

## THE CONSERVATION OF AN OIL PAINTING BY ANTONIO SCHRANZ, 1841 AD

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### Abstract

*This paper presents conservation and restoration of oil painting by artist Antonio Schranz dating back to 1841AD, and it represents a landscape painting on the Bosphorus, where it was suffering from major manifestations of deterioration, such as flaking, cracking, shrinkage, previous restoration processes in the paint layer, flaking and cracking in the ground paint layer, holes and dirt and severe weakness in the support layer and a large yellowing in the varnish layer. Modern methods of tests and analysis were used to find the type of canvas, the number of warp and weft in the canvas, the type of white filler and bonding material on the ground painting layer, Type of colored materials, and the color medium type. While the treatment was done strengthening and lining Painting using BEVA 371 material and using the kauter Device to stick the cracks, also, the old varnish has been removed and replaced with a modern varnish from acrylic resin.*

**Keywords:** Oil painting; Conservation; Restoration; Antonio Schranz.

### Introduction

The importance of this paper comes because it reviews the process of restoration and conservation of an archaeological oil painting of approximately 180 years, which was drawn by a topographic artist from the romantic school [1]. This painting reflects the period that was present in Istanbul at that time, then the importance of how the scientific steps in conservation and restoration of an old oil painting, taking all the necessary tests and analyzes, and applying the restoration with great skill and caution because we were dealing with a weak canvas and its dull colors held up for a long time. It was necessary to make a lining of the canvas, to paint lining while maintaining oil painting to treat the ruptures, cracks, and tears that occur in the canvas support, to strengthen the old painting support when the support is in a state of vulnerability and severe weakness [2-4], or to fix the appearance of flaking the colors or splits [5].

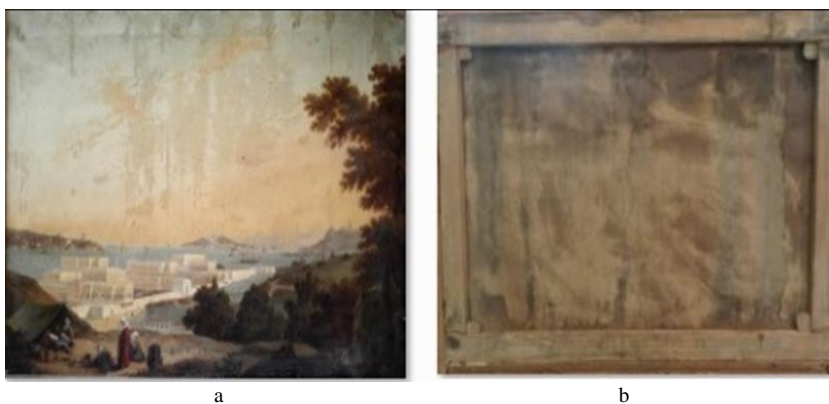
This painting belongs to the romantic school that was prevalent in that period, and the importance of working to maintain and restore it to preserve its historical, aesthetic and archaeological message, and to identify the most important materials used during that period in building the oil painting, and the use of the most important modern devices in examining, analyzing and conservation this painting.

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### Archaeological registration and date of the oil painting

This oil painting is painted on a support of cotton canvas, and it is owned by the Prince Muhammad Ali Museum of the Egyptian Ministry of Antiquities, and it is registered in the museum records under number of 106, Archaeological number 71, and was kept in the museum warehouse within Drawers dedicated to preserving the paintings. This is a drawing of a Turkish scene on the Bosphorus Strait, and on the left side of the painting appears a tent in which some Turks sit in their distinctive traditional clothes, On the heads they have turbans and another two women appear in the scene, one of whom is breastfeeding her child, and the other is helping a man in preparing food on fire. In the background, there are a group of buildings in white representing Ottoman palaces, some mosques, churches, and buildings besides, inside the waterway there are some steamboats, The painting is in a format of a rectangle of 81cm in length and 55cm in width (Fig. 1).



