

AbstractID: 1394 Title: Experimental investigation of the attenuation properties of normoxic polymer gel dosimeters

The attenuation properties of MAGAT (Methacrylic acid Gelatin And Tetrakis) and PAGAT (Polyacrylamide Gelatin And Tetrakis) normoxic polymer gel dosimeters (De Deene 2002) were investigated by measuring their linear attenuation coefficients as a function of absorbed dose. The MAGAT gels were 8% w/w gelatin, 9% w/w methacrylic acid and 10mM Tetrakis (hydroxymethyl) phosphonium (THP) and the PAGAT gels were 5%w/w gelatin, 3%w/w BIS, 3%w/w acrylamide and 10mM THP. The antioxidant THP was added when the gels were ready to be poured into plastic cuvettes for attenuation measurements and screw top plastic vials for measurements with a clinical CT scanner. The polymer gels in the cuvettes and vials were irradiated in a pre-calibrated Gammacell irradiator to doses up to 40Gy. Attenuation counts were obtained by measuring the radiation counts in a spectrophotometer using Am-241 source through each of 5 cuvettes for each dose. The linear attenuation coefficient for each dose was calculated as the slope of the log attenuation curve. CT numbers calculated from the measured linear attenuation coefficients were compared with values obtained using a CT scanner. The CT-dose sensitivity of the MAGAT and PAGAT polymer gel dosimeters from attenuation measurements were calculated to be $(0.8501 \pm 0.0843)\text{HGy}^{-1}$ and $0.3078 \pm 0.0267)\text{HGy}^{-1}$ respectively. The CT numbers calculated for both PAGAT and MAGAT polymer gels from the attenuation measurements had a linear relationship with the measured linear attenuation coefficients.

De Deene Y, Hurley C, Venning A *et al* 2002. *Phys. Med. Biol.* 47 3441–3463.