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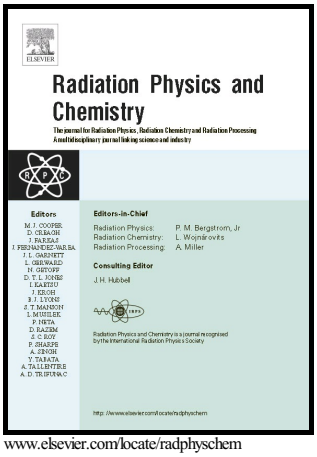

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Determination of Attenuation Parameters and Energy Absorption Build-up Factor of Amine Group Materials

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Abstract:

We have computed radiological parameters of some C- H- N- O based amine group bio material in the energy range 122 keV to 1330 keV with the gamma ray count by narrow beam geometry. The NaI(Tl) detector with 8K multichannel analyser was used having resolution 6.8 % at 663 keV. The energy absorption buildup factor (EABF) was determined by using Geometric Progression (G-P) fitting method up to penetration depth of 40 mfp at energy 0.015 to 15 MeV. The NIST XCOM data were compared with the experimental value and we observed (3~5 %) difference. The comparative study of effective atomic number and effective electron density in the energy range 122 keV to 1330 keV using Gaussian fit for accuracy were performed. The amino acid has the highest EABF value at 0.1 MeV and the variation in EABF with penetration depth up to 1 to 40 mean free path (mfp). The calculated radiological data of biological material are applicable in medical physics and dosimetry.

Keywords: Mass attenuation coefficient (μ_m), Effective atomic number (Z_{eff}), Effective electron density (N_{eff}), G-P fitting method, Energy absorption build up factor (EABF).

Introduction:

Mass attenuation coefficient (μ_m), effective atomic number (Z_{eff}), effective electron density (N_{eff}), molar extinction coefficient are basic parameters to find the penetration and energy deposition of gamma radiation (Gounhalli et al 2012; Manjunatha et al 2016; El-Khayatt et al 2014). Gamma radiation is used in diverse fields such as agriculture (Pires et al 2016), industry, medical (Manohara et al 2007), radiation dosimetry (Gowda et al 2004), diagnosis,