**Fig. 1.** The Oil painting: (a) from the front; (b) from the back

The history of the painting dates to 1841 when the artist Antonio Schranz (1801-1863) drew the painting, and the artist's signature appears on the painting in the lower right side. Below the signature, it is written the history of the painting and a signature which is identical to the official artist's signature (Fig. 2) [1, 6].



**Fig. 2.** Signature of the artist Schranz

Artist Antonio Schranz was the son of German artist Anton Schranz 1739-1839 [7], He comes from a well-known artistic family, where his father, artist Anton Schranz, came from Germany to the Mediterranean islands of Spain, and he married Isabella Howard Tuduri on Menorca's Island in 1794, when the birth of artist Antonio January 31, 1801 was recorded in the records of Menorca, and he and his family in 1818 left for Malta [8].

Antonio Schranz started his career as a topographic artist, as he was employed by wealthy British travellers in Greece, Asia Minor, Egypt, and he completed at least ten trips between 1823-1847 in Egypt, Jordan, and Syria [9].

Artist Antonio Schranz was the artist of the Romantic School, where sandstorms, turbulent waves and ruins he painted on the ruins of Greece and recording the misery left by the Ottoman war on Greece, the true romantic artist in Malta at the time [1, 10].

## Results and discussion

### *The number of warp and weft in the canvas*

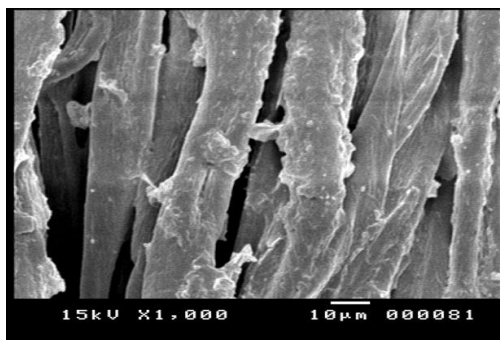
Through the scanning of the optical microscope (USB) to the surface of the painting shows that the texture structure of the support of the simple type, 1:1, and the number of warp and weft for each is  $30 \times 30 \text{ cm}^2$  (Fig. 3).

### *Type of canvas*

Through scanning with the scanning electron microscopy (SEM), and Compared to the standard images of fiber, both linen and cotton, which is likely to be used as a support of this painting show that the type of fiber is cotton, as in figure 4.



**Fig. 3.** The texture structure of the support



**Fig. 4.** Fibers type (cotton fabric)

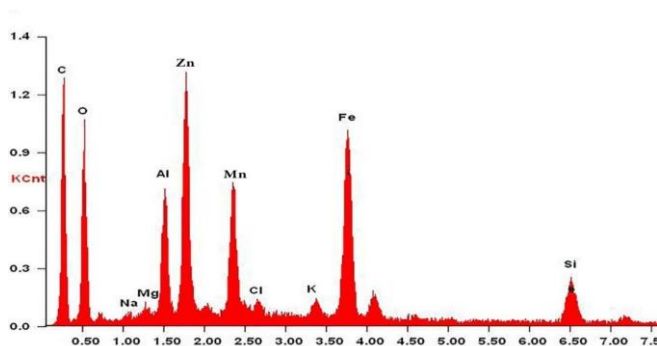
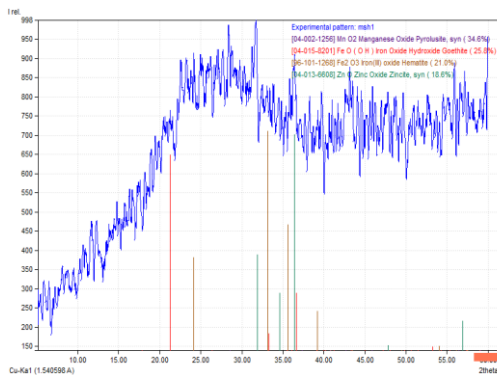
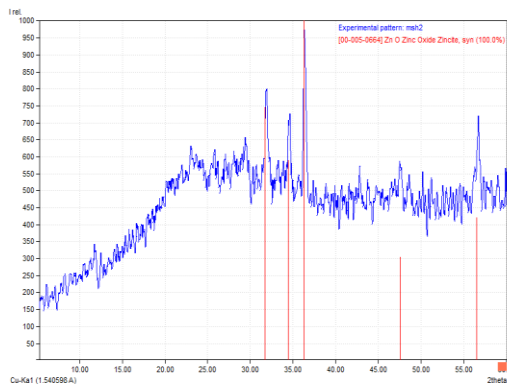
### *The type of white filler material on the ground painting layer*

