

**Natural Radioactivity and External Dose Rates In Tailing Samples From
Rosterman Gold Mine, Kakamega County, Kenya**

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Abstracts

The gold mine tailings over the past have reported naturally occurring radioactive materials (NORM) which have posed adverse radiation risks to the immediate population though there is no proper documentation on the levels of radioactivity and associated hazardous impact on the Rosterman population. In this article, documented results of natural radionuclide concentrations in tailings at Rosterman gold mine, Kakamega county, Kenya were evaluated. The study sampled thirty tailing samples from Rosterman gold mine tunnels, samples were then oven heated at a temperature of 105°C and then crushed by using mortar and pestle. Samples were then sieved and packed in 200 ml plastic bottles for 28 days to attain secular equilibrium. One at a time, the samples radioactivity measurements was done by using the NaI(TI) detector coupled to necessary electronics with pre-installed software at the physics laboratory in Kenyatta University. The activities of ²³⁸U, ²³²Th and ⁴⁰K was found to vary from 39 ± 1.63 Bq/Kg to 118 ± 4.43 Bq/Kg, 72 ± 2.24 Bq/Kg to 223 ± 8.36 Bq/Kg and 85 ± 3.6 Bq/Kg to 362 ± 10.65 Bq/Kg respectively. Radium equivalent activities were found below 370 Bq/Kg in all the collected samples. External gamma dose rates estimated from the levels of radionuclides in sediments had a range of 32 ± 3.4 nGy/h to 68 ± 5.83 nGy/h. Hence, mining of gold at Rosterman has minimal significant health implications to the general population and the miners.

Subject Area: Nuclear Physics

Key Words: Radionuclides, Gamma Ray Spectrometry, External Gamma Dose Rate, Rosterman Gold Mine