]. This traditional iconography was revised in the triptych of Tivoli according to a local style by substituting the Baptist with the Evangelist and by adding the narrative stories in the lateral panels (the *Dormitio Virginis* and the sermon of Saint John the Evangelist). These distinctive characters of the triptych of Tivoli are probably linked to the cult of the Holy Saviour. The stories shown in the lateral panels refer to the passing away to the afterlife of the Virgin Mary and Saint John the Evangelist: it represented the most significant votive event on the Assumption Day when the panel is still brought in procession along the old town streets according to a route described since the first half of the 16th century [1, 5-7]. On the night of the 14th of August, the triptych of the Holy Saviour is accompanied with prayers and chants, by the local authorities and by the citizens of Tivoli, to the square in front of the church of *Santa Maria Maggiore* where the panel of the Holy Saviour and another one representing the Madonna are placed one in front of the other and tilted one towards the other making them bow three times while fireworks are discharged. Due to this ritual, the local people call the procession *Inchinata* (the Curtsied).

Nowadays a copy of the panel, covered by a rich silver plate that leaves visible only the face of Christ, is also transported during the procession. The present cover was created in the 15th century but probably the triptych was already covered in the past. The procession of Tivoli was instituted in 1256 by Berardo [8], bishop of Tivoli, and it is strictly linked to the Roman mid-August rite devoted to the *Archeropita* [5]. The icon of Tivoli reached such a great religious relevance that its creation was attributed to San Luca himself as for the icon in the *Sancta Sanctorum*.

Tivoli is the only town in Lazio region where the *Archeropita* worshipping is still practiced today with the purpose of showing to the people the magnificent event of Rome on the smaller scale [9].

The scientific investigations on artwork with historical, artistic, demotno-anthropological and devotional value can provide a valid contribution to a better comprehension of their usage and of their significance for the communities [10-12].

The analytical approach to a wooden artefact must be related to wood technology aspects, to execution technique, and to the historical artistic significance of the artefact itself. Any intervention on such artefacts, from enhancement to study, from preservation to restoration, must consider several aspects: the botanical species of wood, the pigment nature, the stratification and

binders, the deterioration processes, as well as the environment parameters like relative humidity and temperature [13-14]. In fact the idea of work physicality as a value has developed an interdisciplinary approach, with a stronger attention to diagnostic research. Such method has allowed a possible anamnesis and preserving interventions based on a scientific method which guides restorer's choices [15]. Diagnostic investigations provide often more information about an historical-artistic as well as philological study of the work of art [16].

The dating of the 12th century triptych has been traditionally based on stylistic characteristics only so the non-invasive diagnostic analysis was performed to provide further information about the materials, the execution technique and therefore about the chronological aspects.

At last, it should be stressed that the choice of non-invasive methods of analysis was due to conservative requirements and to the necessity to avoid the paradox of damaging a work of art while monitoring its preservation state.

2. Experimental

The execution technique and the conservation conditions of the triptych were investigated by means of in situ non-invasive analysis: video microscope acquisitions, X-ray fluorescence spectroscopy (XRF), infrared reflectography (IR) and false colour infrared (IRC) photography.

The video microscope acquisitions were performed by a Keyence VH-5911 system equipped with a zoom objective from 25 to 175 magnifications, directly connected to a computer for the acquisition and processing of the images.

Infrared reflectography was obtained by a modified Nikon D100 camera by placing the Kodak Wratten gelatine filter n.89B. The IRC photographs were taken using a Nikon F3 camera with a Kodak Ektachromeinfrared film, by placing the n.12 Kodak Wratten gelatine filter n.12 coupled for time by time with the following ones: n. CC20C, n. CC30M and n. CC50M. The lighting system was made up of 2x250 Philips Photolita lamps. In general, the photographic documentation was difficult due to the position of the triptych inside the niche. In fact, the panels are locked up to the wall without any possibility of moving them. Moreover, the niche is closed by a glass/metal window that protects the artwork but make difficult to take photos and also to admire the entire triptych.

The XFR analysis was carried out by a portable instrument equipped with a 5-50kV tube and a Si-PIN detector (resolution 155 eV at 5.9 keV).

