

AbstractID: 1996 Title: Initial evaluation of a new radiochromic film for IMRT QA

We report on a preliminary evaluation of a newly developed radiochromic film (RCF) specifically formulated for IMRT QA (IMRT RC). Tissue equivalence, insensitivity to light, and self-developing properties make RCF more desirable than silver based radiographic film for radiation dosimetry. Previous versions, such as MD-55, are impractical for IMRT QA because the doses necessary to achieve useful OD's are too large. Utilizing our spectrophotometry absorbance measurements the major absorption peak of 635 nm (minor peak at 580 nm), which is near a He-Ne laser wavelength of 633 nm, shows that the dose to achieve a net OD of one (DNOD1) is 1.9 Gy. Similarly, the DNOD1 for MD-55 is 13 Gy creating a 6.8-fold increase in sensitivity, although the He-Ne laser exhibits greater uncertainty in the OD, which results in a dose response curve (DRC) with unexpected fluctuations. The DRC generated with the He-Ne laser indicates that approximately 8 Gy can be administered prior to noticing effects of saturation. An additional benefit of the IMRT RC is that it stabilizes more quickly, in the order of hours as opposed to days using other RC films, which allows the film to be read sooner. Experiments were conducted using a Lumisys Lumiscan 75 (633 nm), Vidar Dosimetry Pro (white), and Howtek MultiRAD 460 (660 nm) digitizers.