The X-ray analysis showed that the white matter used in the ground painting layer is  $\text{ZnO}$ , (Card No. 01-075-1526), as shown in figure 5.

### *Type of colored materials*

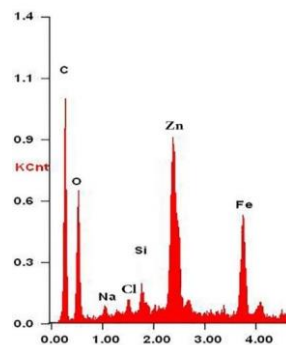
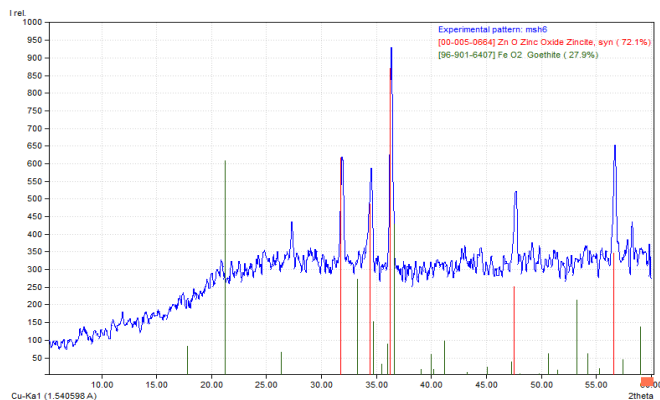
#### *Brown color*

Through the analysis of X-ray diffraction (XRD), it was found that the artist used the *Indian red* ( $\text{Fe}_2\text{O}_3$ ) card number: 04-015-8201, the *yellow Ocher* ( $\text{Fe}_2\text{O}_3 \cdot \text{H}_2\text{O}$ ) card number: 04-013-6608, and *black manganese* ( $\text{MnO}_2$ ) card number: 04-002-1256 as a brown color. Figure 6 shows the result of brown color analysis using X-ray diffraction, while the analysis through an electronic scanning microscope equipped with an EDAX unit shows the presence of a Fe element that confirms the presence of Indian red and yellow *Ocher*. The presence of an Mn element confirms the presence of manganese black. Consequently, the color of the brown color was the result of mixing the yellow and red color with the black color. Figure 7 shows the analysis of the brown color through the scanning electron microscope equipped with the EDAX unit.



*Yellow color*

Through the analysis of X-ray diffraction (XRD), it was found that the artist used the yellow *Ocher* (Fe<sub>2</sub>O<sub>3</sub>), card number: 96-90-6407, figure 8, As for the analysis through the scanning electronic microscope equipped with the EDAX unit, it showed the presence of the Fe element as well as the oxygen component O which confirms the of the presence of the yellow color of the yellow *Ocher*, figure 9.



### Green color

Through the analysis of X-ray diffraction (XRD), it was found that the artist used the green color: Chromium Oxide Green ( $\text{Cr}_2\text{O}_3$ ), card number: 96-210-4123, as in figure 10. As for the analysis through the scanning electron microscope equipped with a unit EDAX shows the presence of chromium (Cr) as well as the oxygen element O, which confirms that the green color used by the artist here is green chrome (Fig. 11).