Wood support was carefully examined with a little digital microscope Dino Lite AM 413, also on the back of the panels, in order to detect the anatomic characters necessary to identify the wood taxa. During this inspection, one micro fragment broke off the central panel and it was collected for laboratory analysis. The thin section obtained from the micro-sample was examined under a Polyvar 100 optical microscope equipped with a PIXeLINK digital camera. It was described according to the standard of the IAWA list of

microscopic features for hardwood and softwood identification and the wood taxa identification was carried out according to literature dichotomous keys, as previously described [15].

3. Results and discussion

The video microscope acquisitions are useful to study in detail the morphological characteristics of the surfaces. In total thirty points were acquired each at 4 magnifications (25x, 50x, 100x and 175x). The surface is clearly covered by a transparent layer that is probably constituted by the protective varnish applied on the occasion of the last conservative intervention performed during the last three years of the 20th century and that generally dims the paintings (Figure 2).

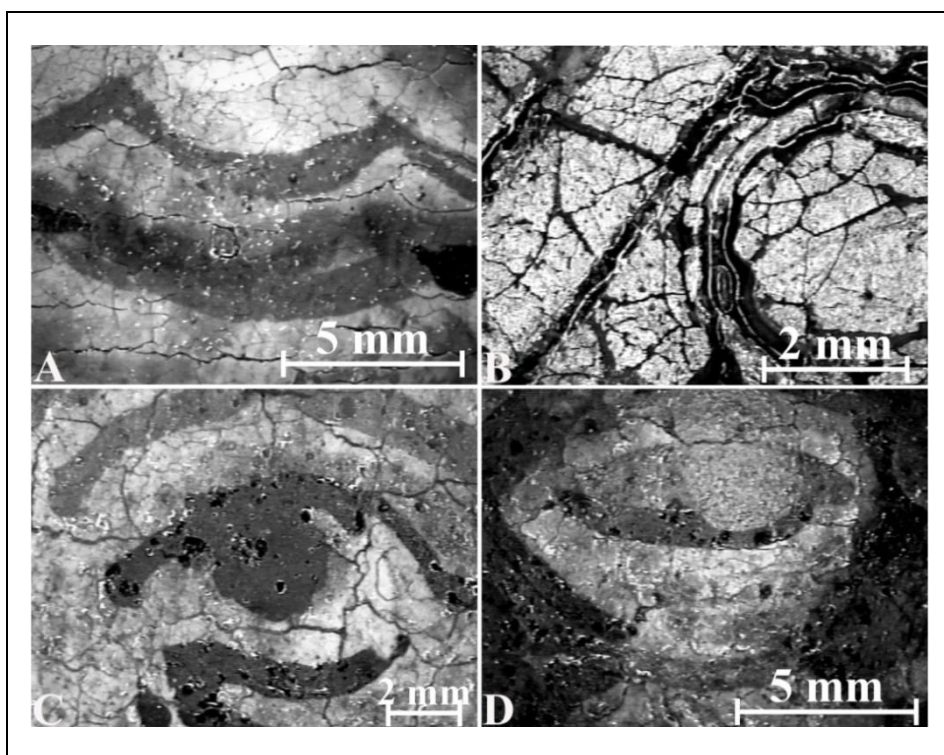


Figure 2. Chosen video microscope acquisitions : (A) upper lip of Christ showing a black dense painting different from the red of the lips, magnification 25x; (B) a detail of the punching on the Christ nimbus showing two concentric lines that define the perimeter of the false pearls, the gold lamina is thin and probably burnished due to the granularity of the surface, magnification 50x; (C) the left eye of Christ in the *Dormitio Virginis* panel showing a refined and detailed execution technique, magnification 25x; (D) the detail of a flame in the scene of the Saint John sermon, also in this case a refined and detailed execution technique can be observed, magnification 25x.

The surface is also characterized by the presence of a widespread *craquelure* due both to the drying process of the pictorial layer and to the subsequent ageing of the painting [17]. The cracking due to the drying process can be 1 mm wide and they can reach the setting layer (Figure 2A and C). The cracking, caused by the ageing, is usually smaller and it depends on the mechanical forces acting on the painting layers (Figure 2A). As general results, the macro photographs and the video microscope acquisitions showed that the *craquelure* is more visible in the golden and white areas of the triptych and in the central panel.

