

Evaluation of a practical and low cost Gafchromic film/flat-bed scanner combination for planar dosimetry

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Purpose: To assess the accuracy and practicality of using GAFCHROMIC[®] EBT Film in combination with an Epson flat-bed scanner for the verification of advanced treatment techniques in radiation therapy. EBT is a new type of Gafchromic film with high sensitivity to ionizing radiation. The combination of EBT with flat-bed scanner represents a very low cost and convenient dosimetry system.

Methods and Materials: Experiments were conducted to evaluate two aspects of the EBT/flat-bed-scanner combination. First the stability of the scanner was evaluated by repeat scanning, over several weeks, of a conventional Kodak XV film, which is known to be highly stable post-irradiation. Second the dose response and stability of EBT film was investigated by repeat scanning, over several weeks, of EBT film pieces irradiated to different doses (0 to 8Gy with 6MV photon beam).

Results: The reproducibility of the Epson scanner was found to be highly stable, to within 1.03%, over all ranges of OD studied. A slight non-uniformity in background was observed, but this background was consistent enabling efficient correction. The dose response was observed to be highest in the red channel of the scanner. The dose response curve of EBT film was found to be non-linear but stable (within 1.32%) within one week after irradiation.

Conclusions: The Epson[®] 4990 Scanner/ GAFCHROMIC[®] EBT Film dosimetry combination appears a promising, low-cost, and highly convenient dosimetry system for radiation therapy.