

The effect of soil depth on the radiation absorption parameters of soil samples

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The aim of this study is to theoretically investigate radiation absorption parameters of six soil samples which have various depth as 0-10 cm, 10-30 cm, 30-50 cm, 50-70 cm, 70-100 cm and 100-200 cm. For this purpose, mainly used radiation absorption parameters which are linear attenuation coefficient (LAC), mass attenuation coefficients (MAC), half value layer (HVL), tenth value layer (TVL), mean free path (MFP), radiation protection efficiency (RPE), transmission factor (TF), effective atomic number (Z_{eff}) and effective electron density (N_{eff}) of soils were determined using Photon Shielding and Dosimetry (Phy-X/PSD) software [1] in energy range from 0.015 MeV to 15 MeV. LACs, MACs and RPEs reduce with increment of photon energy whereas HVLs, TVLs, MFPs and TFs rise with increment of the photon energy. Variation of Z_{eff} as function of energy indicate similar behavior to variation of N_{eff} as a function of energy. As a result, radiation absorption parameters of soil samples change dependence on the soil depth, density of soil samples and elemental contents of the of the soil samples.

Keywords: Radiation absorption parameters, Phy-X/PSD software, Soil depth

Reference:

[1] E. Sakar et al., Radiat. Phys. Chem.166, 108496 (2020).

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