Radionuclide Concentration in Some Environmental Samples from Red Sea Coast And its Associated Health Hazards

A Thesis
Submitted for the degree of Master of Science As a partial fulfillment for requirements of the Master of Science

By
Amr Ibrahim Abd El-Azeam
B.Sc. (Physics), 2007, Ain Shams University

Supervised By
Prof. Dr. Soad Abdel Monam El-Fiki
Physics Department, Faculty of Science,
Ain Shams University

Dr. ElsayedSalama Ahmed
Physics Department, Faculty of Science,Ain Shams University

Dr. Hanan Mohamed Diab
Atomic Energy Authority

(2014)

AinShamsUniversity
Faculty of Science
Physics Department

Degree: M.Sc. degree in Physics

Title: Radionuclide Concentration in Some Environmental Samples from Red Sea Coast and its Associated Health Hazards.

Name: Amr Ibrahim Abd El-azeam

Thesis Advisors **Approved**

Prof. Dr. Soad Abdel Monam El-Fiki ……..
Physics Department, Faculty of Science,
AinShamsUniversity

Dr. ElsayedSalama Ahmed. …….
Physics Department, Faculty of Science,
AinShamsUniversity

Dr. Hanan Mohamed Diab …….
Atomic Energy Authority

AinShamsUniversity
Faculty of Science
Physics Department

Name: Amr Ibrahim Abd El-azeam

Degree: M.Sc. degree in Physics

Department: Physics Department

Faculty: Faculty of Science

University: Ain Shams University

Graduation date: 2007, Ain Shams University

Registration date: 12/11/2012

Grant date: 8/9/2014

بِسْمِ اللّهِ الرَّحْمَنِ الرَّحِيمِ

وَقُل رَّبِّ زِدْنِي عِلْمًا

In the Name of Allah, the Most Gracious, the Most Merciful

"..**And Say: My Lord! Increase me in Knowledge"**

"TAHA/114, the Glorious QurAn"

To

Mother,
Father,
Brothers,
Sisters,
And
Dear Wife.

Acknowledgement

All gratitude is due to ALLAH the most merciful, who guided and gave me strength to complete this work.

I wish to express my sincere thanks and gratitude to my team of supervisors.

I wish to express my deep thanks to ***Prof. Soad Abdel Moneim El-Fiki****, professor of Radiation physics at Physics Department, Faculty of Science, Ain Shams University, for her supervision, honest guidance, continuous encouragement and trustful help through the experimentation and writing the manuscript.*

I would like to thank with gratitude ***Dr. El-sayed Salama Ahmed****, assistant professor of Radiation Physics at Physics Department, Faculty of Science, Ain Shams University, for his kind supervision, kind encouragement, his continuous support and kind guidance throughout the present work.*

I would like to thank ***Dr. Hanan Mohamed Ahmed Diab,*** *assistant professor of Radiation physics at National Center for Nuclear Safety and Radiation Control, Atomic Energy Authority, for her valuable help in practical applications, her advice and generous assistance and continuous helpful discussions leading always towards more perfection and achievement of this work.*

I wish to express my deep thanks to my wife for her patience, encouragement and understanding and my deep thanks with gratitude to all of my family specially my parents for their continuous support and encouragement during my research.

CONTENTS

Chapter 2

Theoretical Aspects

Chapter 3

Experimental Work

Chapter 4

Results and Discussions

List of Tables

List of Figures

Abstract

Name: Amr Ibrahim Abd El-Azeam

Title: Radionuclide Concentration in Some Environmental Samples from Red Sea Coast and its Associated Health Hazards.

Submitted To: Physics Department, Faculty of Science, Ain- Shams University

The specific concentration and activity levels of six main coastal regions (all lies along the Western Coast of Suez Gulf) where studied. Twenty-two soil samples were collected from the investigated regions. These regions are Ain Sokhina, Al Zafrana, Ras Gharib, Ras Shokeir, Gebel El Zeit and Hurghada. Using HPGe γ-ray spectrometry, analysis of the collected samples has been carried out to determine the concentrations of ^{226}Ra, ^{232}Th and ^{40}K in samples. Moreover, radon exhalation rates, effective radium content and radon emanation power were measured by using SSNTDs in the form of CR-39. The obtained average concentrations values of ^{226}Ra, ^{232}Th and ^{40}K were lower than the national and worldwide average values also the average radium equivalent activity value was below the defined limit of 370 Bq/kg. The external and internal hazard indices were found to be less than 1, indicating low radiation doses. Also, it was found that samples have exhalation rates comparable with the worldwide average values. In general the activity levels of the studied regions are within the worldwide average and the public received doses within the safe limit of exposure.

KEYWORDS: Natural activity; HPGe; radon; CR-39; Suez Gulf.