



**Ain Shams University**  
**Faculty of Science**  
**Biochemistry Department**

**Natural product and low dose  $\gamma$ - irradiation as  
inhibitors of chemically induced hepatic and  
renal carcinogenesis in rats.**

A Thesis  
submitted in partial fulfillment of the requirements for the  
master degree of science in Biochemistry

By

**Marwa Mohammed Mohammed Elhelw**  
B.Sc. in Biochemistry (2008)

Under supervision of

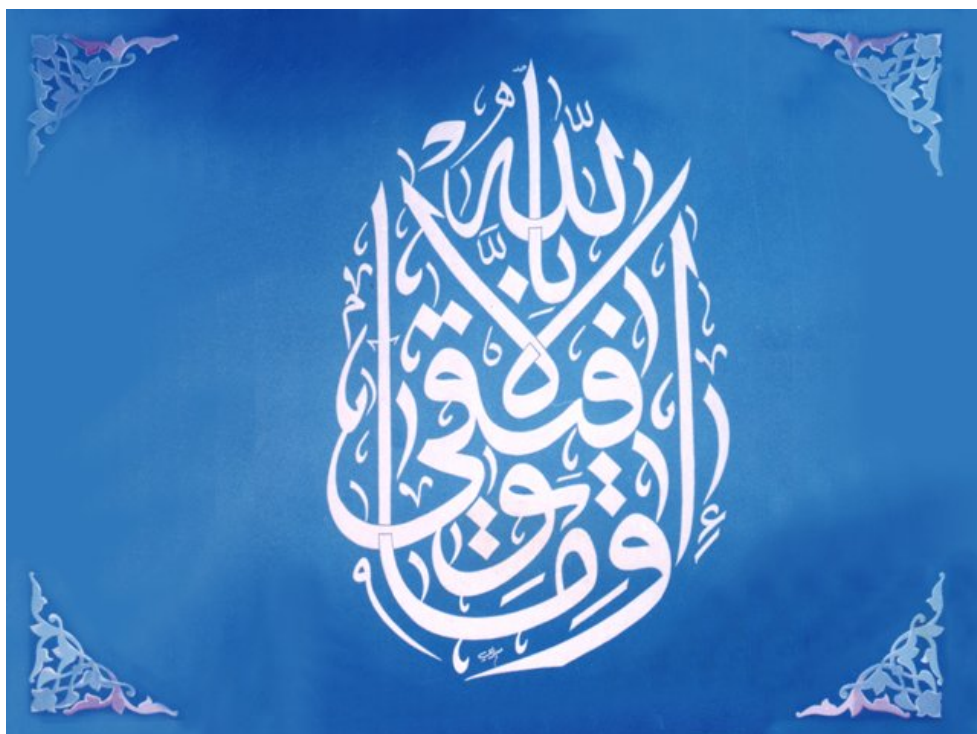
**Prof. Dr. Mohamed Ragaa Mohamed**  
Professor of Biochemistry & Molecular Biology  
Faculty of Science  
Ain Shams University

**Prof. Dr. Somaya Z. Mansour**  
Professor of Biochemistry  
National Center for Radiation  
Research & Technology  
Atomic Energy Authority

