

Evaluation of Uniformity for Gafchromic Sheets for Film Dosimetry

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Abstract : Gafchromic™ sheet are extensively used for the QA of intensity modulated radiation therapy and other in-vivo dosimetry. Intra-sheet Non-uniformity of scanner as well as film causes undesirable fluctuations which are reflected in dosimetry. The aim of this study is to define a systematic and robust method to investigate the intra-sheet uniformity of the unexposed Gafchromic Sheets and the region of interest (ROI) of the scanner. Sheets of lot No#: A05151201 were scanned before and after the expiry period with the EPSON™ XL10000 scanner in the transmission mode, landscape orientation and 72 dpi resolution. ROI of (8'x 10' inches) equal to the sheet dimension in the center of the scanner is used to acquire images with full transmission, block transmission and with sheets in place. 500 virtual grids, created in MATALB® are imported as a macros in ImageJ (1.49m Wayne Rasband) to analyze the images. In order to remove the edge effects, the outer 86 grids are excluded from the analysis. The standard deviation of the block transmission and full transmission are 0.38% and 0.66% confirming a higher uniformity of the scanner. Expired and non-expired sheets have standard deviations of 2.18% and 1.29%, show that uniformity decreases after expiry. The results are promising and indicates a good potential of this method to be used as a uniformity check for scanner and unexposed Gafchromic sheets.

Keywords : IMRT, film dosimetry, virtual grids, uniformity

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