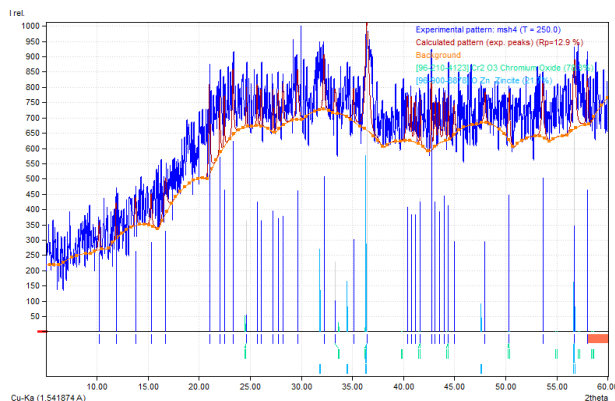


Fig. 10. The type of green color by XRD analysis

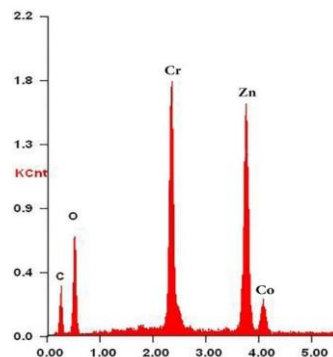


Fig. 11. The green color analysed by EDX

### Type of bonding material in the ground painting layer

By using FTIR and comparing the active groups of the standard sample [11], and the sample under study, it was determined that the adhesive material on the ground painting layer is animal glue, from where it appeared N- H Stretching band) at the peak  $3409.53\text{cm}^{-1}$ , and C-H Stretching band at the Peak  $2924.52\text{cm}^{-1}$ , as well as the group C-O Stretching band, at  $1629.55\text{cm}^{-1}$ , and the bending band C-H appeared at  $1380.78\text{cm}^{-1}$  (Fig. 12).

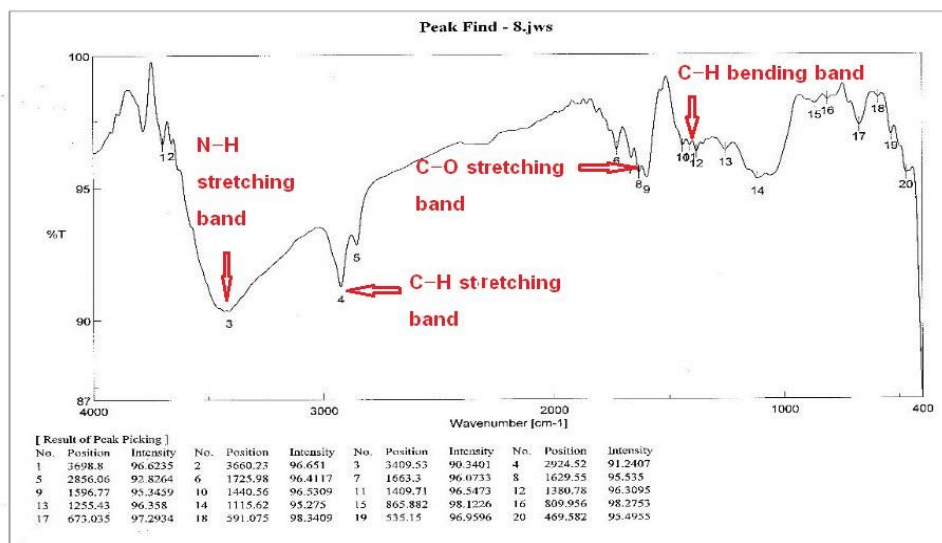


Fig. 12. The FTIR pattern curve shows the animal glue for the ground painting layer

