

hossam maghraby



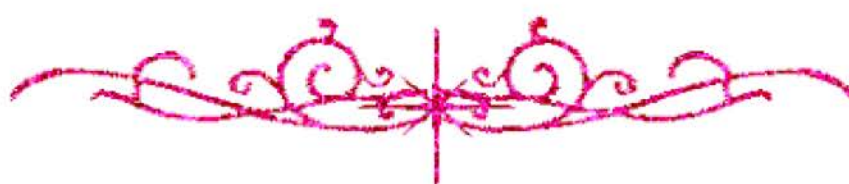
# بسم الله الرحمن الرحيم



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# شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم





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# جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

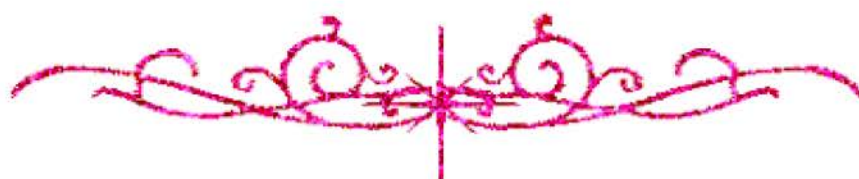
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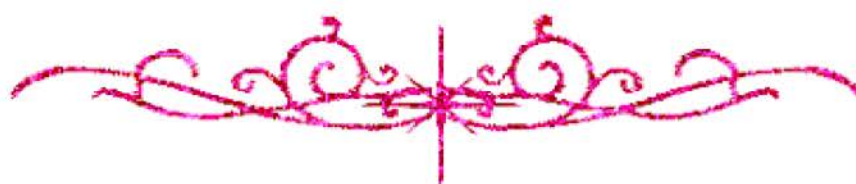
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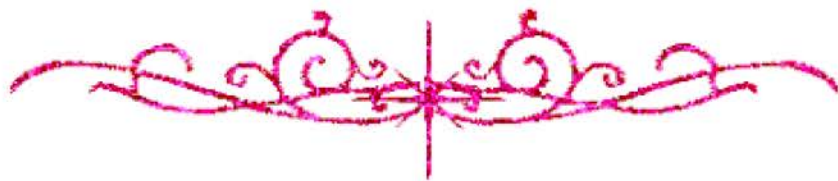




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بالرسالة صفحات  
لم ترد بالأصل



**B I C A I V**

**FATE AND BEHAVIOUR OF SOME TRACE METALS IN TWO SITES:  
GIRONDE ESTUARY (FRANCE) AND ROSETTA ESTUARY (EGYPT)**

**THESIS**

**Submitted to the Faculty of Science    Alexandria University  
for the Degree of Ph. D. in Science  
(Geological Oceanography)**

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***CHAPTER 1***  
***INTRODUCTION***

## 1. 1. General Outline:

No organic life can develop and survive without the participation of metals. Current research has revealed that life is as much inorganic as organic. So, due to the fact that heavy metals entering water ways from either natural or anthropogenic sources become strongly associated with the solid or sediment phase, these materials may accumulate to levels causing a potentially serious threat to the aquatic and benthic organisms. Efforts should be made to elucidate the role of the sediment by examining its adsorbing capacity for metals. Also it is of interest to study some of these metals according to their biological role.

Since the industrial revolution, the efforts of removing man-made pollutants from the natural environment have been unable to keep pace with the increasing amount of waste materials and a growing population that further exasperates the situation. This has often resulted in the transformation of lakes, rivers and coastal waters into sewage depots where the natural biological balance is severely upset and in some cases totally disrupted (Förstner, 1978)

With the growth of technology, two groups of substances in particular have a lasting effect on the natural balance in aquatic systems:- nutrients, which promote unrestricted biologic growth and, in turn, oxygen depletion, and sparingly degradable synthetic chemicals and other waste substances which often constitute multiple effects on the aquatic ecosystems. Experts estimate that industrial and domestic waste water introduces up to a million pollutants into natural waters. These include substances that are not considered dangerous, although many of them add a disagreeable odor or taste to the waters and other significantly upset the ecosystem without being directly



harmful to humans. Other group do, however, have direct and indirect influences on the human organism and can cause serious damage. Substances such as polycyclic aromatics, pesticides, radioactive matter, and trace metals directly endanger human life. This group of pollutants are of note in two respects: firstly, trace metals are not usually eliminated from the aquatic ecosystems by natural processes, in contrast to most organic pollutants, and secondly, most metal pollutants are enriched in minerals and organic substances. Toxic metals such as mercury, cadmium and copper tend to accumulate in bottom sediments from which they may be released by various processes of remobilization, and in changing form can move up the biologic chain, thereby reaching human beings where they produce chronic and acute ailments.

The fact that metals have a biological significance is contradictory to the classical idea that inorganic chemistry is restricted to non-living chemical systems, whereas the living world falls within the realm of organic and biochemistry. Modern research has led to a broader understanding of the inextricability of overlapping ideas in the field of applied chemistry, such as occur in nature, and stresses the need to diverge from artificial compartmentation. It has borne out by experimental evidence that the role of heavy metals in living systems follows the pattern of natural availability and abundance of the same metals occurring in nature (Williams, 1967 ; Vahrenkamp, 1973 and Wood 1974 , 1975).

## 1.2. Environmental problems with trace elements: