الآيه

بسم الله ارحمن الرحيم

قال تعالي :

(قل هل يستوي الذين يعلمون والذين لايعلمون

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 everyone who supported me throughout the course of this MSc research. Thanks to them for their guidance, valuable criticism and friendly advice during the project work. This project would not have been possible without

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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

SPECT Single Photon Emission Computed Tomography

: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 radionuclide's 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 الدراسه تعني بضبط الجوده لجهاز قياس الجرعات الاشعاعيه المستخدم في مركز الخرطوم للعلاج بالاشعه والطب النووي .

تهدف الدراسه الي تقويم اداء جهاز قياس الجرعات الاشعاعيه وقد أجريت اختبارات ضبط الجوده في الفتره من ديسمبر 2015 الي يناير 2016 وقد وشملت الملاحظات

العامه لمكونات الجهاز , قياسات الخلفيه الاشعاعيه , الصحه ، الدقة,الاستمراريه ،الخطيه واالاعتماديه 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 الخلفيه الاشعاعيه في المدي المسموح به ((0.45+0.562 وفيما يختص باختبار الدقه فان الخطأ في القراءه كان ((0.39% وهو في المدي المقبول اما اختبار الصحه فقد اظهر ان الخطأ في القراءه هو 0.27%)) وهو ضمن المدي المقبول .فيما يختص باختبار الاستمراريه فان الخطأ في القراءه هو ((2.47% وهو في المدي المقبول اما اختبار الخطيه فقد اظهر ان الخطأ في القراءه بلغ نسبه 3.7%)) وهو كذلك ضمن المدي المقبول واخيرا اظهر الاختبار الهندسي ان معامل التصحيح هو ضمن المدي المدي المسوح به (0.95-1.05) .وقد اظهرت نتائج الدراسه ان اداء الجهاز جيد وليس هناك حاجه للتعديل والصيانه .

Chapter one