

AbstractID: 5737 Title: Example Responses of the Free Radical Diagnostic alpha-Diphenyl-picorhylyhydrasy (DPPH) to a Conventional Dose Rate and a Very High Dose Rate Electron Beam

Alpha-Diphenyl-picorhylyhydrasy, or DPPH, a free radical diagnostic, can be used as a dosimeter when it is suspended in a medium that is at least partially translucent. The amount of color change of DPPH from a nominal purple to yellow is an indication of the number of free radicals created. **Purpose:**As a preliminary investigation, we examined two different combinations of DPPH and the response to two different 6 MeV electron beams. **Method and Materials:**The combinations consisted of DPPH with water and with bovine serum albumen, (BSA). The two electron beams were from a Varian 2100EX with a conventional dose rate, and from a modified Varian Saturne SL42 with a very high dose rate. The Saturne was operated in 6 MV photon mode with its target and monitor chambers removed so the dose rate of the electron beam was over 3000 times higher than the conventional dose rate. The peak instantaneous dose rate, which occurs when an "electron bunch" impinges, is over 10^7 Gy/min for the SL42. Approximately 2 ml of the DPPH combinations were irradiated in 3 cm diameter culture dishes to different doses. Controls were taken and exposed to the same environmental conditions as the irradiated dishes. Rapid color change occurred within seconds of irradiation, and the color change was analyzed on a Power Wave X Bio-Tek analyzer. **Results/Conclusions:** Although there is more scatter in the preliminary data for the SL42 irradiation, the response from both beams can be approximated as being linear up to the maximum dose measured, 6000 cGy. The slope of the response for both beams is about the same, which indicates that the free radical activity is not heavily influenced by the dose rate within this range. The possibilities of using DPPH as a "biological" dosimeter will be discussed.