The IRC photography was performed on the two panels representing the *Dormitio Virginis* and the Saint John sermon due to the position of the artefact inside the chapel and also to the necessity of studying the side panels in respect to the central one. In fact, the side panels were generally less studied in respect to the Holy Saviour. The main results from this technique concern the blue and the red areas that appear red and yellow respectively in IRC suggesting the presence of ultramarine blue and vermilion. Some black parts have been observed in the Virgin garment and in the apostles' tunics that can be associated to repainting based on azurite. A similar result has been found on the panel with the Saint John sermon.

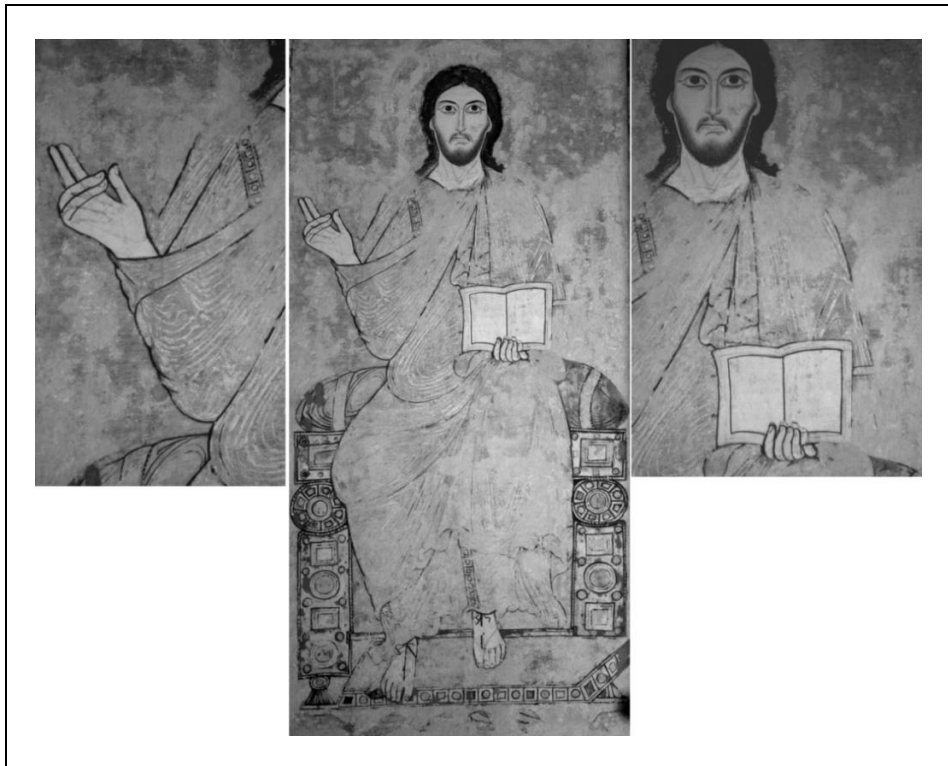


Figure 3. Infrared reflectography images of the Holy Saviour Panel with details of the left hand and of the book.

The infrared reflectography was performed only on the central panel due to the specific modality of this technique in positioning the lamps and the camera. The IR technique allowed to reveal details of the preparatory drawing and to show some changes in the drawing of the hands and of the right foot of Christ (Figure 3).

On the Christ face the drawing under the eyes, nose, moustache and chin can be observed. Some shadows on the neck are also visible in the infrared reflectography. The facial features seem to be shifted on the right side in respect to the visible image. The IR detail of the right hand of Christ revealed a position of the fingers different from the visible one. In fact, the fingers appear bent on the hand palm. The infrared reflectography also highlights the preparatory drawing in the *pallium*. The detail of the left hand holding up the book points out the presence of a drawing of the fingers different from the visible one. The red colour of the inscription is clearly transparent to the IR and it can be supposed the use of vermilion as pigment [18]. Another interesting area can be observed in the right foot that appears in an unnatural and 'inconvenient' position in respect to the Christ figure and in particular to the knee position. In fact, a second foot, shifted at different angle, is evident under the visible Christ's foot. The presence of a second foot that appears quite abraded can be related to a liturgical aspect that is the religious usage of the feet washing with *basilicum* (basil). This practice was used for the Lateran image, in fact during the procession the panel was anointed in specific points with basil leaves [3, p. 126-127]. So, it can be supposed that the foot, anointed during the processions, was abraded leading to the deterioration of the painting layer. Probably, this problem led to re-paint the most degraded part such as the right foot.