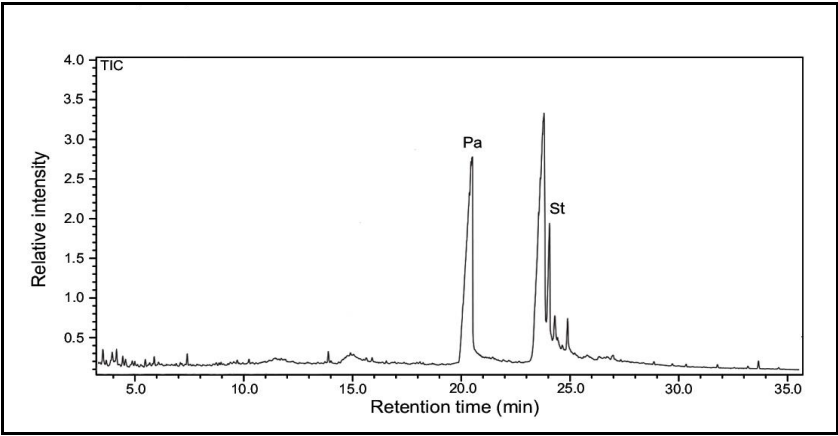
***The color medium type***

The results of the analysis showed that the color medium used was linseed oil. The percentage of palmitic acid C16 to Stearic C18 was 1.58. This percentage indicates that the oil used is linseed oil. The table 1 shows the fatty acids in the sample.

**Table 1.** The fatty acids in the sample of GC-MS chromatography analysis

Fatty Acids	Retention Time (Min)	Content %
Palmitic C16	19.54	6.58
Stearic C18	23.28	4.43
Oleic C18-1	24.17	18.51
Linoleic C18-2	25.21	17.25
Linolenic C18-3	27.12	53.21

Figure 13 explains the result of the chromatography analysis of a GC-MS device.



**Fig. 13.** The result of GC-MS chromatography analysis

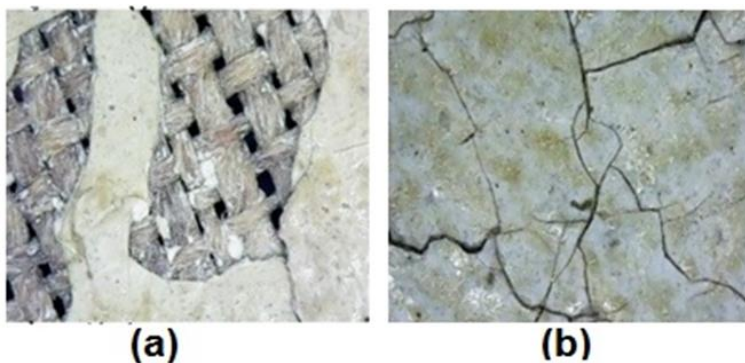
***Documentation deterioration and degradation***

The canvas was suffering from various dirt, different damages as holes (Fig. 14).



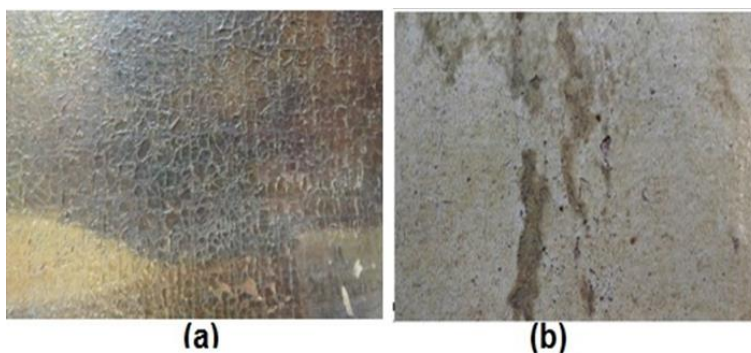
**Fig. 14.** Manifestations of support layer deterioration: (a) Dirt; (b) Holes



