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DETERIORATION FACTORS FACING MURAL PAINTINGS IN EL SAKAKENY PALACE (PROBLEMS AND SOLUTIONS)

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ABSTRACT

In the present study, an investigation has been undertaken in to El Sakakeny palace back to the 19th century and built by Antonio Laschiac. It is initially located in El Sakakeny square in Egypt. The investigation used to focus to the deterioration factors with it's discoloration and mural paintings. The investigation revealed that the most vital deterioration factor facing the mural paintings in El Sakakeny palace is the daily sun light and the groundwater which appeared in the amount of salts. The effect of all deterioration factors can be prevented by using simple ways from the preventive conservation.

KEYWORDS: Mural paintings, El-Sakakeny palace, SEM, EDX, XRD, Groundwater, Sun Light

1. INTRODUCTION

The 19th century is considered the most important period in the Egypt art which distinguished with the great paintings which painted with Foreigners. In this century, several mural paintings were applied on ceil and walls of halls of many palaces away of oriental style (Novotny, 1960).

El Sakakeny palace (Fig.1) was built for Habib El Sakakeny Pasha (The owner of the palace) in 1897, The whole space of the palace is 2698 m². It is consisted of three floors, that palace is famous because of it's decoration and the mural paintings on ceils or on walls. There are mural paintings exist in love chamber in first floor in El Sakakeny palace they were Rococo style as the colours were light and there is an obvious movement in the flying birds or in the growing of planets (Fig.1), Their dimensions about 20 cm x 25 cm, 20 cm x 45 cm and 20 cm x 25 cm without the frame it's width 1.8 cm It dates back to the 19th century or in year 1897. They suffered from many deterioration factors as following:

-That palace was built on a dried lake called Karaga. So the walls of the basement suffer from the raising of groundwater (X-Ray diffraction assured that the major salt is Halite which increase especially in walls close to the ground) (Fig. 1a).

-The style of the palace is the Italian style which used huge windows which exposed the mural paintings to the daily sun light (Fig.1 b,c) .

-As the palace used as office for curators: Modern paint on walls, random electricity, and using a lot of chairs and desks (Fig.1 d,e,f).

The most vital deterioration factors facing the mural paintings are: a) salts in the rising ground water, b) the daily sun light which dried the paintings so the salts polymerized so it's became bigger producing an interior compression causing the detachments of paint layers as shown in (Fig.1c).

Figure 1 The deterioration factors facing El Sakakeny palace , (A) The ground water in the external walls , (B)the huge window in El Sakakeny palace , (C) The sun light affect the mural painting in front of the huge window causing detachment of the paint layers , (D) The modern paints ,(E) The random electricity as the lamp is touching the wall causing detachment of the paint layer , (F) The chairs and desk for the too many curators inside the palace .

2. MATERIALS AND METHODS

2.1 Sampling

Samples were collected carefully from the destroyed edge, using a micro scalpel, to identify the constituents and degree of deterioration of the paintings. All the analyzed and investigated samples were carefully collected from areas without aesthetic value or from severely damaged parts for defined the percentage of salts in which high in the wall.

2.2 X-Ray Diffraction

The X-ray diffraction patterns of the paintings were obtained using a diffract meter (Philips PW 1840), operated at 40 kV and 25 mA, using Cu Ka radiation and a receiving slit of 0.2 mm. The measurements were made at room temperature. Preparation of each sample consisted of grinding it in the dry form, by using a mortar and pestle to obtain a fine powder (Stuart , 2007)

2.3 Scanning Electron Microscope coupled with EDX

Samples were analyzed with an Environmental Scanning Electron Microscope (FBI, Netherlands) coupled with Energy Dispersive X-ray analysis. The microstructure and morphology of mineral constituting of the paintings were analyzed with a

scanning electron microscope FEI Quanta 200. The microscope operated at 30 kV accelerating voltage. Sample preparation consisted of application of a superficial gold film by sputtering to prevent electrostatic charge.

3. RESULTS AND DISCUSSION

3.1 X-Ray Diffraction:

XRD analysis results revealed the following:

1 .Halite is the major salts in all samples as it is appeared in the original mortar 21% percent because of the groundwater which raised in all the walls of the palace, 19% percent of the ground layer , and 36% percent in the outside wall close to the ground assured the occurrence of deterioration (Arnold et al.,1987), which caused the detachment of painting layer (Ashurst,1998) (Fig. 2 a,b) so the problem of raising of groundwater in the wall a very vital problems faced all the mural paintings in the palace so that problem must be solved by prevent raising groundwater in the walls using the polymeric taps Albiotimin (Kumar ,2010).

2. The problem of detachment of paint layer can be solved by stopping the exposing to the daily sun light (Mora et al., 1984) by covering the mural paintings with special glass sheets (ultraviolet reflector) (Middleton, 2008).

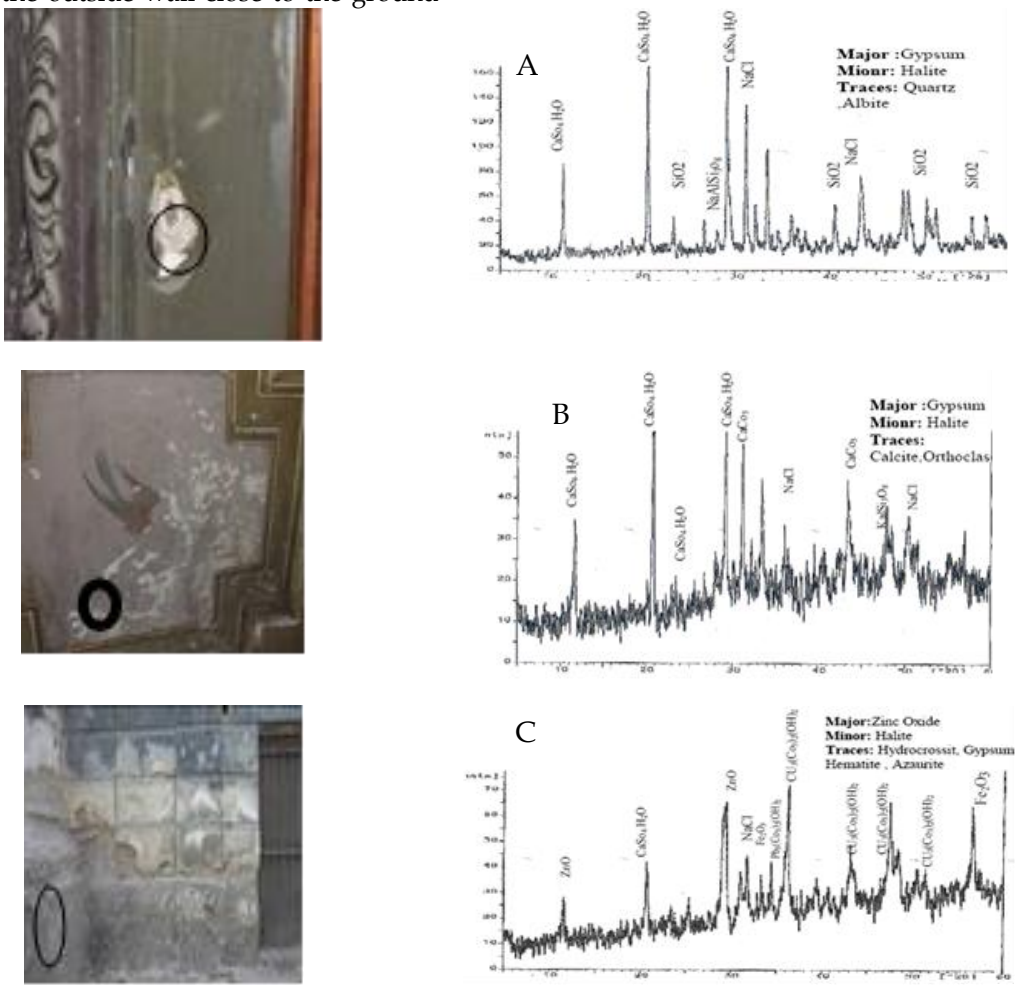

Figure 2 : X-Ray patterns of the samples from El Sakakeny palace (A) The original mortar Consisted of gypsum ,Quartz, Albite and 21% Halite , (B) The sample were taken from the outside wall close to the ground the percentage of Halite 36% which assured the raising of groundwater in the walls ,(c)The sample was taken from the color in back ground of the damage mural painting to define if the percentage of Halite which caused the detachment or not but the result assured that the Halite percentage is 19% so it is causing the detachment.

3.2 Scanning Electron Microscope coupled with EDX

The EDX patterns of samples from El Sakakeny palace indicate the following results which are resumed Figures 3 to 5. The observations made by SEM of deteriorated walls show the appearance of halite crystals with a very high percentage (the salt was identified by XRD) on both surface and depth .

