

AbstractID: 9216 Title: Application of Gafchromic XR-RV2 film for small animal irradiation dosimetry

Purpose: To assess the accuracy of self-developing Gafchromic XR-RV2 film for the dosimetry of small animal kilovoltage x-ray irradiation. **Method and Materials:** Two kilovoltage x-ray beams (100kVp and 150kVp) for small animal irradiation from a Faxitron machine were employed in this study. The doses of a point at the center of a round field with diameter of 20cm in a 30x30x10 cm³ solid water phantom at a depth of 1cm were measured via Gafchromic XR-RV2 films and a Farmer ion chamber. The films, cut into small samples (3.5x1.5cm² in size), were from the same batch to remove the variability between batches. Two film calibration curves were established for the two beams. The films were scanned with an Epson V700 flat-bed scanner 24 hours after exposure and analyzed with FilmQA software. The doses of the same point for a round field with diameter of 1cm were also measured. **Results:** The Gafchromic XR-RV2 film calibration curves were found to be weak dependent of beam energy (<8% difference of the pixel values between 100kVp and 150kVp). The agreement of measured doses for big field between Gafchromic XR-RV2 films and Farmer chamber were within 5% (-4.0% to 5.0%). While for small field irradiation, large difference (up to 75%) of measured doses was observed, which indicates that Farmer chamber underestimated the point dose due to field size is not big enough to cover chamber body. **Conclusion:** The Gafchromic XR-RV2 film can provide acceptable accuracy of dose measurements for kilovoltage x-ray irradiation and it is more accurate than Farmer ion chamber for small field irradiation that are often used in small animal treatments. The combination of Gafchromic XR-RV2 film with flat-bed scanner represents a low-cost and viable dosimetry tool for small animal irradiation.