



شبكة المعلومات الجامعية

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ





شبكة المعلومات الجامعية



شبكة المعلومات الجامعية

التوثيق الالكتروني والميكرو فيلم

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
على هذه الأفلام قد اعدت دون أية تغيرات



يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

في درجة حرارة من 15 – 20 مئوية ورطوبة نسبية من 20-40 %

To be kept away from dust in dry cool place of
15 – 25c and relative humidity 20-40 %



شبكة المعلومات الجامعية



بعض الوثائق الأصلية تالفة



شبكة المعلومات الجامعية



بالرسالة صفحات
لم ترد بالأصل



**EVALUATION OF RADIOCHEMICAL PURITY
OF THE COMMERCIALY AVAILABLE
 ^{99}Mo - $^{99\text{m}}\text{Tc}$ GENERATORS ELUTES
A COMPARATIVE STUDY**

A THESIS

Submitted to the Department of physics, Aswan
Faculty of Science , South Valley University

**For the Degree of M . Sc.
(PHYSICS)**

by

Ali Gad El-Rab Abd Alla
(B.Sc. 1992)

Supervision

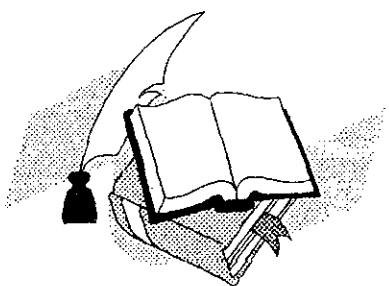
Prof. Mohamed A. Abdeen ,MD
Prof of Radiotherapy and Nuclear Medicine Dept.
Cairo University

Dr. Mohamed A.Abd El-Rahman
Assoc .Prof. of physics
physics Department
Faculty of science , Aswan

Dr. Abd Alla Al-Tawil MD
Assoc. Prof. Nuclear Medicine
Nuclear Medicine Dept
Faculty of Medicine Cairo

2000

B1...ca



ACKNOWLEDGMENT

ACKNOWLEDGEMENT

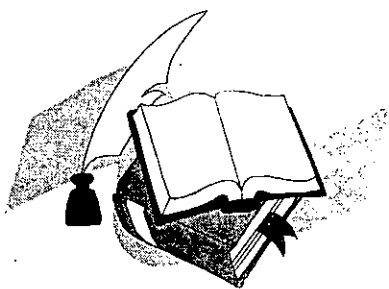
All gratitude is due to **God** almighty who guided and aided me to bring forth to light this thesis I wish to express my sincere thanks to my supervisor **Prof. M. A. Abdeen** from Radiotherapy & Nuclear Medicine Department, Faculty of Medicine, Cairo University ,and Head of Aswan oncology center ,for suggesting the present study, for indeed beyond my power of expression .Such gratitude. I have towards him is profoundly felt but hardly expressible .I will never forget the many hours of his time, he spent in discussion as well as his profound interest.

The author is deeply grateful to **Dr. M.M.A. Abd El-Rahman** Assoc. Prof .,physics Department, Faculty of Science, Aswan, South Valley University , for his supervision ,continues discussion, and reading and correcting the manuscript .

My special thanks are due to **Dr.Abd Alla El- Tawil** Assoc. Prof, Nuclear Medicine Department, Faculty of Medicine, Cairo University, for his continues help . The present studies have been done in the framework of the mentioned projects.

I extend my sincere thanks to the Vice-Dean **Prof. A.I.Mohmoud** for help and assistance also my deep thanks to Dean of Faculty of Science& Prof. **A. E. Belal** Head of Physics Department, Faculty of Science, Aswan, South Valley University, for constant help, advice and encouragement. Special thanks are due to Staff Members of Aswan Cancer Institute for care and kind help .

Ali .G. Abd Alla .



CONTENTS

CONTENTS

Subject -----	Page
ABSTRACT -----	***
ACKNOWLEDGMENT -----	***

CHAPTER 1

(REACTORS PRODUCTION , RADIOCHEMICAL AND RADIONUCLIDE PURITY)

1-1 INTRODUCTION-----	1
1-2 Mode of production of diagnostic radionuclide-----	1
1-3 Reactors production -----	2
1-4 Logistic of supply -----	4
1-5 Radiochemical purity -----	8
1-6 Radionuclide purity -----	8
1-7 Chemical purity -----	8
1-8 Biological purity -----	9
1-9 Technetium radiochemistr radiochemical analysis ---	10
1-10 Electrophoresis -----	15
1-11 Gel filtration -----	15
1-12 High-performance liquid chromatography (HPLC) -	17
1-13 Solvent extraction -----	18
1-14 Production of radionuclide-----	20
1-14 . 1 Cyclotron -produced radionuclides -----	20
1-14 . 2 Reactor- produced radionuclides-----	23
1-14 . 3 Fission (n, f) reaction -----	25
1-14 . 4 Equation for production of radionuclides -----	26

Subject -----	Page
---------------	------

CHAPTER 2

RADIOACTIVE DECAY

2-1 Isomeric transition -----	29
2-2 Alpha decay -----	31
2-3 Beta decay -----	34
2-4 Double beta decay -----	35
2-5 Gamma decay -----	37
2-6 Kinetics of radioactive decay -----	37
2-6.1 Radioactive decay equations -----	37

CHAPTER 3

EXPERIMENTAL

3-1 Sample collection -----	40
3-1.1 Working procedures -----	40
3-2 Radionuclide generators -----	41
3-2.1 Elutec technetium (Tc -99m) generator -----	41
3-2.3 Method of use (Tc -99m) generator -----	43
3-3 Calculation of the max. eluable activity of technetium- -----	44
3-3.1 Calculation of the weight of technetium in the eluate --	44
3-4 Deluxe isotope calibrator -----	46
3-4.1 Product description -----	46