

## **Hazard assessment of radionuclides in soil and sediments of Malakand District, Khyber Pakhtunkhwa.**

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### **Abstract**

This study is aimed to conclude NORM (Naturally Occurring Radioactive Material) in soil and sediment samples of Malakand. For this reason, 25 soil and sediment samples were collected from Malakand district. To determine the activity concentration of Ra226, Th232 and K40 and to assess their radiological hazards analysis on the collected samples were carried out by using gamma ray spectrometry consisting of high purity germanium (HPGe) detector. The activity concentrations calculated are given in the unit of Bq kg<sup>-1</sup>. Activity concentrations of Ra226, Th232 and K40 in the samples were determined to be  $55 \pm 0.74$  (6-181),  $45 \pm 0.75$  (8-73) and  $734 \pm 6.6$  (65-1648) Bq kg<sup>-1</sup> respectively. The maximum value of radium equivalent activity was less than recommended value 370 Bq kg<sup>-1</sup> but was higher than country's soil. The results were compared with the international recommended values and country's soil and sediments. The hazards of the radiological indices and measurement rates in this study were higher than their worldwide mean values however lower than their maximum suggested limits demonstrating that soil and sediments don't impose any health hazard. Malakand soil can be regarded as having normal levels of natural background radiation.