The IR image shows also that the contour of the throne is clearly defined. At last, some dark grey areas can be observed, probably due to the presence of re-paintings with ochre and earth based pigments.

The XRF analysis was performed on nineteen points, as described in the Table 1.

The presence of lead, calcium and strontium in almost all the examined points suggests the use of gypsum and lead white as setting layers. Blue colour was obtained by ultramarine blue; the presence of copper in some point is probably due to repainting. Vermilion is widely used for red and flesh colours sometimes mixed with red lead. The presence of arsenic in two points of the Christ's throne suggests the use of orpiment as priming of the painting. This pigment was detected only in the central panel of the triptych. The presence of orpiment as a priming layer was revealed also during the analysis of three micro-samples obtained from the panel on the occasion of the restoration performed between 1998 and 2001. In fact, the documents conserved in the archive of Superintendence for Historic and Artistic Heritage report the analysis on the cross-sections of the three samples by optical microscopy under reflected light and ultraviolet fluorescence, and by SEM/EDS (Scanning Electron Microscopy/Energy Dispersive Spectroscopy) [Fasc. 79, 25/09/98, cap.2102, Archivio della Soprintendenza Speciale per il Polo Museale, Roma, 1998]. The

cross section of the sample taken from the red area in the right side of the Christ's throne, showed the presence of a setting layer made of gypsum, a second yellow layer composed of orpiment and the third external layer made of red lake with vermilion.

Table 1. Results of the XRF analysis expressed as cps (counts per seconds of the X-rays of each element).

Point	Description	Ca	Mn	Fe	Cu	As	Sr	Sn	Au	Hg	Pb
Tiv.01	Blue of the pillow of Christ	27					71				27
Tiv.02	Blue gem of the Christ's throne	30					92				52
Tiv.03	Flesh of the Christ's hand									46	2883
Tiv.04	Red fold on the Christ's right sleeve (original)	24					83		506	1190	36
Tiv.05	Red paint on the Christ's chest (repainting)	39		38			49		887	250	32
Tiv.06	Red area of a square gem near to the point 2	135					80			6053	265
Tiv.07	Orange colour of a square gem near to the point 6	63					74			1538	1857
Tiv.08	Red of the Christ's throne, on the left	51		37	125	2446	215			42	159
Tiv.09	Red of the Christ's throne, on the right	33	43	117	65	5770	126			46	210
Tiv.10	Yellow of the Christ's throne			114			154		3342		27
Tiv.11	Green gem on the left of the throne						99			73	3239
Tiv.12	Red-orange on the Virgin garment	122		213	28		262			17	59
Tiv.13	Flesh tone on the Virgin hand			38			57				8482
Tiv.14	Red on the Virgin garment	95		42			236				198
Tiv.15	Red of the bed of the Virgin	29					149			4453	620
Tiv.16	Blue on the Virgin garment	37		23	151		109	142			6740
Tiv.17	Green on the garment of Saint John	58		271	45		170				1583
Tiv.18	Brown hair of one of the apostles	127	203	108	50		201			481	788
Tiv.19	Yellow background in the St John sermon panel						129		2721		123

Concerning the wood support, a careful in situ observation was performed in order to obtain as much information as possible about the species and the technological aspects. Each panel consists of a single board arranged in vertical grain. In the central panel a board, with horizontal grain, was added in the lower part to increase the length of the Holy Saviour panel.

