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Using Acacia Nilotica Plant as an Anti-Bacterial and Fungal with Its Applied on an Archaeological Organic and Inorganic

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Abstract: The antifungal and bacterial industry has witnessed a great growth, as the number of discovered antigens has reached nearly *2,500*, but only about *60* species are actually used in the life field. Chemically manufactured products may have a negative effect and this effect may extend to the point of destruction, so the trend now in the manufacture of anti-fungal and bacterial is to use the organic antibiotics extracted from the original plant Specially In the pharmaceutical industry in gum and dental infections and eliminating bacterial growth in them, as well as it was used as an effective anti-toxin for the body, so we chose here to use the *Acacia Nilotica* plant as an anti-bacterial and anti-fungal. its use on the effects is safe and easy to use, so the *Acacia Nilotica* plant was prepared in the laboratory as a suspension solution and it was applied topically on four different types of bacteria and two fungi, After observing the positive effect resulting from the application of the *Acacia Nilotica* plant to the experimental samples using camera imaging, *Acacia Nilotica* plant was applied to an example of For organic traces *(a page from a manuscript)*, and an example of inorganic traces is *(a wall in a tomb contains a mural),* and from this research we can apply the antifungal and bacterial extracted from plants to treatment the archaeological organic and inorganic infected in an easy, safe and effective way.

Keywords: Manuscripts, Wall Painting, Fungi, Bacteria, Antibacterial, Antifungal, Acacia Nilotica

1. Introduction

Fungal and bacterial spots that appear on the surfaces of the archaeology are an one the problem of biological damage on the effects. In this research, we tried to solve this problem by preparing an antifungal and bacterial that would be an effective treatment for the effects whether the archaeology are organic and inorganic are diverse in shape, appearance and effect [1]. Relative humidity is the main factor in bacterial and fungal growth, as well as the oxidation processes that occur for materials that bind to color materials and the most important examples that affect the archaeology of bacterial and fungal spots as (Escherichia Coli and Aspergillus Niger) [2].

There are many experiments and attempts to avoid this infection, and these methods were inappropriate traditional methods for cleaning spots, such as mechanical cleaning, which may cause tears in archaeological organic, and cause scratches in an archaeological Inorganic and may also lead to cracks and loss of parts of the colored layers [3], and there are attempts to experiment with modern materials to avoid this infection, such as the use of lasers and the use of chemically manufactured antifungal and bacterial agents that may cause severe damage to the color materials [4], and the trend now is to use anti-Fungal and bacterial are made from natural plants that do not have any harm, such as the use of some oils [5]. Removing Fungal and spots at the same time and without damage to the archaeology is very important, and Acacia Nilotica plant is an easy-to-use and anti-bacterial and fungal, it has been applied in several areas, the most important of which is the removal of fungi and bacteria from the gums and teeth [6]. Research as an antifungal and

bacterial on an example of archaeological organic and another for archaeological inorganic.

2. Materials and Methods

2.1. Historical Samples

2.1.1. Archaeological Organic

Photo by the author

Figure 1. *Applied Manuscript of the Islamic era, red circle refers to bacteria and fungi point.*

It is the last page of (the Noble Qur'an), it is a manuscript dating back to 1300 AH, 1882 AD, it was written in the printing house of its writer (Hassan Ahmed Al-Toukhi) next to Al-Azhar Mosque Some dirt and fungal and bacterial spots appear on it, in addition to signs of human damage from some signatures and numbers of unknown meaning.

2.1.2. Archaeological Inorganic

Photo by the author

Figure 2. *(A, B) Applied wall painting of Gnuka Tomb in Minya city, Egypt. And red circle refers to bacteria and fungi point.*

The cemetery of *"Gnuka"* is located *7* km away in the mountainous area east of the city of Minya inside the village of *"Tahna Al-Jabal"*, which was called in the old days during the Pharaonic era as *"Riant"* and was built around *2750 BC* and was discovered by the Scottish explorer *"George Fraser"* in *1893 AD*, and these tombs are distinguished by the fact that they were carved into the rock in the form of rocky terraces [7].

2.1.3. Acacia Nilotica

The Acacia Nilotica plant is native to central and eastern Africa, and it is a perennial thorny tree of the legume family [8], sometimes reaching 4 meters in length in its natural composition on phosphorous, calcium, amino acids, phenolic and tannins [9].

http//www.webteb.com.

Figure 3. *Acacia Nilotica.*

2.2. Experimental Samples

2.2.1. Preparing of Acacia Nilotica

Acacia Nilotica material was prepared in the laboratory of the Biology Department - Faculty of Science - Minya University by grinding Acacia Nilotica plant well and then mixing it in 70% acetone as picture No. (4), then mixing the solution in the mixer for 3 hours continuously for three days as picture No.(5), and then the solution was left to dry completely for 10 days [10], and after drying the solution the substance was deposited as a suspension, this suspension was used by applying it directly to the experimental samples.

