

AbstractID: 8778 Title: I-125 seed dosimetry in the near field using Gafchromic® EBT film

Purpose: To perform radiochromic EBT film dosimetry in the near field of model MED3631A/M I-125 seed and to determine the TG-43 dosimetric parameters. **Method and Materials:** Gafchromic® model EBT films (lot#35076) were horizontally positioned, one at a time, above and in contact with a NAS model MED3631A/M I-125 seed horizontally placed at the center of a solid water phantom (RMI457, 30x30x20cm³). A multiple-film technique was employed. To cover the distance range of 0.06-5cm, 50 EBT films of different sizes (4x4-12x12cm²) were irradiated by 10 individual seeds (NIST traceable air kerma strengths ~10U, based on current NAS calibration) using different exposure times (1-295hr). A separate set of 19 calibration films was exposed to 50kV x-rays at 100 cm SSD for doses of 0.2-40Gy at the University of Wisconsin. All experimental, calibration and background films were scanned using a CCD100 densitometer using a green light source with fine spatial resolution (0.2mm). Based on the established calibration curve, dose conversion for the experimental films and generation of the TG-43 dosimetric parameters (for L=4.2mm) were achieved using IDL v6.0. **Results:** The dose rate constant was 1.004 cGy/Uh. The radial dose function was obtained for the radial distances from 0.06 to 5cm. The 2D anisotropy functions for distances from 0.1 to 5cm were determined. General agreement with published values and those recommended by TG-43U1 report for $r \geq 0.5\text{cm}$ was found. The near field data for 0.25cm is close to Rivard's Monte Carlo results for the "ideal capsule orientation", but different from the TG43U1 consensus values based on Rivard's weighted "diagonal" and "vertical" capsule orientations. **Conclusion:** Using EBT film dosimetry with the multiple-film technique, TG-43 dosimetric parameters were determined for model MED3631A/M I-125 seed in the near field and out to 5cm, allowing for accurate treatment planning calculations. Research supported partially by North American Scientific Inc.