The video microscope investigation on the lower side of the lateral panels allowed to reveal that the panels were obtained by subradial cuts, the Saint John one showing the painting layer in the outer surface (Figure 4A). The Virgin panel cut is difficult to read due to the presence of a deviation of the fibres caused by a border knot falling (Figure 4B) and of layers of materials on the transversal wood surface probably applied during the restorations performed on the triptych (Figure 4C). The subradial cut together with the presence of the painting layers seem to compensate the effect of the distortions due to changes of the thermo hygrometric parameters.

As the cupping is barely perceptible, the effect of the shrinkage anisotropy seems to be compensated for the hygroscopic asymmetry caused by the presence of the painting layers only on one side of the panel.

In order to identify the wood species, different methods could be applied according to the artwork typology, to the state of preservation and to the possibility of inspecting parts of the panel. In the case of the triptych of Tivoli,

observations on the macroscopic characteristics and control of the microscopic ones were performed in order to limit the sample number. As stressed by some authors, any intervention on wood artworks has to be considered “an intrusion more or less invasive on the original material, anyway irreversible” [19].

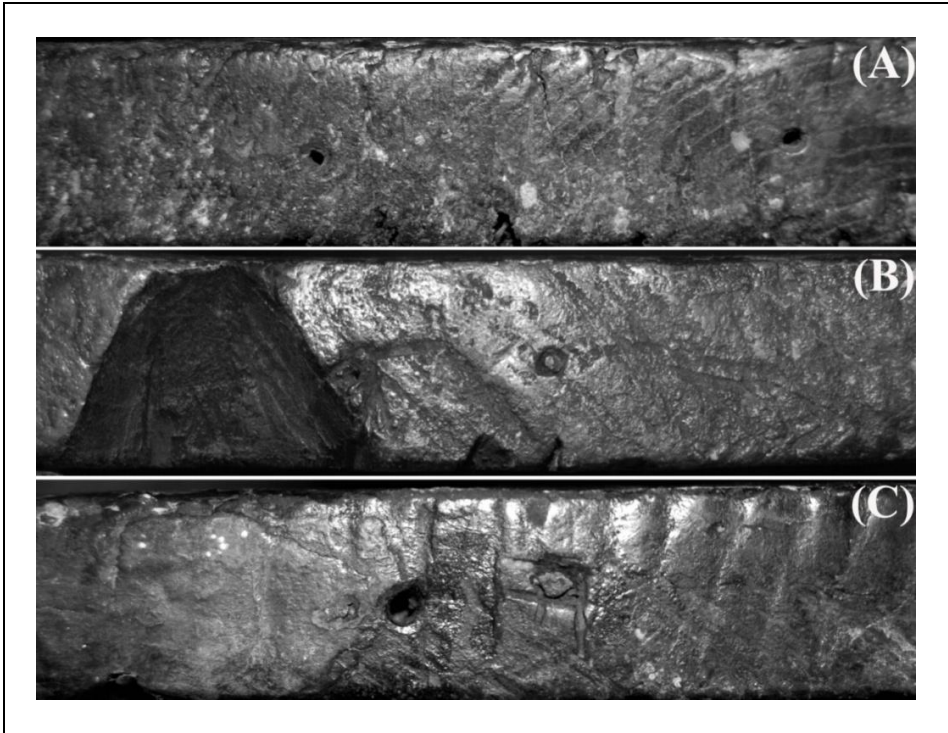


Figure 4. (A) Lower side of the panel with Saint John the Evangelist. On the transversal surface of the panel the growth rings with porosity are visible. The subradial cut outside pith and the painting layers, on the upper side of the image, are visible. (B) Lower side of the panel with the Virgin *Advocata*. The growth rings with the ring-porous can be observed. (C) Same as (B); presence of surface materials that make difficult the microscopically examination of wood.

The macroscopic observations indicate a ring-porous broadleaf species in each panel, confirmed by the microscopic observation of thin sections (Figure 5). The wide early wood vessels were easily distinguishable from the latewood vessels, solitary and arranged in dendritic patterns. The rays were uniseriate (1 cell wide) so they were not visible to naked eye, feature unique among ring-porous species of the temperate regions. The study of the anatomical features of the wood micro-sample allowed identifying chestnut (*Castanea sativa* Mill.).