Figure 4. *Acacia Nilotica with acetone percent 70%.*

Figure 5. *Acacia Nilotica in mixture.*

2.2.2. Examination by (Digital Camera) of the Experimental Samples

Fungal and bacterial areas were taken from the applied archaeological samples and grown in Petri dishes.

Escherichia Coli
Serratia Sp
Staphylococcus Aurus
Pseudomonas Aeruginosa all refers to find "bacteria"
And the emergence of two types of fungi, namely
(Aspergillus Niger, fusarium oxysporium)

Acacia Nilotica suspension was applied to the samples Bacterial and fungal counted and then examined using a (Nikon3200d) camera, as the pictures (6-11).

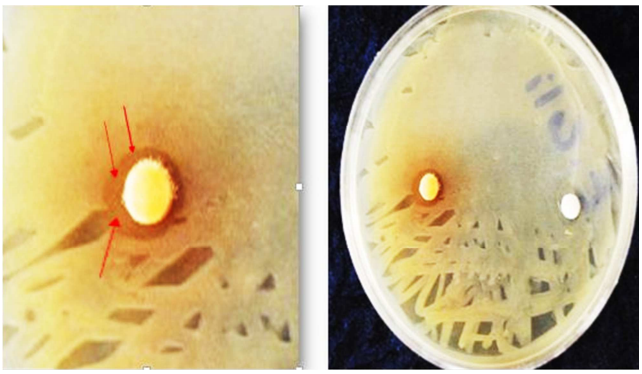

Figure 6. *Escherichia Coli.*

The red arrows indicate the ability of the suspension *Acacia Nilotica* to inhibit bacterial growth.

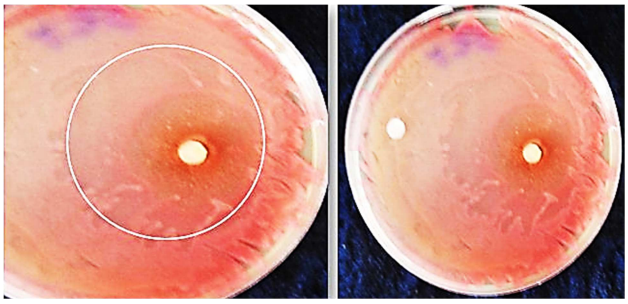

Figure 7. *Serratia Sp.*

The circle indicates the area over which the suspension of Acacia Nilotica plant was able to prevent bacterial growth.

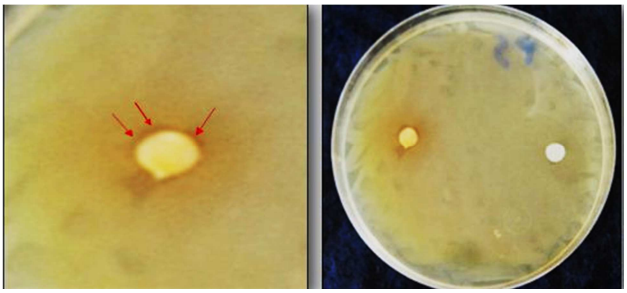

Figure 8. *Staphylococcus Auras.*

The red arrows indicate the ability of the suspension Acacia Nilotica to inhibit bacterial growth.

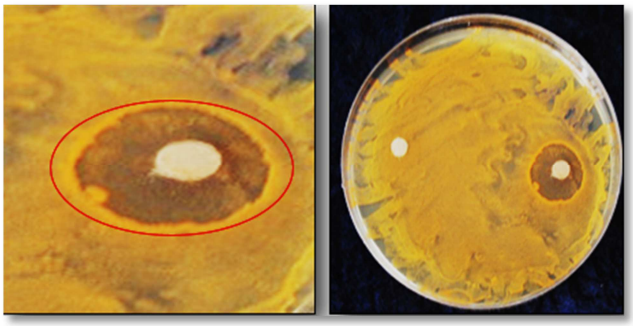

Figure 9. *Pseudomonas Aeruginosa.*

The circle indicates the area over which the suspension of Acacia Nilotica plant was able to prevent bacterial growth.

Figure 10. *Aspergillus Niger.*

The circle indicates the area over which the suspension of Acacia Nilotica plant was able to prevent fungal growth.

