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Energy dependence response of the Fricke gel dosimeter prepared with 270 Bloom gelatine for photons in the energy range of 13,93 keV to 6 MeV.

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The Fricke gel dosimeters have been very studied for radiotherapy [1] and radiosurgery [2,3,4] applications because of its tissue equivalence, easily to be molded into any desired shape and size [5] and ability to evaluate three-dimensional (3D) dose distribution with high spatial resolution [6,7] using magnetic resonance imaging (MRI) technique. The dosimetry is based in the oxidation of ferrous (Fe^{2+}) to ferric (Fe^{3+}) ions by action of the ionizing radiation proportional to the absorbed dose [6,8]. The accurate absorbed dose determination should be performed for a quality control in any medical procedure using ionizing radiation beyond the applications mentioned above.

In this work the energy dependence response of the Fricke Xylenol Gel (FXG) dosimeter developed at IPEN [9] prepared using 270 Bloom porcine gelatine to photons with effective energies between 13,93 keV (obtained using a PANTAK-SEIFERT® model ISOVOLT 160 HS low-energy X ray machine) and 6 MeV (using a VARIAN® model CLINAC 6EX photons accelerator) was evaluated, in order to verify the possible dosimeter application in other medicine areas, for example, mammography, breast radiotherapy and blood bags radioesterilization. The well established spectrophotometry evaluation technique [10,11] was employed .

Dosimetric characteristics such as response stability, dose response, useful dose range, minimum and maximum detection limits, dose rate and angular dependence response and batch reproducibility were also evaluated.

The results obtained indicate that the FXG solution studied does not presents energy dependence response for photon energies higher than 50 keV in the energy range studied. The maximum energy dependence response, 30% , was observed to 37,05 keV.

This results can be extended to MRI evaluation technique that permits 3D dose distribution evaluation and the FXG dosimeter can contribute to three-dimensional dosimetry in different areas.

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