

**Research Article**

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An Extensive Study of Examination, Restoration, and Display of a Rare Historical Costumes, Practical Application

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Historical clothing like Badawi's tunic is a kind of three-dimensional textile. They are exposed to different types of damage as a result of various damage conditions such as faulty display, environmental conditions, air pollution, biological damage. For these historical clothing needs to intervene quickly restoration processes. In the past, there were erroneous repairs to the historical dress. Therefore, the first steps of restoration are to remove the previous faulty repairs. Tests were carried out using a Scanning electron microscopy, X-ray diffraction, infrared pattern to identify the type of fiber, the damage of the historical object. The stability of pigments was tested in the historical object. Mechanical cleaning was performed using different brushes. Also, wet cleaning using water and detergents. Also, sterilization and drying of the historical object.

The final installation of the historical piece was carried out as a prelude to the exhibits. All restoration steps are recorded by photograph.

Keywords: Historical clothing; Restoration; Fibers; Cleaning; Sterilization**Introduction**

Textiles are part of our daily life now as much as in the past, from very early with human activities have been concentrated on the making of cloth and embellishing it for the purpose of keeping as warm and comfortable as possible, to show status- emperor, soldier, beggar man, thief- and to identify oneself. Many cultures of this world are still identified by their beautiful costume and textiles [1-5].

The historical textiles exposed to many challenges such as oscillate relative humidity (RH), changing temperature, and effect of light, effect of air pollution, non-standard storage and display methods. All these factors cause damage and decay in both fibers and dyes which results in weakness in fibers and dye, hardness in fibers, separate parts, loss parts, stain and dust [6-8].

The paper aims to present the [8] strategies for the conservation of historical textiles in Egypt. It shows new methods in the conservation of historic textiles, at least in Egypt. The paper aims

at knowing the kinds of fibers and dyes, stain, dust, and different damages in this object through different ways of investigation. The paper reports the conservation treatment of the object such as cleaning, removing the old adhesive and old restorations, completing loss parts, fixing separate parts and making a new display.

Description of object

It is a coarse Cotton mantle with length is 135cm. It is width at the shoulder 125cm, the height of sleeve 48 cm, the age of the mantle is more than 750 years old like the words which written at Almakrezy book Alsayed Ahmad Bn Ali Ibraheem Albadawy nicknamed "Alsayed.AL Badawi", witnessed some events such as the battle of Ain Ghalot and he attended the fall of the Fatimid state and the emergence of the Ayyubid state in 1250 AD. This mantle was found in the special room of Alsayed Albadawy and with an opening on the front with the length of the mantle. The original summer mantle and the newly summer mantles which their number is two.

I found the summer mantle down a number of layers It was put by the people and we have removed these layers in order to reach the original mantle. It was reached after two layers but was found to have some aspects of damage, such as stains that were found because of perfume. Also, has been established by some of the grubbiness that have become a suitable place for the growth of fungi and insects as well as the dust accumulated on them. All summer mantles are similar in color to red cotton, it is the same size and there is a slight difference in the opening of the mantle, the front is not decorated and does not bear writings.

Documentation and Examination

Visual documentation

The initial visual assessment revealed that the textile presented a poor conservation condition. The textiles were weak and very dirty since they covered with dust, soil and stains. In general, the object suffered from intensive surface damage resulting in fiber deformation, missing parts and holes especially along the objects edges. The fringes were weak and suffered from abrasive damage and tearing [9,10].

Optical and SEM documentation

The morphology of the surface of the wrapped cotton was investigated using Scanning Microscope (SEM) - a Quanta 200 ESEM FEG from FEI. Small samples taken and investigated under SEM to show the quality of the fibers as well as their damage aspects. SEM image showing the cotton fibers identified from different parts of the object. The fibers are extremely roughened, damaged, broken with transverse cracking and longitudinal splitting characterized by small scratches, small slits and holes. Furthermore, one can see the dust, dirt that covered the fiber [11-14].

Photograph documentation

High-resolution digital camera used for a documentation step. Photograph documentation used before, during, and after conservation process [15].

Testing the stability of dyes

Before starting the wet cleaning process. It is necessary to measure the sensitivity of dyed in the Historical mantle. Therefore, the colors are still when it is submerged in wet cleaning material that done by using small pieces of cotton. The cotton piece is wet and moved in a circular way over various areas of the mantle [16, 17].

Restoration Process

Mechanical cleaning

Surface cleaning means various mechanical cleaning operations that are used to remove damaged cavities on the textile surface. They are often dust and sand, as well as the remains and residues of insects. This grubbiness is mechanically linked to textiles, as this grubbiness are inside in the spaces between the capillaries and some between the threads and some of them and the textile folds. Surface cleaning methods include brushes of various types, vacuum cleaners and air blowers, along with other hand tools such as fryer and mixers [18].

The wet cleaning procedure

In most cases mechanical cleaning is not enough to remove stains on the surface of the archaeological textile, so we go to used wet cleaning by water and detergents.



