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Radiation exposure levels in the coastal strip from Uswatakeyyawa to Chillaw

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The West coast of Sri Lanka is known to have pockets of high natural radiation background areas. The high radiation background is mainly due to gamma rays emitted from the members of the decay chains of U and Th present in the monazite bearing beach sand in that area. In this study an attempt was made to calculate the radiation exposure in 48 locations along the beach from Uswatakeyyawa to Chillaw by using the activity concentrations of ^{238} U and ^{232} Th and also ^{40}K in the beach sand. The activity concentrations of the three radionuclides were determined using the high purity Ge detector. The exposure rates thus calculated were compared with experimentally measured dose rates.

The Ra equivalent concentration (Ra_{eq}) of the sand was determined to test the suitability of beach sand as a building material. Use of beach sand for construction purposes is a suitable alternative to overcome the heavy environmental degradation caused by mining river sands. The exposure rates ranged from 5 nGy h^{-1} to 4567 n Gy h^{-1}. Of the 48 locations studied, 21 locations showed effective dose rates above the world average of 2.4 mSv y^{-1}. A good agreement between the measured and calculated exposure rates was obtained. More than 50 % of the samples studied contained Ra_{eq} higher than 370 Bq kg^{-1} which is the internationally accepted limit of Ra_{eq} for building materials from a radiological point of view. Due to the scattered occurrence of elevated levels of naturally occurring monazite along the coast this study indicates the necessity to screen when beach sand is used for construction.