

Gamma Spectrometry Evaluation of Soil Radioactivity in the City of Veles and Its Environs

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To obtain the baseline levels of soil radioactivity in the city of Veles and its environs, 53 topsoil samples were collected from uniformly distributed sites across an area of 1200 km². Following appropriate laboratory preparation, gamma spectrometry was used to determine the activity concentrations of the radionuclides present in the soil samples. The analysis focused on the three most relevant naturally occurring radionuclides ⁴⁰K, ²²⁶Ra, and ²³²Th, along with the artificial radionuclide ¹³⁷Cs. Based on the measurement results, the absorbed dose rate in air and the annual effective dose rate were calculated. After descriptive statistics was made, the mean, median, minimum, and maximum values of the activity concentrations and radiation hazard indices were compared with results from similar studies conducted in Macedonia and across the Balkans, revealing no significant increases or potential health risk to residents. Spatial distribution maps illustrated significant variability in radionuclide concentrations, indicating the influence of geographical location, geology, and lithology as the main contributing factors.

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