

QUANTIFICATION OF ABSORBED DOSES FROM RADIOACTIVE GOLD NANOPARTICLES AND CHROMIUM 51 SEED IMPLANTS

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ABSTRACT

In the ever ending search to seek better options of treatments in radiation therapy, few novel approaches are presented in this thesis. The work presented is in 2 folds. Potentially both can be applied in radiation dose deposition through the method of brachytherapy. One of the study measures the absorbed doses radioactive gold of Au198 and Au199 in nanoparticulate form. Secondly radioactive chromium (Cr51) is discussed in the traditional brachytherapy seed implant form. Both of these approaches are not interdependent. However, it provides size comparative benefits. Gelatin based dosimeters are used to quantify the absorbed radiation doses of Au198 and Au199. Also the quantification for Au198, Au199 and Cr51 is presented using MCNP5 code from the Monte Carlo Techniques of Oak Ridge National Labs.

In the outcome of quantification, it was estimated that large amount of radiation doses in therapeutic range was deposited by the beta radiation of Au198 and Au199. In the other study related to Cr51, MCNP5 code evaluates the radiation doses for 1 miliCurie of radioactivity and confirms its candidacy in brachytherapy applications.