

Abstract - ID: 19

Author(s): Mutaman Kehail (**Presenter**), University of Gezira
Yasir Abdelrahim, University of Gezira, Faculty of Science
Elrashied Mohamed Ali, University of Gezira, Faculty of Health and
Environmental Sciences

Title: Unconventional use of X-ray to increase productivity of Sesame (*Sesamum indicum* L.) and Sunflower (*Helianthus annuus* L.) Seed-oil

Abstract:

X-rays are electromagnetic waves used in medicinal diagnosis. The X-rays waves can cause the organism's cell to mature. The present work aimed at studying the quantitative effect of X-ray in increasing the productivity of sesame (*Sesamum indicum* L.) and sunflower (*Helianthus annuus* L.) seeds oil. Samples of sesame and sunflower seeds which were brought from the local market of Wad Medani City, Gezira State, Sudan, were submitted to a dose of 33.4 sec. of X-ray using X-ray machine at the Dept. of Radiation, Nuclear Medicine Institute, University of Gezira. The treated seeds were then grown in the experimental farm, University of Gezira. After maturation, the harvested seeds of sesame and sunflowers were submitted to proximate analysis for the whole seeds and quality characteristics for the extracted oils. The study tests followed the standards and the recommended methods. The results of the study showed that, the x-ray treated samples have significantly increased the oil content in both samples compared to controls. Both oil samples showed matched values of iodine, fatty acid, peroxide, saponification, and Refractive index values to the global standard ranges. It can be concluded that, the x-ray treatment (at a considerable very low dose) paved the way for a simple method to increase the production of oils from sesame and sunflower plants without deterioration in their quality characteristics. The recommendation of this study was to run similar studies on the other oil- or cash crops.

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Abstract - ID: 23

Author(s): Elrashied Mohamed Ali (**Presenter**), University of Gezira, Faculty of Health and Environmental Sciences
Mutaman Kehail, University of Gezira

Title: Quality Characteristics for the Nutritional Contents in the Irradiated Groundnut (*Arachis hypogaea* L.) Seeds

Abstract:

Groundnut (*Arachis hypogaea* L.) is one of the important legume crops of tropical and semiarid tropical countries, where it provides a major source of edible oil and vegetable protein. The objective of this study was to determine the quality characteristics for the nutritional contents in the irradiated groundnut seeds. This study was conducted at Radiation Laboratory, Nuclear Medicine Institute and Food Analysis Laboratory, Faculty of Engineering and Technology, University of Gezira, Sudan. The seed samples were divided to five groups: two groups were treated with two doses of X-rays (33.4 sec. and 200.2 sec.) and the other two groups were treated with two doses of gamma rays (200 CGY and 800 CGY) in addition to control. Each group of the treated seeds was sown in the Experimental Farm, University of Gezira. The nutrient contents (oil, protein, ash, moisture, fiber and carbohydrate) in addition to mineral contents were determined in the harvested seeds. The results showed that, the resultant seeds which treated with different radiations lead to produce mutants with relatively high content of oils, proteins, mineral contents (ash), moisture and fiber, but with low carbohydrate contents. Also the low dose of x-ray (33.4 sec) gave better results than the higher dose (200.2 sec), and x-ray gave better results than gamma ray. Further studies should be conducted to ascertain the safety use of plants from seeds treated with radiation as a source of oil and vegetable protein.

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Abstract - ID: 63

Author(s): Maged ABDO (**Presenter**), Faculty of Sciences, Chouaïb Doukkali University

Are you an invited speaker/presenter to ICRM2018?: No

Title: Monitoring of Radioactive Aerosol Activities in Homes Contain Internal Well

Abstract:

Natural radioactive aerosols form as a result of the decay of Radon isotopes emitted from the soil surface, building materials and rocks into the atmosphere. The solid Radon progenies exist in attached form to aerosol particles or unattached form and can be cause acute health effects when they are inhaled in diverse environments. Moreover, densely ionizing alpha particles which are emitted by deposited short- lived decay products of Radon ^{218}Po and ^{214}Po can interact with biological tissue in the lungs leading to damage and causes lung cancer. Evaluation of radioactivity and monitoring of aerosols in the different environments are important to assess the potential hazard of radiation exposure. The study of indoor Radon and outdoor have been carried out for some dwelling (with or without internal well) of El-jadida city, Morocco. In the context of passive dosimetry, we have using Solid State Nuclear Track Detectors SSNTD (CR-39).