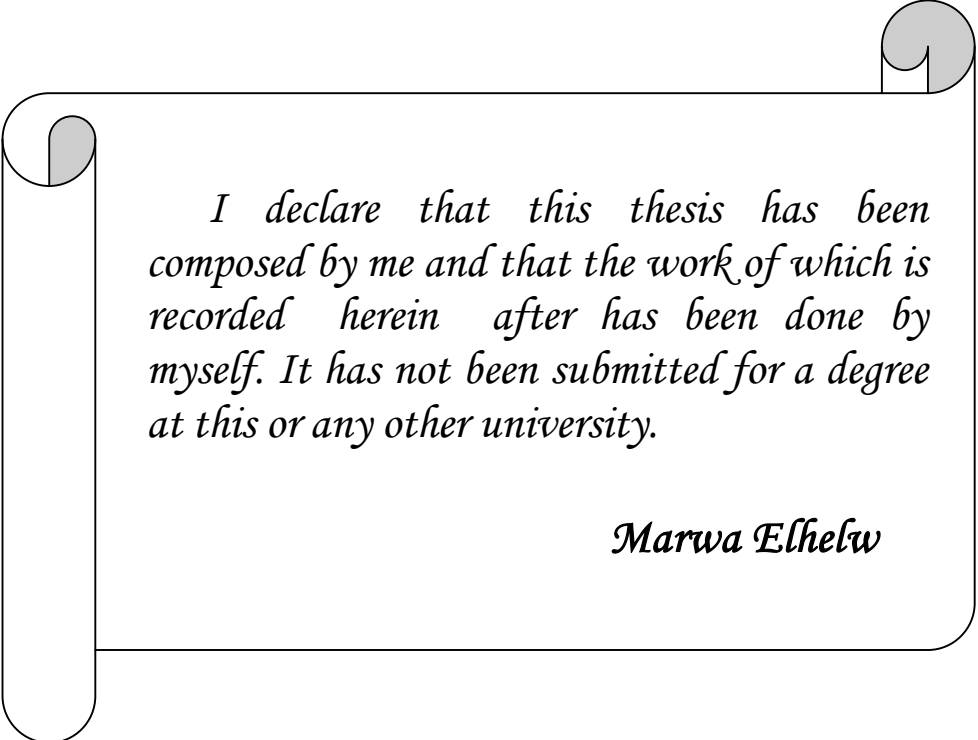
**Prof. Dr. Neamat H. Ahmed**  
Professor of Cell Biology  
National Center for Radiation  
Research & Technology  
Atomic Energy Authority

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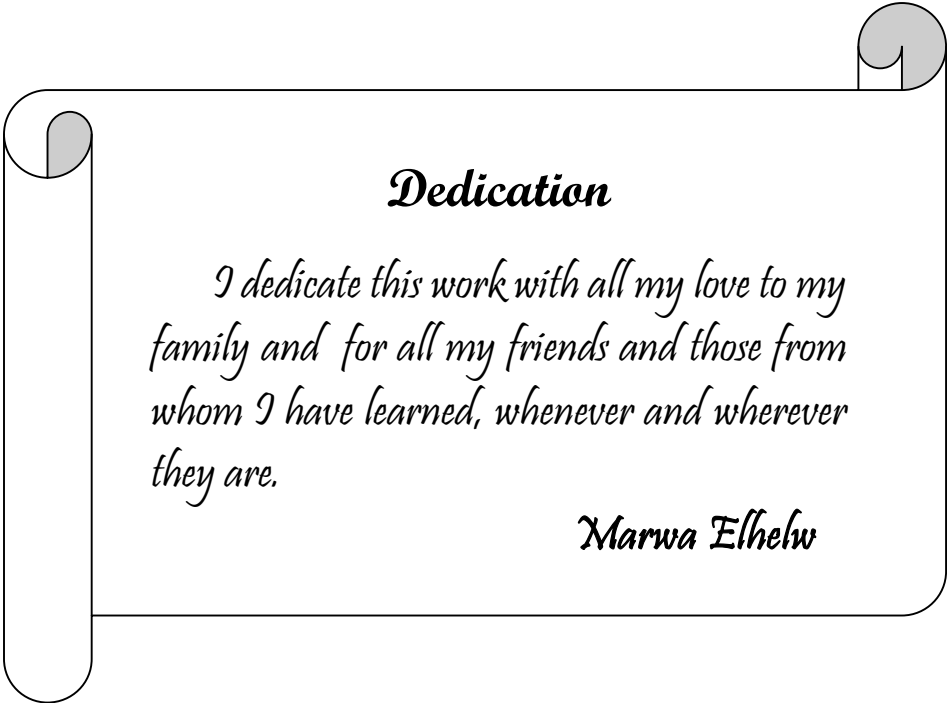




*I declare that this thesis has been composed by me and that the work of which is recorded herein after has been done by myself. It has not been submitted for a degree at this or any other university.*

*Marwa Elhelw*





## ***Dedication***

*I dedicate this work with all my love to my family and for all my friends and those from whom I have learned, whenever and wherever they are.*

