

Implication and Hazard of Radiation Level in the Building Materials

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Abstract

The natural radioactivity due to radium, thorium, and potassium in building material samples contribute to the radiation dose received by human beings significantly. It is essential to evaluate the activity levels of these nuclides for the assessment of natural radiation dose. Activity concentrations of the gamma emitting primordial radionuclides ²³²Th, ²²⁶Ra, and ⁴⁰K were measured using high resolution gamma spectrometry technique with high purity germanium (HPGe) detector in building materials: sand, brick, granite, cement and rock, collected from various areas of Gulbarga and Koppal districts. The standard ASTM procedure was followed for the sample preparation. The distribution of radionuclides and variation in activity concentration depend upon the rock formation and the geological properties of the region. The activity of the three radionuclides, ²³²Th, ²²⁶Ra, and ⁴⁰K, were found to be in the range of 3.1-227.1, 1.6-111, and 23.2-1505 Bq/kg, respectively. The dose related radiological parameters were also calculated for all the samples and the observations show that the activity concentrations of the radionuclides are well within the UNSCEAR limits.

Key words: natural radioactivity, background radiation, radioactive equilibrium, gamma spectrometry, HPGe detector.