In the present study, the average values of indoor Radon concentration (with/without well) 140.8/91.24 Bq.m^{-3} and a standard deviation 12.23/13.12. While the average value of outdoor Radon concentration 21.6 Bq.m^{-3} . The average values of Radon progeny concentration 64.8/ 41.97 Bq.m^{-3} and a standard deviation 5.6/ 6; while the average value of outdoor Radon progeny concentration 9.95 Bq.m^{-3} . The obtained experimental results were agreement with the published data by other workers in the different countries. Our obtained results can be used as reference information to assess any changes in the radioactive background level of the atmosphere in the survey area.

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Abstract - ID: 87

Author(s): Abdulmalek Rajkhan (**Presenter**), King Abdulaziz University
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Khaled Alsafi, KAUH Nuclear Medicine Department
Ahmad Subahi, King Saud university for Health Specialities

Are you an invited speaker/presenter to ICRM2018?: No

Title: A GAMOS Monte Carlo Simulation of Radiation Workers Eye Lens Dose in Nuclear Medicine Using CT DICOM Image

Abstract:

Abstract

A substantial decrease in eye lens dose was recommended by the ICRP 116 in 2012. The previous dose limit was 150 mSv per year while the new dose limit is set at 20 mSv per year. This reduction in dose has accompanied deep studies of the eye dose with radiation workers. This paper will present a sophisticated medical dosimetry technique using GAMOS to simulate the dose to workers' eyes in the University's Nuclear Medicine Department. A CT image of head and neck has been acquired and an eye lens structure contour was drawn. Radioactive point and open sources like Tc99m and I-131 in the nuclear medicine department were assessed in the simulation. The technique finds that there is a difference between point and open source eye lens dose scored. The simulation turned out that the eye lens structure receives a certain dose in each irradiation direction. Also, the position and height of the open source (patient) governs the eye lens dose. The workers' eye lens dose was found less than the regulatory limit drawn by the ICRP but can approach it if all factors like position and size of patient are not given attention to.

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Abstract - ID: 91

Author(s): Sarah Hagi (**Presenter**), King Abdulaziz University
Mawya Khafaji, King Abdulaziz University Hospital

Are you an invited speaker/presenter to ICRM2018?: Yes

Title: ArabSafe Initiation: Urging National Mammography Facilities to Know their Doses

Abstract:

ArabSafe has launched early 2017 to adhere to the Bonn Call for Action in the Arab World^{1,2}. This initiative aims to impact the current diagnostic imaging practice, support self-regulation, increase awareness of radiation safety of patients, workers, and the public, and promote a radiation safe culture in all Arab countries.

In Saudi Arabia, several diagnostic imaging providers are establishing local Diagnostic Reference Levels (DRLs) for imaging modalities including mammography to quantify patient exposure doses, optimize, and benchmark their practice. This should be a continues process and not only for research purposes. In addition, performing quality control (QC) tests on equipment to comply with international regulations is not enough to ensure patient safety.

Data was collected from a mammography unit for 12 months at King Abdulaziz University hospital from December 2016 during which DRLs were being established and QC tests were conducted regularly. A total of 1445 scans were performed during that period; median mean glandular dose of 4.89 mGy (ranging from 0.43mGy to 31.22mGy). The data showed that over 90(6%) patients received a high dose during their mammographs. This high dose was due to either the number of views and magnifications performed or to the low force used during acquiring the image. Keeping in mind that the Mammography Quality Standards Act (MQSA) enacted in 1994 by the US congress ensures dose limit for a mammogram is 3 mGy ³. The high scan doses have exceeded this limit and could not have been picked up without continuous monitoring of patient doses.