***Marwa Elhelw***



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# CONTENTS

|                                                                                | Page |
|--------------------------------------------------------------------------------|------|
| List of Abbreviations.....                                                     | I    |
| List of Figures.....                                                           | IV   |
| List of Tables.....                                                            | VIII |
| <b>Abstract</b> .....                                                          | 1    |
| <b>Introduction</b> .....                                                      | 3    |
| <b>Aim of the work</b> .....                                                   | 8    |
| <br><b>I. Review of Literature</b>                                             |      |
| I.1. Cancer.....                                                               | 9    |
| I.1.1. Hepatocellular carcinoma (HCC).....                                     | 10   |
| I.1.1.1. Factors influencing the risk of HCC development.....                  | 11   |
| I.1.1.2. Diagnosis of HCC .....                                                | 15   |
| I.1.1.3. Clinical Signs and Symptoms of HCC .....                              | 15   |
| I.1.1.4. Treatment of HCC .....                                                | 15   |
| I.1.2. Renal cell carcinoma (RCC).....                                         | 16   |
| I.1.2.1. Risk factors of RCC .....                                             | 17   |
| I.1.2.2. Clinical Signs and Symptoms of RCC .....                              | 17   |
| I.1.2.3. Diagnosis and Staging of RCC.....                                     | 18   |
| I.1.2.4. Treatment of RCC.....                                                 | 18   |
| I.2. Oxidative Stress and Cancer.....                                          | 19   |
| I.3. The Role of Oxidative Stress in Chemical Carcinogenesis ..                | 21   |
| I.4. Ferric nitrilotriacetate (Fe-NTA).....                                    | 22   |
| I.5. Apoptosis and carcinogenesis .....                                        | 25   |
| I.5.1. Caspase cascade.....                                                    | 27   |
| I.5.2. Extrinsic and intrinsic apoptosis signaling .....                       | 27   |
| I.6. Nutraceuticals: phytochemical polyphenolic compounds<br>(flavonoids)..... | 31   |
| I.7. Ginkgo biloba extract .....                                               | 33   |
| I.7.1. Antioxidant Activities of G. biloba extract .....                       | 35   |
| I.7.2. Anticancer effects of G. biloba extract .....                           | 37   |
| I.7.3. Ginkgo biloba and Caspase-3 .....                                       | 39   |
| I.8. Low Dose Gamma Irradiation.....                                           | 40   |

## II. Materials and Methods

|             |                                                                     |    |
|-------------|---------------------------------------------------------------------|----|
| II.1.       | Materials .....                                                     | 44 |
| II.1.1.     | Experimental animals .....                                          | 44 |
| II.1.2.     | Radiation source.....                                               | 44 |
| II.1.3.     | Ginkgo biloba treatment.....                                        | 45 |
| II.1.4.     | Preparation of Fe-NTA solution.....                                 | 45 |
| II.1.5.     | Experimental design .....                                           | 46 |
| II.1.6.     | Collection of samples.....                                          | 48 |
| II.1.7.     | Instruments Used in the Practical Part .....                        | 49 |
| II-2.       | Methods                                                             |    |
| II.2.1.     | Biochemical methods .....                                           | 50 |
| II.2.1.1.   | Liver function tests .....                                          | 50 |
| II.2.1.1.a. | Determination of alanine aminotransferase (ALT)<br>activity .....   | 51 |
| II.2.1.1.b. | Determination of aspartate aminotransferase (AST)<br>activity ..... | 53 |
| II.2.1.2.   | Kidney function tests .....                                         | 55 |
| II.2.1.2.a  | Quantitative estimation of creatinine in plasma ...                 | 55 |
| II.2.1.2.b. | Quantitative estimation of urea in plasma .....                     | 56 |
| II.2.1.3.   | Oxidative stress Parameters .....                                   | 58 |
| II.2.1.3.a. | Determination of lipid peroxide level (LPx) .....                   | 58 |
| II.2.1.3.b. | Determination of nitric oxide (NO) .....                            | 59 |
| II.2.1.4.   | Antioxidant parameters .....                                        | 63 |
| II.2.1.4.a. | Determination of reduced glutathione content<br>(GSH).....          | 63 |
| II.2.1.4.b. | Determination of glutathione peroxidase(GPx)<br>activity .....      | 66 |
| II.2.1.4.c. | Determination of superoxide dismutase(SOD)<br>activity.....         | 68 |
| II.2.1.4.d. | Determination of catalase activity.....                             | 71 |
| II.2.2.     | Determination of Caspase-3 .....                                    | 73 |
| II.2.3.     | Histopathological Preparation .....                                 | 79 |
| II.2.4.     | Statistical analysis.....                                           | 80 |