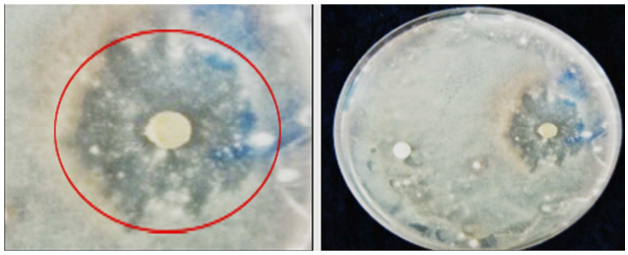

Figure 11. *Fusarium oxysporium.*

The circle indicates the area over which the suspension of Acacia Nilotica plant was able to prevent fungal growth.

2.3. Applied Samples

The *Acacia Nilotica* suspension was applied to applied samples that were subjected to bacterial and fungal attack (Some fungi and bacteria), the type of fungi and bacteria were identified from experimental smears work [11], and figure 12 shows the application of the suspension on applied samples by drip method.

Figure 12. *Acacia Nilotica dribs on applied samples.*

2.3.1. Applied Manuscript

Photo by the author

Figure 13. *(A) Applied manuscript before applied Acacia Nilotica.(B) Applied manuscript after applied Acacia Nilotica,(C) Applied manuscript after applied Acacia Nilotica using stereo microscope (250x) in faculty of fine arts, Minya University.*

2.3.2. Applied Wall Painting

Figure 14. *(A) Wall painting before applied Acacia Nilotica, (B) Wall painting after applied Acacia Nilotica., (C) Wall painting after applied Acacia Nilotica using stereo microscope (250x) in faculty of fine arts, Minya University, Photo by the author.*

3. Results

In the experimental application, the effect of the Acacia Nilotica suspension was tested on bacterial samples (Escherichia Coli, Serratia Sp, Staphylococcus Aurus, Pseudomonas Aeruginosa) and fungal samples (Aspergillus Niger, fusarium oxysporium(, The samples were selected as they appeared in the smears, and they are the most famous in archaeology, so the results of the experimental application were as shown in the following tables:

First, the effect of the suspension on the experimental Bacteria:

Table 1. *The effect of the suspension on experimental Bacteria.*

Type of bacteria	Great effect 85-100	Medium effect 75-85%	little effect 70-75%	no effect
Escherichia Coli		✓		
Serratia Sp	✓			
Staphylococcus Auras	✓			
Pseudomonas Aeruginosa		✓		

Second, the effect of the suspension on the experimental Fungi:

Table 2. *The effect of the suspension on experimental Fungi.*

Type of fungi	Great effect	Medium effect	little effect	No effect
Aspergillus Niger		✓		
fusarium oxysporium	✓			

As for the application of Acacia Nilotica suspension on the applied samples:

Table 3. *The application of Acacia Nilotica suspension on the applied samples.*

Applied sample	Great effect	Medium effect	little effect	No effect
manuscript	✓			
Wall painting	✓			

4. Discussion

When applying the suspension to experimental samples of bacteria and fungi, it turned out that the suspension had a very great effect in preventing bacterial and fungal growth by more than 87, By visual examination of the samples find that the suspension has separated the fungi and bacteria from the place of their feeding, and the fungi and bacteria are living organisms that analyze the nutrients of their food in order to absorb them, as they cannot obtain food except through absorption [12] " Absorptive mod of nutrition".

That is, they send enzymes to the zone in which they live, so these enzymes break down nutrients into their simple components and then absorb them. When it prevent the fungus and bacteria from doing this process, it may have killed them, which is what actually happened. From the process of resistance until his life does not end, so he mutates and clings to increase his ability to absorb food [13], and there are factors that help fungi and bacteria to resist, the most important of which is the amount of the antigen on it. The light entering on the fungus and bacteria during the application of the antidote, as well as the presence of water helps the fungus spread in large areas [14]. Which became clear when applying the suspension of the *Acacia Nilotica* plant to the applied samples that the rate of preventing fungal and bacterial growth was large, in order to take into account the avoidance of factors that help the fungus and bacteria to carry out resistance, so the distillation process was the ideal process to put the antifungal over the fungus, so we were able to control the amount of the antifungal, which prevented fungi and bacteria From resistance to mutation and coexistence, the amount of heat was also taken into account by reducing the temperature of the antibody to less than 5 degrees Celsius by placing it in the freezer, which helps prevent and kill fungal and bacterial growth [15].

5. Conclusion

When using the *Acacia Nilotica* suspension as an anti-fungal and bacterial, it must be placed in an environment that helps to play the role of preventing fungal and bacterial growth, and the most important of these factors is the temperature of the antifungal Less than 5%, the amount that is placed on the fungus and bacteria less, and the method of applying the antibody by drib, all of which helped improve the result upon application, the fungal and bacterial to activity stop in the application and the microscope was used to confirm to activity stop, which did not appear when examined with the last microscope and photographed with the camera. We recommend the use of *Acacia Nilotica* as anti-fungal and bacterial and increase the study and focus on it in the future.

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