

A method is described which determines the radiological equivalence of different materials by comparing their macroscopic photon and electron interaction parameters over the energy range of interest. This method has been applied to three gels used for radiation dosimetry and verified with Monte Carlo calculated dose distributions.

Monte Carlo calculated 6 MV photon gel depth dose curves all agreed to within 1% of those calculated in water. 6 MeV electron beam gel depth dose curves were all within 1 mm of those in calculated water.

The results show that for the gels investigated the dominant property determining water equivalence is the electron density of the gel. Future research into alternative gel formulations should aim to achieve an electron density as close as possible to water.