Although chestnut, particularly in Central Italy, has a limited sapwood extension [20], in the case of triptych the sapwood was completely removed. The complete removal of sapwood is a way to ensure the artefact greater durability against wood-boring insects. This caution can be explained with the importance of the tryptic. The heartwood in chestnut is darker than sapwood and

with the ageing it undergoes a further darkening [21]. This kind of wood was used as a structural material for important building frames and artefacts of demo ethno anthropological interest, but it was found less frequently in artistic artefacts.

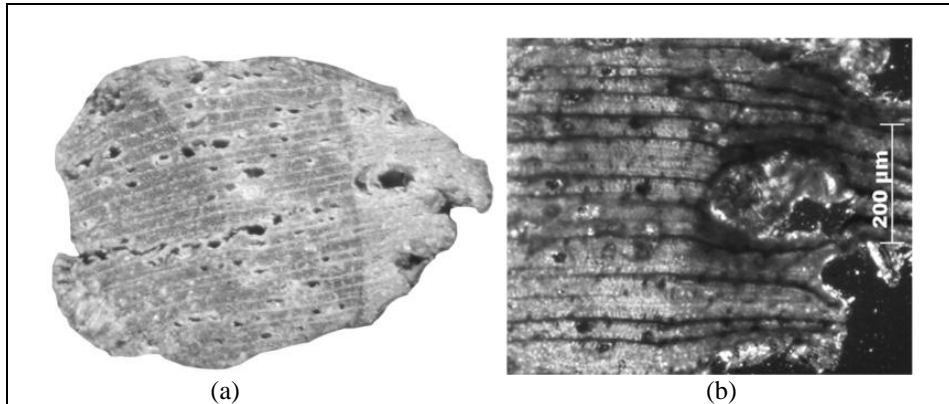


Figure 5. (a) Micro sample detached from the back side of the central panel, wood transversal section; (b) thin section of the sample. The large vessel identifies the early wood part of the ring. In the late wood the porous size is smaller. The rays are uniseriate.

The identification of the chestnut wood in the Tivoli's triptych is an important result that supports its dating also in comparison with the Virgin panel of Saint Angel in Pescheria, a chestnut wooden panel dated back to the first quarter of the twelfth century [22]. This panel was carefully studied in 1968 by Ilaria Toesca on the occasion of the restoration of the artwork and several analogies with the Holy Saviour of Tivoli were found concerning both the stylistic characters and the execution techniques [23]. Toesca affirmed that the panel of Saint Angel in Pescheria and that of Tivoli seem parts of the same work of art suggesting the possibility that during the procession of *Inchinata* the Holy Saviour of Tivoli met the Virgin of Saint Angel in Pescheria [23].

During the Middle Age the use of wood panel paintings was not as diffuse as the wall paintings. The most ancient wood panel paintings are the icons of the 5th-7th centuries. In Italy the *Archeropita*, created with walnut wood, and the so called *Madonna della Clemenza*, made of cypress wood, date back to 8th century and they are the oldest known icons [24]. The Sacred Icon of the *Glicofilusa* Virgin, stored in the Gregorian Monastery of Vena in Sicily, is made of a single chestnut panel (170x67x3cm) and it is dated back to the 6th century A.D. even if the ¹⁴C dating postpones the cutting down of the original tree to some subsequent centuries, between the 11th and 13th [A. Mandò, *Indagine al radiocarbonio, in I misteri della teotokosglicofilusa*, 2008, <http://www.santuariodellavena.it/joomla/category-list/10-i-misteri-della-teotokos-glicofilusa-vena.html?showall=&start=1>].

4. Conclusions

In this paper some non-invasive analysis on the painted surface of the Holy Saviour triptych in Tivoli and a micro-invasive study of the wood support were performed. The analysis revealed the presence of pigments like vermilion, ultramarine blue, red lead, gold in the original painting and also lead white and orpiment in the priming. The wood support is made of chestnut a species rarely used for panel painting. This result supports the dating of the panel if compared with another panel painting (Saint Angel in Pescheria) of the first quarter of the twelfth century.

The combined study of the historical background and of the material aspect of the works of art is fundamental to fully understand their present state, to evaluate the most appropriate conservative environment and to stimulate a wider deliberation before the conservative intervention.

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