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Abstract - ID: 350

Author(s): ABDEL FATAH AHMED (**Presenter**), Department of Medical Physics- Faculty of science and Technology - Alneelain University

Are you an invited speaker/presenter to ICRM2018?: No

Title: Assessment of Biological and Health Effects of Radiofrequency and Microwaves Radiation on Albino Rats Spleen

Abstract:

This work was conducted to investigate the effects of radio frequency and microwaves radiation emitted from a mobile telecom base stations on the spleen of Wister albino rats (*Rattus norvegicus* Album). Ninety six male rats were directly exposed to three radiation intensities (10.5 $\mu\text{W}/\text{cm}^2$, 0.6 $\mu\text{W}/\text{cm}^2$ and zero level). The experimental animals were divided into three groups. Group A, represent the control, was not exposed. Group B, was exposed to radiation of power density 10.5 $\mu\text{W}/\text{cm}^2$ and at a distance of 10 meter from the base of transmitter. Group C received radiation with power density 0.6 $\mu\text{W}/\text{cm}^2$ at a distance of 50 meter from the base of tower. Eight rats of each group were examined after six weeks and were then removed from the experiment. After 12 weeks another eight rats of each group were tested to investigate the effects of base-stations radiation. The radiated rats were exposed for 12 hours/day; throughout the exposure periods to assess the effect of RF/MW radiation on rats' spleen. Histopathological studies were conducted to investigate the structural changes in the spleen tissue after exposure to this type of radiation. The results showed distinguished different in all investigated parameters. The microscopic results of irradiated rats shown different changes in their spleens structure (e.g clear brown Pigment of the wall of cells, hypofusion, heamosidrosis, hemorrhage, and hyper plasia of lymphoid follicles) .The research group concluded that exposure to mobile tower radiation can cause several damages to the rats spleen and change their spleens structure at tissue

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Abstract - ID: 354

Author(s): Najla Al-Harbi (**Presenter**), King Faisal Specialist Hospital & Research Centre
Sara Bin judia, KFSHRC
Ghazi Alsbeih, KFSHRC

Are you an invited speaker/presenter to ICRM2018?: No

Title: Reduced HPV Infection and Genetic Over-Transmission of TP53 72C Polymorphism Lower Cervical Cancer Incidence in Saudi Women

Abstract:

Objective: Cervical cancer is very common worldwide that is treated by combination of surgery-chemo-radiotherapy, particularly brachytherapy. The incidence of cervical cancer is unexplainably low in Saudi women. We used this paradigm to study the association between human papillomavirus (HPV) infection and genetic predisposition in *TP53* G72C single nucleotide polymorphism (SNP).

Methods: Patients treated between 1990 and 2012 were reviewed and a series of 232 invasive cervical cancer cases were studied and compared to 313 females' controls without cancers. *TP53* G72C SNP was genotype by direct sequencing. HPV was detected and genotyped in tumor samples using HPV Linear Array.

Results: Cervical cancer incidence showed bimodal curve with a first peak at 42.5 years and a relative rebound at 60.8 years. HPV proofed positive in 77% of patients (significantly below 85%-99% worldwide estimate; $P = 0.001$). Sixteen HPV genotypes were detected, mostly 16 (75%) and 18 (9%). While no difference was observed between cancer and controls, *TP53* G72C was significantly associated with HPV-positive tumors (Odds Ratio = 0.57; 95% Confidence Interval: 0.36-0.90; $P = 0.016$). The protective C-allele was significantly over-transmitted in the population ($P < 0.0003$).

Conclusions: The combination of relative low HPV infection and protective *TP53* 72C allele over-transmission provide plausible explanation for the low incidence of CxCa in our population. Therefore, HPV screening and host SNP genotyping may provide more relevant biomarkers to gauge the risk of developing cervical cancer. Supported by NSTIP-KACST 12-MED2945-20 (RAC# 2130 025).

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Abstract - ID: 389

Author(s): Krishna Mishra (**Presenter**), KFSHRC
Subramanian Pulicat, King Faisal Specialist Hospital & Research Centre
Belal Moftah, KFSH&RC
Ghazi Alsbeih, KFSHRC

Are you an invited speaker/presenter to ICRM2018?: No

Title: Development of Gamma-H2AX Assay for Radiation Biodosimetry in Saudi Arabia

Abstract:

Introduction: The establishment of reliable and accurate biodosimetry is important for the estimation of absorbed dose in exposed individuals or population. This is required for triage, medical treatment and management of radiological casualties. The aim of this study was to develop a γ -H2AX based quick and reliable biodosimetric methods for estimation of dose received. The assay can be utilized to measure absorbed dose *ex-vivo* and *in-vivo* after diagnostic or therapeutic exposure. Moreover, it can also detect full or partial body irradiation.