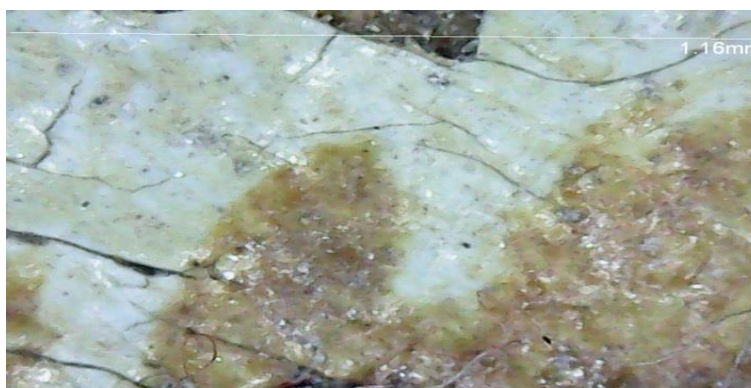


**Fig. 15.** Manifestations of ground painting layer: (a) Flakes; (b) Cracks

Also found in the lower part of the painting layer there are signs of deterioration, such as cracks and flakes (Fig. 15). On the color layer, there are flakes, cracks, color shrinkage and wrinkling, and signs of previous restorations (Fig. 16). Finally, the varnish layer was suffering from a yellowish-brown color (Fig. 17).



**Fig. 16.** Manifestations of paint layer:  
(a) flakes, cracks, color shrinkage, and wrinkling;  
(b) color retouch as a result of previous restorations



**Fig. 17.** Yellowing of the varnish layer

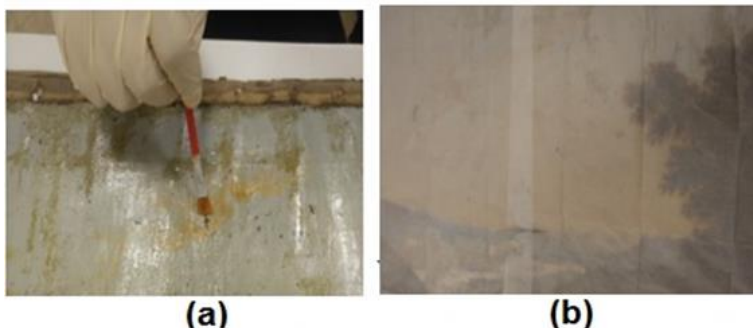
### ***Treatment and restoration***

The painting was cleaned through mechanical cleaning using soft brushes to remove dust and smears from the back of the painting and forward figure 18.



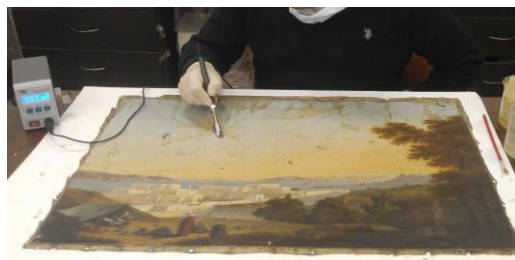
**Fig. 18.** Mechanical cleaning using soft brushes

The painting layer was reinforced by BEVA 371 [12-14], where it was placed on the surface of the canvas several layers, waiting between the first layer followed by until the full drying, it has been covered in Tissue paper (Fig. 19).



**Fig. 19.** The process of strengthening the painting layer: by Beva 731; (b) by Tissue paper

The next step was to treat and flatten the painting surface using the cauter [15], set to a temperature of 65°C, and the process of individualization and combining the edges of the cracked holes was done through three sessions, three hours each session (Fig. 20). The varnish layer has been removed using toluene and medical cotton wrapped on a stick (Fig. 21).



**Fig. 20.** Individual the Beva by cauter

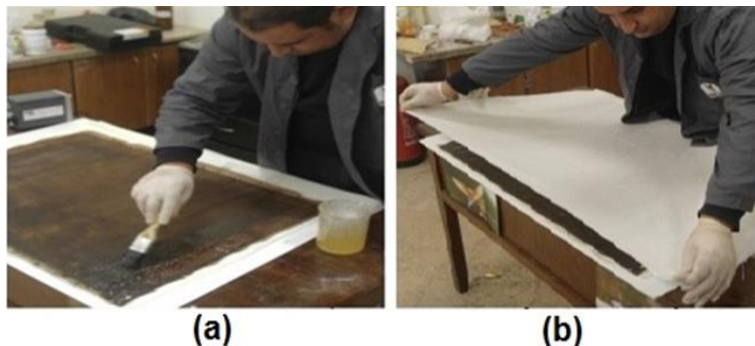


**Fig. 21.** Removing the varnish layer

A new lining of support was required, and it was used a new support from cotton. This new support must be identical to the old one, in terms of tension and contraction [16]. A fabric