|               |                                                                                                                                                |     |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <b>III.</b>   | <b>Results</b>                                                                                                                                 |     |
| III.1.        | The Effect of G. biloba and low dose $\gamma$ - radiation on Liver function enzymes of ferric-nitrilotriacetate (Fe-NTA) treated rats.....     | 81  |
| III.1.1.      | Alanine aminotransferase (ALT).....                                                                                                            | 81  |
| III.1.2.      | Aspartate aminotransferase (AST).....                                                                                                          | 82  |
| III.2.        | The Effect of G. biloba and low dose $\gamma$ - radiation on kidney function parameters of ferric-nitrilotriacetate (Fe-NTA) treated rats..... | 86  |
| III.2.1.      | Creatinine .....                                                                                                                               | 86  |
| III.2.2.      | Blood urea nitrogen (BUN).....                                                                                                                 | 87  |
| III.3.        | The Effect of G. biloba and low dose $\gamma$ - radiation on oxidative stress markers of ferric-nitrilotriacetate (Fe-NTA) treated rats.....   | 90  |
| III.3.1.      | lipid peroxide level (LPx).....                                                                                                                | 90  |
| III.3.2.      | Nitric Oxide (NO).....                                                                                                                         | 94  |
| III.4.        | The Effect of G. biloba and low dose $\gamma$ - radiation on antioxidant markers of ferric-nitrilotriacetate (Fe-NTA) treated rats.....        | 98  |
| III.4.1.      | Reduced glutathione (GSH).....                                                                                                                 | 98  |
| III.4.2.      | Glutathione peroxidase (GPx).....                                                                                                              | 104 |
| III.4.3.      | Superoxide dismutase (SOD).....                                                                                                                | 108 |
| III.4.4.      | Catalase .....                                                                                                                                 | 112 |
| III.5.        | The Effect of G. biloba and low dose $\gamma$ - radiation on Caspase-3 activity of ferric-nitrilotriacetate (Fe-NTA) treated rats.....         | 118 |
| III.6         | Histopathological Studies.....                                                                                                                 | 122 |
| III.6.1.      | Liver .....                                                                                                                                    | 122 |
| III.6.2.      | Kidney .....                                                                                                                                   | 128 |
| <b>IV.</b>    | <b>Discussion</b> .....                                                                                                                        | 134 |
| <b>V.</b>     | <b>Summary</b> .....                                                                                                                           | 152 |
| <b>VI .</b>   | <b>References</b> .....                                                                                                                        | 157 |
| <b>VII .</b>  | <b>Arabic Summary</b> .....                                                                                                                    |     |
| <b>VIII .</b> | <b>Arabic Abstract</b> .....                                                                                                                   |     |



***LIST OF ABBREVIATIONS***

|               |                                        |
|---------------|----------------------------------------|
| <b>AEA</b>    | Atomic Energy Authority                |
| <b>AFP</b>    | Alpha feto protein                     |
| <b>ALT</b>    | Alanine aminotransferase               |
| <b>Apaf-1</b> | Apoptotic protease activating factor-1 |
| <b>AST</b>    | Aspartate aminotransferase             |
| <b>ATP</b>    | Adenosine triphosphate                 |
| <b>BUN</b>    | Blood urea nitrogen                    |
| <b>CAT</b>    | Catalase                               |
| <b>CT</b>     | Computerized tomography                |
| <b>DISC</b>   | Death inducing signaling complex       |
| <b>DNA</b>    | Deoxyribonucleic acid                  |
| <b>EDTA</b>   | Ethylene diamine tetra acetic acid     |
| <b>FasL</b>   | Fas ligand                             |
| <b>Fe-NTA</b> | Ferric-nitrilotriacetate               |
| <b>GB</b>     | Ginkgo biloba                          |
| <b>GSH</b>    | Reduced glutathione                    |
| <b>GSH-Px</b> | Glutathione peroxidase                 |
| <b>GSSG</b>   | Oxidized glutathione                   |
| <b>Gy</b>     | Gray                                   |
| <b>HBV</b>    | Hepatitis B virus                      |
| <b>HCC</b>    | Hepatocellular carcinoma               |