Methods: Peripheral blood lymphocytes were isolated by histopaque after 30 minutes of exvivo radiation exposure to the whole blood. Fixed, permeablised and probed using anti- γ -H2AX antibodies. The immunofluorescence of 10000 cells were measured using flow cytometry and automated using Metapher microscope.

Results: Dose response calibration curve was established using the yields of γ -H2AX immunofluorescence at different doses (0 to 5 Gy). The γ -H2AX foci fluorescence was linearly dependent on radiation dose up to 5 Gy. The calibration curve $Y=0.76\pm 0.1 D+1.36\pm 0.04$. The kinetics of disappearance of γ -H2AX foci was also evaluated.

Conclusion: Data show that this assay can be utilized to measure absorbed radiation dose ranging between 0.25 to 5 Gy. In contrast with cytogenetic dicentric chromosome assay, the γ -H2AX foci assay is fast and reliable that can be performed at regular diagnostic laboratories holding cytofluorimetry facility particularly in the 1st 24 hours following suspected accidental radiation exposure. Supported by KFSHRC Operational Transformation Initiatives #31: Integrated Biomedical Physics Centre: Delivery of precision radiation Medicine and RAC# 2170 005.

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Abstract - ID: 403

Author(s): Abdelrahim Suliman (**Presenter**), National Ribat University, Sudan

Are you an invited speaker/presenter to ICRM2018?: No

Title: Radiogenic radiation risk from Cardiac Computed Tomography Procedures

Abstract:

INTRODUCTION: The Recent technical advancements in CT have resulted in a remarkable growth in the use of CT imaging in clinical practice. CT scanning is accompanied by high radiation doses. Radiation dose equivalent range during the scan radiation cross-sectional between 2.0 and 21.0 mSv

OBJECTIVE. The objective of this study was to measure patient dose during cardiac CT procedure from four different hospitals equipped with CT of 128 slices patients and to compare dose length product (DLP) based estimates of effective dose .

MATERIALS AND METHODS. A total of 84 patients were investigated in this study with different clinical indications. Multislices CT 128 slices were used in all four hospitals. Effective doses were also calculated from the respective DLPs using published conversion coefficients that depend only on body region.

RESULTS. The mean patient age (years), weight (kg), and body mass index (BMI(kg/m²)) were 48.7±11, 81.9±12, 31.3±6, respectively. The tube voltage (kVp) and tube current were ranged between 100 to 140 and 50 to 850, in that order. The overall mean and range of patients' dose values of CTDIvol and DLP were 34.8±15 (3.7-117) , 383.8±354 (46.0-3277.0). The mean and the range of effective dose was 5.4±5 (0.64-45.9).

CONCLUSION. Patient dose showed wide variation between different hospitals and even in the same hospital. The dose in one hospital is almost double the patient doses at other three hospitals these variations in patients suggest the need to optimize the radiation doses and established diagnostic reference levels (DRL). Patient doses within the range of previous studies

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Author(s): Mohamed Suliman (**Presenter**), Sudan University of Science and Technology, College of Medical Radiologic Sciences

Are you an invited speaker/presenter to ICRM2018?: No

Title: Estimation of Effective Radiation Dose and Cancer Probability in Intravenous Urography Using Computed Radiography System

Abstract:

Intravenous Urography (IVU) is one of the most common radiographic procedures during the management of renal system disorders due to their numerous indications. This study aimed to measure the radiation dose and estimating the risks resulting from exposure to X-rays during IVU. A total of 50 patients were examined in certain hospitals in Khartoum, Sudan. The average age of the samples was 38.44 ± 14 years, and the average of height weight and BMI were 1.68 ± 0.1 , 68.68 ± 12 and 24.28 ± 4.07 respectively. The mean of exposure factors kVp, mAs were 74.04 ± 3.1 and 33.64 ± 4 respectively and the average of number of films per procedure was 5.72 ± 1.49 . The mean ESAK was 2.1 ± 0.64 mGy and the mean effective dose was 0.131 ± 0.04 mSv. The overall cancer risk for IVU procedures was 5.85 per million procedures. The mean ESAK and effective doses of this study is the lowest compared to previous studies locally and internationally. This can be attributed to usage of CR and reduction of the number of films per procedure. The study showed that the impact of digital technology made considerable dose reduction. The radiation risk is very low compared to the previous studies.

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