AbstractID: 10972 Title: Study of dosimetric characteristics of MAGIC polymer gel with formaldehyde for electrons beams using PENELOPE code

Purpose: Conformational techniques require an accurate control of doses and dose distributions. A dosimeter with high spatial resolution and high sensitivity is essential while 3D features would be a plus. Polymer gel dosimeters have appropriate spatial and dose resolutions for quality control in conformational radiotherapy with photon beams, but the study for their use in electron beams is still a gap. This work analyzes the dosimetric equivalence between MAGIC polymer gel with formaldehyde and water for therapy electron beams using PENELOPE Monte Carlo code. **Method and Materials:** In this study, the gel-water dosimetric equivalence was studied for electron beams in an energy range of 5 to 22 MeV, with 15 x 15 cm^2 field size at 100 cm source-surface distance. The phantoms of homogeneous MAGIC polymer gel[1] and water had dimensions of 20 x 20 x 20 cm^3. The spatial resolution set in the simulations was 2 mm from the central-axis depth-dose distribution. The percentage depth-dose (PDD) curves and 3D dose distributions in the phantoms were determined by PENELOPE code. **Results:** The PDP curves showed that the MAGIC gel has a higher attenuation coefficient than water for all energies evaluated. For therapeutic range the smallest difference found was 0.4 cm for the 5 MeV and the highest difference was 1.6 cm for the 22 MeV beam showing that as higher the electrons energy as higher the difference in attenuation in comparison with water. **Conclusion:** The comparison between the PDP curves for the gel and water showed the greatest attenuation coefficient of the gel, due to its higher effective atomic number. Future studies with MAGIC gel will evaluate the feasibility and applicability of this dosimeter in conformal radiotherapy with electron beams.