

AbstractID: 7634 Title: A method for extracting the relevant MRI information from normoxic polymer gels exposed to low doses

Purpose: To extract the contribution due to the formation of polymer at low dose from the MRI multi-echo signal using a numerical method for Laplace transform inversion and to analyze the transverse relaxation rate spectrum

Materials and Methods: Several samples of MAGIC gel (9% by weight of methacrylic acid) were prepared and irradiated with ^{60}Co and 6 MV photon beams to doses in the range of 0.1 to 0.5 Gy. The samples were scanned in a 7 Tesla MRI Bruker BioSpec using a Carr-Purcell-Meiboom-Gill sequence. The signals were analyzed with the inversion algorithm. Samples of pure gelatin and a combination of gelatin and methacrylic acid were scanned in an MR spectrometer from Bruker. The samples were also scanned in an optical CT.

Conclusions: Data analysis showed that polymer formation can be used as a better parameter than the average transverse relaxation rate for polymer gel dose calibration at low dose. The chemical shift spectrum showed that gelatin was not affected by radiation. The optical CT scan correlated well with the other results.