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Faculty of Archaeology

**Study on**  
**Some Operational Problems of Modified Inert Atmosphere**  
**Fumigation and Their Solutions -**  
*Applied on a Selected Wooden Artifact*

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# **Study on Some Operational Problems of Modified Inert Atmosphere Fumigation - *Applied on a Selected Wooden Artifact***

## **ABSTRACT**

The use of modified inert atmosphere (MIA) fumigation as an alternative to conventional chemical and physical pest control techniques has proven effectiveness in eradicating insect pests in museum collections. Nowadays MIA are conducted in rigid chambers whose fixed size limits their use whenever small, few or very large objects are to be treated. Therefore, the growing need for utilizing custom-size flexible systems seems to be everlasting. Conducting flexible systems is associated with some operational problems; as the difficulty of choosing the proper inert fumigant and maintaining its desired concentration over the treatment period, to regulate relative humidity to the range suitable for the materials of the artifacts to be treated, and to detect live insect individuals to a high level of accuracy. Incompetence in dealing with these problems, MIA treatment may fail, and artifacts may be jeopardized. Researches conducted to propose solutions to some of these problems still have their limitations.

This study focuses on the operational problems of MIAs and their solutions, highlighting the innovative approaches that overcome the limitations of conventional trials. It aims at providing comprehensive knowledge of the technology and technical aspects of carrying out MIA treatments, to guide implementing a proper MIA treatment to disinfest a polychrome wooden coffin at the Grand Egyptian Museum, Egypt. The thesis is divided into five chapters: Chapter 1: The Use of Modified Inert Atmosphere in Eradicating Insect Pests in Cultural Objects: *Introductory Background*; Chapter 2: Modified Inert Atmosphere Fumigation: *Operational Problems*; Chapter 3: Documentation and Examination of the Polychrome Ancient Egyptian Wooden Coffin under Study; Chapter 4: Determining the Modified Inert Atmospheric Parameters for Treatment of a Polychrome Wood: *Experimental Study*; and Chapter 5: Modified Inert Atmosphere Fumigation and Conservation Treatments of an Ancient Egyptian Polychrome Wooden Coffin: *Applied Study*

## KEY WORDS

Operational Problems

Modified Atmosphere

Anoxia

Inert Gas

Disinfestation

Insect

Artifact

Wood Conservation

Relative Humidity

Leakage

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