شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

بعض الوثائق الأصلية تالفة

بالرسالة صفحات لم ترد بالأصل

EVALUATION OF SOME HEAVY METAL LEVELS IN THE MAIN WATER PIPE LINES IN SHEBIN EL-KOM

Thesis

SUBMITTED FOR PARTIAL FULFILMENT OF MASTER DEGREE

IN FORENSIC MEDICINE AND CLINICAL TOXICOLOGY

By

Fayrouz Ibrahim Nour El-Din

M.B., B.Ch.

Supervised by

Prof. Dr.
Samy Moustafa Badawy
Professor and Chairman of Forensic Medicine and Clinical Toxicology Dept.
Faculty of Medicine, Menoufiya Univ.

Prof. Dr.
Sahar Mohamed Kamel
Professor of Forensic Medicine and Clinical Toxicology
Faculty of Medicine, Alexandria Univ.

FACULTY OF MEDICINE
MENOUFIYA UNIVERSITY
1997

EVALUATION OF SOME HEAVY METAL LEVELS IN THE MAIN WATER PIPE LINES IN SHEBIN EL-KOM

Thesis

SUBMITTED FOR PARTIAL FULFILMENT OF MASTER DEGREE

IN FORENSIC MEDICINE AND CLINICAL TOXICOLOGY

By

Fayrouz Ibrahim Nour El-Din

M.B., B.Ch.

Supervised by

Prof. Dr.

Samy Moustafa Badawy

Professor and Chairman of Forensic Medicine and Clinical Toxicology Dept.
Faculty of Medicine, Menoufiya Univ.

Prof. Dr.

Sahar Mohamed Kamel

Professor of Forensic Medicine and Clinical Toxicology
Faculty of Medicine, Alexandria Univ.

FACULTY OF MEDICINE
MENOUFIYA UNIVERSITY
1997

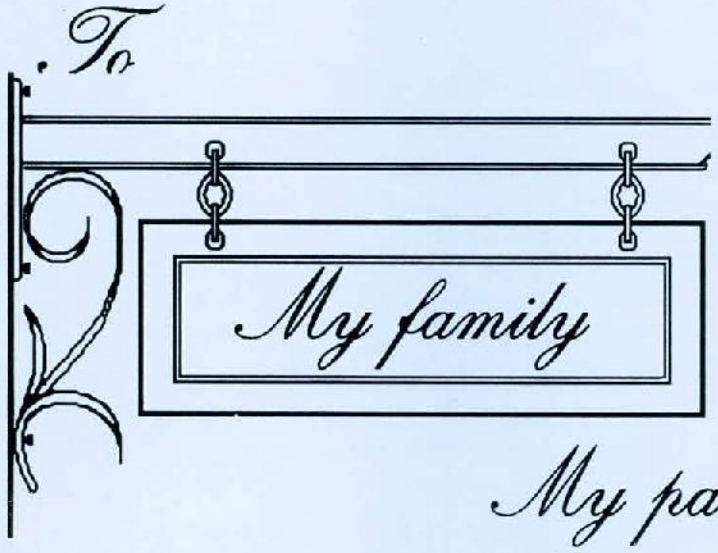
Acknowledgement

First and foremost thanks to ***ALLAH****, the most helpful and beneficent.*

I would like to express my great appreciation and deepest gratitude to my advisor and ***Professor Dr. Samy Moustafa Badawy,*** *Vice Dean of Postgraduate and Research, Professor and Chairman of Department of Forensic Medicine and Clinical Toxicology, Menoufiya University for his close and wise guidance, follow up, suggestion, devotion in solving many of the problems which arose throughout the course of this study and encouragement.*

I would like to express my deep thanks to ***Professor Dr. Sahar M. Kamel,*** *Professor of Forensic Medicine and Toxicology, Alexandria University for her utmost help and continuous encouragement throughout the work, her kind advice and sincere support added very much to this work.*

Last but not the least, I would like to express my deepest gratitude to all those who have contributed to the completion of this work.



My parents

My husband

My children

Yasmin & Ahmed

CONTENTS

LIST OF ABBREVIATIONS

$Al_2(SO_4)_3$	Aluminium sulphate
CCL_4	Carbon tetrachloride
$CHCl_3$	Chloroform
$CoCl_2$	Cobaltous chloride
$HgSO_4$	Mercuric sulphate
HNO_3	Nitric acid
$KMnO_4$	Potassium permenganate
mcg/dL	Microgram/decilitre
µg/L	Microgram/Litre
$Na_2C_2O_4$	Di-sodium oxalate
$Na_2S_2O_3$	Di-sodium thiosulphate
$Na_3C_6H_5O_7$	Sodium citrate
$Na_4P_2O_7$	Sodium pyrophosphate
$NaC_2H_3O_2$	Sodium acetate
NH_4OH	Ammonium hydroxide
WHO	World Health Organization

INTRODUCTION

WATER POLLUTION

Water is one of the most essential constituent of the human environment. Man needs it for his existence. It is the key factor in human health and well-being. Without it there would be no life of any kind on the earth.[1] So throughout the history of man kind, access to safe water has played an important role. Wars have been fought and massive migrations have taken place to gain and guarantee access to safe water.[2]

It is difficult to imagine any clean and sanitary environment without water. Invariably, the progress of sanitation throughout the world has been closely associated with availability of water, and the larger the quantity and the better the water quality, the more rapid and extensive has been the advance of public health.[1]

Sources of Water:

Generally water sources are classified as follow:-

1) Rain Water:

In some rural and isolated area rain water can be collected from roofs or from specially prepared catchment areas to be

stored in cisterns or special reservoir for communal use.[1] Its quality is generally good being free from minerals, however it may be contaminated by gases and particles as it washes out the atmosphere, e.g. acid rain in industrialized areas.[3,4]

2) Surface Water:

Surface water is major source of public water supply system. It comes from precipitation of rain fall, melting of snow and from growth water that enters streams and rivers from springs.[5] Surface water has certain merits. It is more abundant, softer than ground water, and has intermediate mineral content. However it is most frequently polluted by transportation wastes, industrial wastes, human wastes or shore wastes. It is usually contaminated, highly coloured and often turbid so surface water must be treated before safely use.[4]

3) Ground Water:

It is infiltration of rain and surface water to be stirred in the water-bearing stratum or aquifer, then it later forms springs and wells[1]. Ground water is of high sanitary quality because it is not near to pollution sources as surface water.[6] Also its passage through the soil allow improving bacteriological quality. It is normally free from turbidity, requires no

treatment and cheaper in cost of supply. However it tends to be highly mineralized than surface water because of the solution of minerals as they percolate through the ground.[3] Ground water may be contaminated by sewage along the well casing and by direct surface contamination into the ground water stratum.[4]

Many impurities are found in untreated water which may render it unsafe for public water supplies. Safe water must be free from taste, colour and odour. It should have no dissolved minerals or gasses as well as no suspended matters, or pathogenic organisms. When water has any of these objectionable impurities in considerable quantity, it is considered unsuitable for use as it may cause diseases. Hence standards for drinking water became target with the progress of pollution. W.H.O. adopted to separate drinking water standards for Europe and developing countries of Asia, Africa and Latin America recognizing that those standards are used primarily as guide to countries for establishing their own standards.[1]

Water For Use is Classified Into:-

- *Potable Water:* Which is one that is safe to drink, pleasant to taste and can be used for domestic purpose.