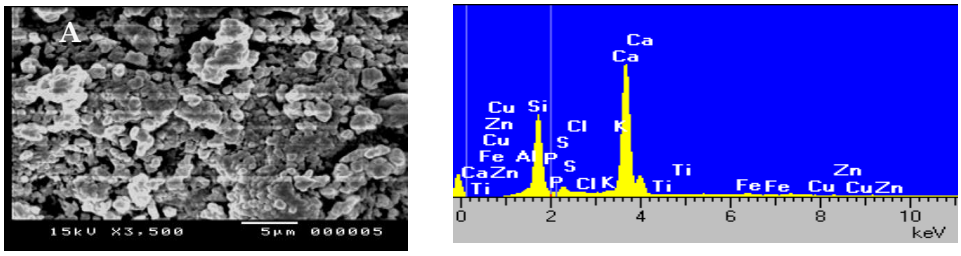

Figure 3. A Sample taken from the original mortar contained 19% halite

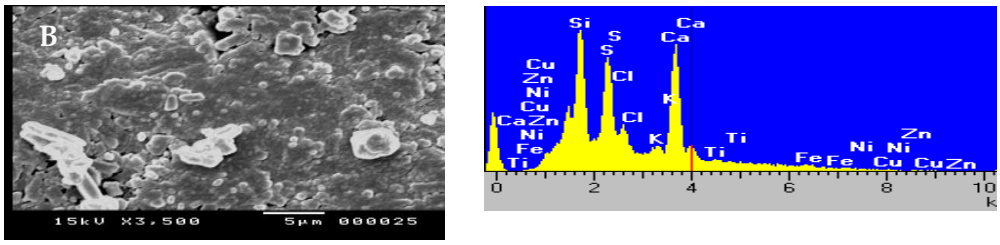

Figure 4. B Sample taken of ground layer and show the big quartz crystals which approved the homogeny of the mortar

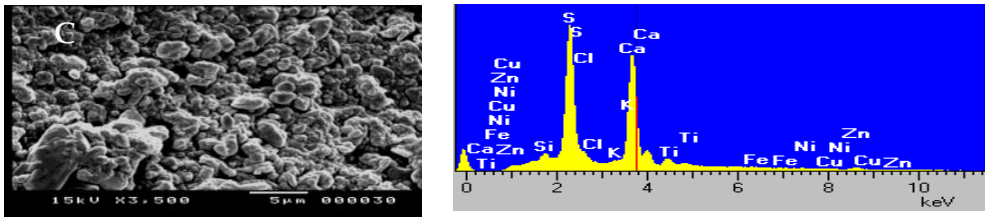

Figure 5 C Sample of reddish brown color which is a mixture of azurite and Hematite with little percentage of magnetite the big crystals of salts appear

3.3 The Suggested Way to Protect The Mural Paintings at El Skakaney Palace

Mural paintings can be protected by covering them with flat glass this method used widely in tombs in Luxor and Aswan to prevent visitors from touching the painted layers the flat glass must be light weight glass, smooth, high resistance for breaking and scratches as well as high transparent, it should also cutout all the harmfull radiations and with suitable thickness. (Fig.6A)

Sizes with a suitable and the characteristics of the nails and tools to install the glass on the mural paintings: (Fig.6 B,C)

These nails should be from stainless steel, resistance for corrosion agents, simple way to use them in fixing the glass sheets

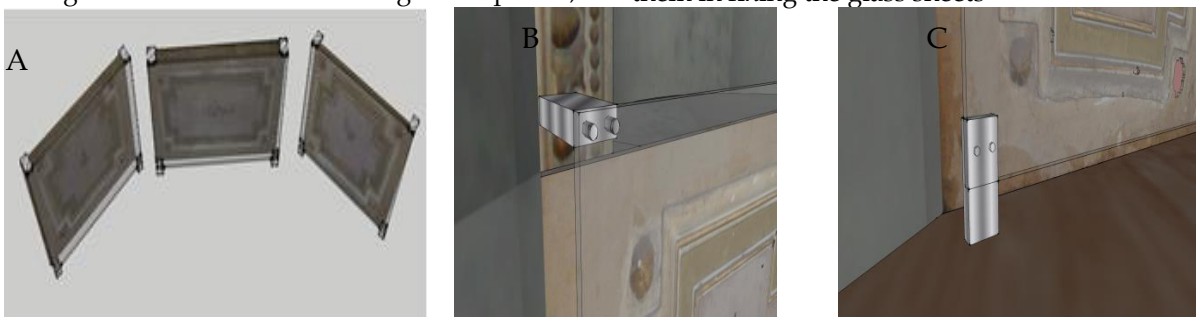

Figure 6 A The final view of the special glass on mural paintings, (B ,C) The shape of the nails which used in the installation of the glass to the wall

4. CONCLUSION

This paper is presenting the initial stages for restoration and conservation of mural paintings in El Sakakeny palace, this study focused mainly on the deteriorated places of the walls specially by identifying the percentage of the salts to assure it's

responsibility for the detachments of paint layers, so we can find the best and optimum restoration ways for this project.

The mural paintings in El Sakakeny palace suffered from two major and vital deterioration factors from salts and daily sunlight.

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