AbstractID: 13785 Title: MIXED DOSE DISTRIBUTION OF ELECTRON AND PHOTON BEAMS THROUGH THE MAGIC-f POLYMER GEL AND PENELOPE CODE

Purpose: Evaluate the improvement of the dose distributions in treatments using mixed photon and electron beams through polymer gel dosimetry with MAGIC-f and Monte Carlo simulation using PENELOPE. **Method and Materials:** A cylindrical phantom with dimensions of 10 cm diameter and 12 cm height was homogeneously filled with MAGIC-*f* and was irradiated with 6 MV for photon and 12 MeV for electron. Fields of 3 x 7 cm^2 at 100 cm SSD were used to deliver a prescribed dose of 8 Gy for each beam. The phantom analysis followed a previous developed protocol in which an MRI image is registered one day after irradiation in a 3.0 T MRI scanner using a head coil, a multiple spin echo sequence with 16 echos, TE = 22.5 ms and TR = 3000 ms. From the MRI base images R2 values were calculated on a pixel-by-pixel basis to produce R2 maps which are related the absorbed dose. The same geometry used in the irradiation process was simulated by PENELOPE with spatial resolution of 1 mm. The depth doses and dose profile were used to compare the results from experiments (MAGIC-f) and simulation. **Results:** The comparisons between PENELOPE and MAGIC-*f* showed maximum differences of 3.0% and 3.2 %, inside the volume of the 90% isodose for the profile and for the PDP curves, respectively. Typically electron treatment, in 90% isodose, beginning in 0.2 cm for 12 MeV, compared this with the study mixed field was of 0.9 cm, protecting 0.7 cm of the healthy tissue. **Conclusions:** The comparison preliminary between the dose distribution for PENELOPE and MAGIC-*f* showed that gel dosimeter could be used in radiotherapy, for special applications, as photons and electrons mixed fields. Besides of the concordance found, more measurements will be done.