Figure 1: The Historical Tunic that consist of three different textiles layers before the decomposition process. One can see that the main color is red color without any decoration unit.



Figure 2: Deteriorations aspects details of the historic tunic, one can see dirt and stain, separate parts, missing parts.

The choice of detergent is determined by the fiber and soil present in the fabric. pH indicator paper used to test the washing solution. Unless there is a possibility of damage, the textile is allowed to soak in the detergent solution for a period (15minutes). During these periods, enough solution is used to cover or submerge the specimen. This cleaning procedure used water with other detergent agents (Synperonic N), to increase the effectiveness of the cleaning process. The ratio was one-part detergent Synperonic N to 100 parts of distilled water. The water agitated by the hand to allow it to penetrate between the fibers to release the dirt particles, for 15 minutes. The bath temperature was 30°C in order to increase the

effectiveness of cleaning. Then a second cleaning bath with distilled water only applied by the conservator for 10 minutes again with water agitation and then a third bath with distilled water only, for

10 minutes. It also reduced the soiling, relaxed the fibers, removed the creasing and brightened the colors [7, 8, 19](Figure 1-6).

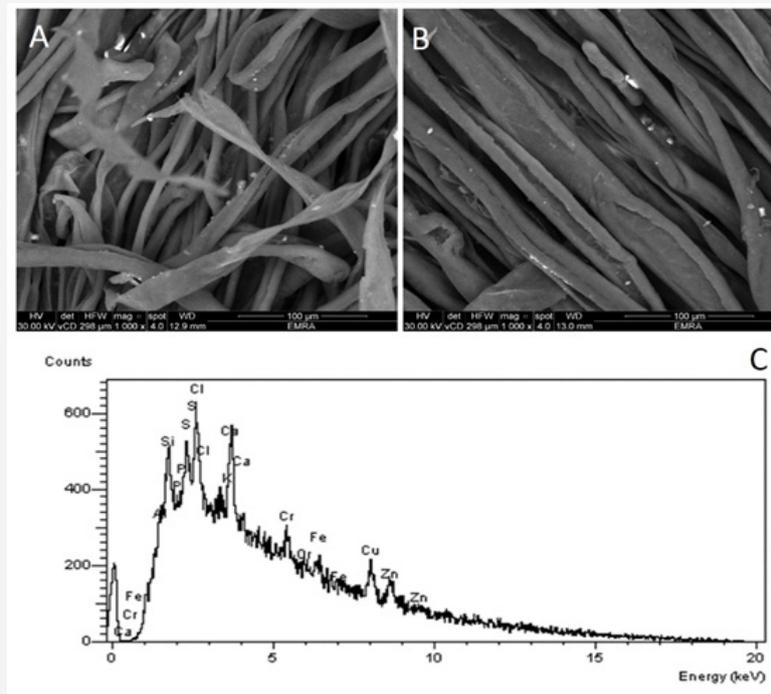


Figure 3: (A and B) show SEM images of historic tunic, it is clear that the main fiber materials of historical tunic is cotton fibers. 3C show EDX of the historic tunic, it is appearing main elements type of dirt and stain.



Figure 4: (A and B) show mechanical cleaning process of historic tunic to remove the separated dirt, while 3C show wet cleaning by using water and detergents to remove adhered stain in the tunic.



Figure 5: Support of the week and separated parts of the tunic. Furthermore, one can see bed linen support that adhered to the historic tunic by using silk thread.



Figure 6: Display method of the historic tunic after support and after finishing all the restoration process.

Drying process

The drying process of wet textiles can provide an opportunity to realign distorted fibers. The water acts as a lubricant reducing the stress of the fibers and allowing the straightening of the yarns with minimum risk. Blocking and drying considered a crucial part of wet cleaning process. To proceed with the next stage – drying – a table was prepared. Then, the textile pieces still wet from the wet cleaning placed on top of the table and covered with sheets of Japanese papers to absorb any water surplus [20, 21].

Final Support

A new linen support was prepared and washed well to remove chemical residues and prevent shrinkage later due to humidity changes. Then the new linen support was ironed to remove crease and was placed inside the historical shirt. Stitches were used with a very fine needle and fine silk thread to fix it into the tunic. In the beginning of the final stage, the edges of the tunic all around were attached by sewing with a small stitch technique (blanket stitch) and afterwards the edges of the missing and vulnerable parts were

attached by small stitches. Similarly, sized stitches were used to attach the body of the tunic. The tunic could be displayed either on a mannequin made of inert material or on any other suitable three-dimensional viewing system [16,22].

Conclusion

The article present restoring and maintaining historical tunic in environment uncontrolled museum. Scientific documentation processes using Visual documentation, Optical and SEM Documentation, X-ray diffraction analysis, testing the stability of dyes, and Photograph documentation. The documentation explained a lot of information about materials used in the manufacture of such textiles. This has helped in the development of the repair and maintenance plan as well as the selection of materials suitable for the restoration. Restoration and maintenance operations carried out on the historical piece.

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