The objective of this work was the establishment and application of an indirect method that used a spectral model based on generalized simulated annealing algorithm to determine the spectrum of clinical linear accelerators photons based on the transmission curve. Analysis of the spectra was made by analytical determination of dosimetric quantities and related parameters.

Equivalence between Solid Water and printed PLA plates for 6 MV clinical photon beam - An assessment using thermoluminescent dosimetry

VALERIANO, C.C.S., Instituto de Pesquisas Energéticas e Nucleares – IPEN.
MORENO, C.S., Hospital Israelita Albert Einstein
CORRÊA, E.L., Instituto de Pesquisas Energéticas e Nucleares – IPEN.
SAKURABA, R.K., Hospital Israelita Albert Einstein
CAMPOS, L.L., Instituto de Pesquisas Energéticas e Nucleares – IPEN.

Presenter: CAMPOS, L.L., Instituto de Pesquisas Energéticas e Nucleares – IPEN., lcrodri@ipen.br

Three dimensional models of anatomical structures, produced by rapid prototyping are being adopted for medical application as hemodynamics studies and maxillofacial surgery planning. Models with geometrical accuracy can be achieved using medical images as MRI or CT and produced using polyurethane, polylactic acid and epoxy resins[1]. When a volume of tissue equivalent material is used to simulate an interaction of radiation, this volume is given by the name phantom [2]. Plates with different thickness were printed using a 3D printer using a filament of PLA. As the standard material it was used plates of Solid Water RMI-457. The plates of PLA and Solid Water were irradiated using a Linear Accelarator of 6 MV. For each material were performed irradiations for the same thickness of material, in each of them were used thermoluminescent dosimeters of LiF:Mg,Ti to measure the absorbed dose. This work aims to compare the thermoluminescent (TL) dosimetric behavior of PLA plates printed using a 3D printer and solid water plates in the absorbed dose evaluation using clinical photon beams.

COMPARISON BETWEEN AAA AND ACUROS XB CALCULATION ALGORITHMS FOR VMAT TREATMENT PLANNING OF BRAIN MULTIPLE METASTASES USING OSL DOSIMETRY

Daniel Villani, Instituto de Pesquisas Energéticas e Nucleares - IPEN/USP, Carolina dos Santos Moreno, Hospital Israelita Albert Einstein, Vinicius Demanboro Gonçalves, Hospital Israelita Albert Einstein, Roberto Kenji Sakuraba, Hospital Israelita Albert Einstein, Letícia Lucente Campos, Instituto de Pesquisas Energéticas e Nucleares - IPEN/USP.

Presenter: Letícia Lucente Campos, Instituto de Pesquisas Energéticas e Nucleares - IPEN/USP., lcrodri@ipen.br

The “Alabama Technique” demonstrates plan quality and provide a practical, systematic approach to the treatment planning technique for single isocenter cranial radiosurgery with volumetric modulated arc therapy (VMAT) used in metastatic carcinoma treatments. The Optically Stimulated Luminescence dosimetry has become one of most used techniques for radiation dosimetry now days, especially after the improvement of Landauer’s Luxel™ and creation of Landauer’s Inlight™System, initially for individual monitoring radiation protection, and now it has been tested and validated for radiation therapy dosimetry with good results. This work aims to compare Varian AAA and Acuros XB dose calculation algorithms for treatment planning of multiple brain metastases using “Alabama Technique” with a 3D printed anthropomorphic phantom and the OSL InLightTM system for dosimetric validation. An anthropomorphic skull 3D printed phantom was submitted to a CT scan and planed five target volumes. In order of comparison, two dose calculations were performed in the Varian Eclipse with VMAT planning with "Alabama technique", using the Varian’s AAA and Acuros XB and treatment was delivered with a VARIAN True Beam linear accelerator with Multileaf Collimator HD and 6 MV photon beam were used. Landauer nanoDot dosimeters were positioned inside each of the five target volumes planned and the experimental dosimetric results were compared with the two calculation algorithms. The experimental results using the OSLDs show agreement of 97.26 %, 99.12 %, 99.99 %, 95.94 % % and 98.79 % for the targets 1 to 5 respectively for the ACUROS XB calculated doses.The findings of this work indicate that ACUROS XB calculates more accurate doses compared with AAA, with all the experimental agreements better than 96 %. The intrinsic precision and uncertainty of the InLight system device is sufficient to sustain the dosimetric uncertainties below 2 %, validating the results.

The influence of soil cover on pore distribution and connectivity density in a Ferralssol evaluated by 3D computerized microtomography

Author 1: Marcelo Wermelinger Lemes, Universidade Federal Fluminense;
Author 2: Alessandra Silveira Machado, Universidade Federal do Rio de Janeiro;
Author 3:Gustavo M. Vasques, Empresa Brasileira de Pesquisa Agropecuária, EMBRAPA;
Author 4: Ricardo Tadeu Lopes, Universidade Federal do Rio de Janeiro;
Author 5: Reiner O. Rosas, Universidade Federal Fluminense

Presenter: Alessandra Silveira Machado - Universidade Federal do Rio de Janeiro, UFRJ, alessandramachado192@gmail.com

The pores of the soil are represented by cavities with different sizes and shapes, determined by the arrangement of solid particles which constitute a volumetric fraction of the soil filled with air, water and nutrients solution. The soil porosity influences in