

## Environmental Impact Assessment of Ceramic Tile Materials Used in Jordan on Indoor Radon Level

**Authors :** Mefleh Hamideen

**Abstract :** In this investigation, the activity concentrations of  $^{226}\text{Ra}$ ,  $^{232}\text{Th}$ , and  $^{40}\text{K}$ , of some ceramic tile materials used in the local market of Jordan for interior decoration were determined by making use of High Purity Germanium (HPGe) detector. Twenty samples of the different countries of origin and sizes used in Jordan were analyzed. The concentration values of the last-mentioned radionuclides ranged from  $30 \text{ Bq.kg}^{-1}$  (Sample from Jordan) to  $98 \text{ Bq.kg}^{-1}$  (Sample from China) for  $^{226}\text{Ra}$ ,  $31 \text{ Bq.kg}^{-1}$  (Sample from Italy) to  $98 \text{ Bq.kg}^{-1}$  (Sample from China) for  $^{232}\text{Th}$ , and  $129 \text{ Bq.kg}^{-1}$  (Sample from Spain) to  $679 \text{ Bq.kg}^{-1}$  (Sample from Italy) for  $^{40}\text{K}$ . Based on the calculated activity concentrations, some radiological parameters have been calculated to test the radiation hazards in the ceramic tiles. In this work, the following parameters: Total absorbed dose rate (DR), Annual effective dose rate (HR), Radium equivalent activity (Raeq), Radon emanation coefficient F (%) and Radon mass exhalation rate (Em) were calculated for all ceramic tiles and listed in the body of the work. Fortunately, the average calculated values of all parameters are less than the recommended values for each parameter. Consequently, almost all the examined ceramic materials appear to have low radon emanation coefficients. As a result of that investigation, no problems on people can appear by using those ceramic tiles in Jordan.

**Keywords :** radon emanation coefficient, radon mass exhalation rate, total annual effective dose, radon level

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