that is not chemically treated, as it was washed well and individually through the electric iron, PEVA 371 was selected in the lining process (Fig. 22) [12, 17, 18].

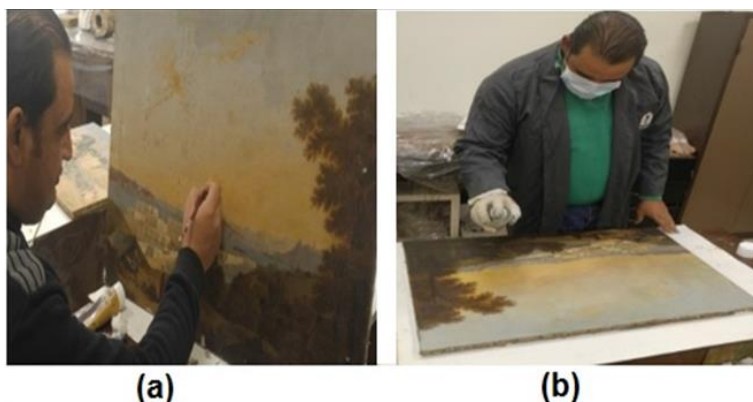


**Fig. 22.** The process of lining painting: (a) Beva individual; (b) Place the new support

A mixture of white zinc with calcium carbonate in a ratio of 2:1 was made with animal glue until it became homogeneous [19], and was placed as a ground layer of form, after that it was left to dry and then it was sanded with a fine sanding in order to match with the color layer level (Fig. 23).



**Fig. 23.** Painting ground laying



**Fig. 24.** The restoration: (a) retouching the painting layer; (b) re-apply a new varnish



**Fig. 25.** The oil painting before (a) and after restoration (b)

Acrylic colors were used for retouching, because acrylic colors are more stable, chemical do not melt in water and they resist to climate changes and have a good adhesion [20]. To re-apply a new varnish layer, a varnish of acrylic resin is used in modern varnishes, (methyl methacrylate), has been applied through spraying the painting on a flat table, making sure that the color is sprayed and covers all parts of the painting surface [15, 21]. The modern varnish extracted from synthetic resins is better than varnish obtained from natural resins [22].

## Conclusion

The aim of the conservation of the oil painting was to preserve it from the various manifestations of deterioration present on it, in order to carry out its archaeological, historical, cultural and aesthetic message, and then to study the types of materials, and techniques used by the artist during that period in the Mediterranean basin.

The researchers have found that one of the most important causes of the appearance of deterioration on this painting is the type of support - cotton cloth that was affected by the surrounding weather environment, which caused a kind of cracks along the paint layer and the ground painting layer, also the presence of a previous color restoration process that put these colors on the varnish layer which gave a color film heterogeneous.

The painting has preserved itself during this long period of time - approximate 180 years, due to the artist's use of raw materials and good materials, such as animal glue or white zinc as paint ground layer, and flaxseed oil as a color binder, in addition to the technique of applying the color layer using soft brushes and multi-paint layers.

Different examination methods were used in order to identify the materials used on this picture, then it was used best materials and devices for restoration process, such as PEVA 371 and cauter device, all these in order to have a correct scientific restoration method, using materials that will not affect the authenticity of the painting and at the same time to keep as long as possible the painting in best condition.

The final result of conservation and restoration was an indisputable success, as the painting became brighter and more powerful while eliminating all aspects of the deterioration that were affecting the painting.

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