بسم الله الرحمن الرحيم

قال تعالى:

(قل هل يستوي الذين يعلمون والذين لا يعلمون

انما يتذكر أولوا الالباب) (الزمر 9)

صدق الله العظيم
Dedication

To the fountain of patience and optimism and

.........hope

....... To my dear mother and father

To those who have demonstrated to me what

.......is the most beautiful of my brother's life

To the people who paved our way of science

.....and knowledge
To those who teach me and

show me the way of knowledge

To the taste of the most beautiful moments
with my friend who endured this long process
with me, always offering support and love

......dear my best brother Kifah

Acknowledgment

I am using this opportunity to express my gratitude to
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Table of contents

<table>
<thead>
<tr>
<th>Title</th>
<th>Page No</th>
</tr>
</thead>
<tbody>
<tr>
<td>الایه القرانیه</td>
<td>I</td>
</tr>
<tr>
<td>Dedication</td>
<td>II</td>
</tr>
</tbody>
</table>
# Acknowledgment

# Table of contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of tables</td>
<td>VI</td>
</tr>
<tr>
<td>List of figures</td>
<td>VII</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>VIII</td>
</tr>
<tr>
<td>Abstract</td>
<td>IX</td>
</tr>
<tr>
<td>Abstract (Arabic)</td>
<td>X</td>
</tr>
</tbody>
</table>

## Chapter one

### Introduction .1.1

1

#### Overview .1.1.1

1

#### Operator errors .1.1.2

2

#### Typical applications .1.1.3

3

#### Initial Calibration .1.1.4

3

#### Problem of the study .1.2

4

#### Rational and importance of this study .1.3

5

#### Objective .1.4

5

#### General objective .1.4.1

5

#### Specific objective .1.4.2

5

## Chapter tow

### Literature review

#### Introduction .2.1

7
Chapter three

Materials and methods

Materials .3.1 22

Dose calibrator .3.1.1 22
Construction 3.1.1.1 22
Type of radionuclide-dose calibrator 3.1.1.2 24
Characteristic of dose calibrator 3.1.1.3 24
Radionuclide source 3.1.2 25
Other tools 3.1.3 25
Methods 3.2 26
Physical Inspection 3.2.1 26
Background test 3.2.2 27
Precision test 3.2.3 27
Accuracy test 3.2.4 28
Constancy test 3.2.5 29
Linearity test 3.2.6 29
Geometrical dependence test 3.2.7 30
Area of study 3.3 31
Duration of research 3.4 31

Chapter four
Results

Results 4 33
Chapter five
Discussion and conclusion

Discussion 5.1 39
Conclusion 5.2 40
Recommendation 5.3 41
References 5.4 42

List of tables

Table (1): Dose calibrator reading of Background test.......................... 33
Table (2): Dose calibrator reading of precision test.............................33
Table (3): The dose calibrator reading of accuracy test..........................34
Table (4): The dose calibrator reading of reproducibility test....................34
Table (5): The dose calibrator reading of linearity test

Table (6): The dose calibrator reading of Geometrical dependence test

List of figures
Figure (1): Dose calibrator construction.................................23

Figure (2): The Veenstar (Vik-202) 5051 radionuclide dose calibrator..25

figure (3): Relation between time and dose caliber reading.............35

figure (4): Relation between activity and time............................36
Abbreviation

IAEA International Atomic Energy Agency
NRC Nuclear Regulation Commission
ANSI American National Standard Institute
NCRP National Council on Radiation Protection
RDRC Radioactive Drug Research Committee
FDA Food And Drug Administration
IND Investigational New Drug
USP-NF United State Pharmacopeia-National Formulary
ICRP International Commission of Radiation Protection
QA Quality Assurance
QC Quality Control
DRL Diagnostic Reference Level
PET Positron Emission Tomography
NM Nuclear Medicine
AAPM American Association of Physics in Medicine
Abstract

This study is concerned with quality control of the dose calibrator which is located in the Radiation Therapy and Nuclear Medicine Center of Khartoum. The objective of the study is to evaluate the dose calibrator performance. Quality control tests were performed in the period between Dec/2015 and Jan/2016. They included general observations to the components of the device, background measurements, precision, accuracy, continuity, linearity, and geometric dependency. Two standard radionuclides Cs-137 and Tc-99m were utilized for the purpose of the study and has come to the following results, all the components of the device work properly and readings for background radioactivity were in the acceptable range (0.562 ± 0.45). Concerning Precision testing, the error of the reading was (0.39%), and it was within the accepted range. Concerning accuracy testing, the error of the readings was within (0.27%), and it was within the
accepted range. For constancy test the error value of readings was (2.47%) , and it was also within the accepted range and the error of readings concerning linearity testing was (3.7%) , and it was within the accepted range and finally the results of geometric dependency showed that the correction factor was within the accepted range(0.95-1.05). All the results showed that the devise has good performance and there is no need for any correction and maintenance.

المستخلص:

هذه الدراسة تعني بضبط الجودة لجهاز قياس الجرعة الإشعاعية المستخدم في مركز الخرطوم للعلاج بالأشعة والطب النووي.

تهدف الدراسة إلى تقييم إداء جهاز قياس الجرعة الإشعاعية وقد أجريت اختبارات ضبط الجودة في الفترة من ديسمبر 2015 إلى يناير 2016 وقد وشملت الملاحظات.
العككامه لكوونككات الجهككاز , قياسككات الخلفيككه الشعككعاعيه , الصككحه ، الدقككة,السككتمراريه
،الخطيه واالعتماديه الهندسيه.

استخدمت اثنان من المصادر المشعه المعياريه لغرض الدراسه وهي السيزيوم 137والتكنيشيوم 99 م وقد خلصت الدراسه الي النتائج التاليه :

جميع مكونات الجهاز تعمل بشكل جيد وقراءات الخلفية الإشعاعية في المدى المسموح به (0.562 ± 0.450) وفيما يختص باختبار الدقة فان الخطأ في القراءة كان (0.39%) وهو في المدى القبول اما اختبار الصحة فقد اظهر ان الخطأ في القراءة هو (0.27%) وهو ضمن المدى القبول .كلما يختص باختبار الاستمرارية فان الخطأ في القراءة هو (2.47%) وهو في المدى القبول اما اختبار الخطيه فقد اظهر ان الخطأ في القراءة بلغ نسبه (3.7%) وهو كذلك ضمن المدى المقبول واخيرا اظهر الاختبار الهندسي ان معامل التصحيح هو ضمن المدى المسموح به (0.95-1.05).وقد اظهرت نتائج الدراسه ان اداء الجهاز جيد وليس هناك حاجة للتعديل والصيانة .
Chapter one