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Experimental Studies on the Effect of Some Burial Environments on Bone Properties and Their Methods of Treatments with the Application on Some Archaeological Bones

By

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THESIS

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Summary

Bones artifacts are found a lot in museums store and excavation sites once the bone has discarded, it goes through different processes. These processes separated into two different categories: intrinsic and extrinsic factors. The intrinsic factors are those that take place within the bone**.** The extrinsic factors are those based on the environment surrounding the bone. Deterioration of bones in different types of soil depends on the type of soil and pH level in it. The bones in sandy soil were less distorted. In clayey soil the combination of high soil acidity, poor drainage, and heavy compaction produces rapid degradation of bones. Bones preservations in gravels depend on the acidity and permeability, and on whether the deposit in an aerobic and waterlogged. Bones in salty soil contain soluble salts, ground water and seawater can carry these salts into the pores of the artifact during burial leaving them behind when the water evaporates. Preservation on site is generally only possible where the material is kept damp until it has been lifted and transported to laboratory. Proper cleaning methods can disclose morphological and cultural features preserved on bones and can minimize damage caused by matrix dirt left in bones. Structural consolidation was best carried out with a polymer in an organic solvent solution. The polymer often used for consolidation was Paraloid B72. New bones in this study were prepared from sheep bones .The bone samples buried in four different types of soil such as salty soil, clay soil, sandy soil and ferruginous soil in different conditions. Fourier transform infrared spectroscopy gives information on the composition and crstallinity of the bone mineral; and at the same time gives an indication on the behavior of the protein material in bone. X-ray powder diffraction analysis was used to determine the crystallinity of modern and archaeological samples. Color changes were measured using CIE L* a* b* system. The total color difference (ΔE*) was calculated according to the equation: $\Delta E = (\Delta L)^2 + (\Delta a)^2 + (\Delta b)^2$. Polarized light microscopy involves examining thin transparent materials using polarized light. A scanning electron microscope was used to observe the surface morphology. The bones used in experimental works are discovered from Tell Tebilla. It locates in the East Delta, south of Dikrinis, 12 km. North of Mendes. The bones were in bad preservation state because it found in clay soil. Cleaning process, removing salts, completion missing parts and consolidation were applied in this bones preserve this bones from deterioration.

Key words

- Archaeological bones.
- Burial environments.
- pH.
- Deterioration.
- Conservation.
- FTIR.
- XRD.
- Polarized microscope.
- Color changes.
- Soil.

DEDICATION

I dedicate this thesis to my parents

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List of contents

List of Tables

List of figures