Natural radioactivity of ground water in some areas in Aden Governorate South of Yemen Region


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Abstract: This paper presents the concentrations of naturally occurring radionuclides $^{226}$Ra, $^{232}$Th and $^{40}$K measured in Groundwater collected from Aden Governorate South of Yemen Region using gamma spectroscopy. Thirty seven Groundwater samples were collected from four areas in Aden Governorate. The average activity concentrations for groundwater from Beer Ahmed area were 1.60 Bq l$^{-1}$, 1.25 and 16.90 Bq l$^{-1}$ for $^{226}$Ra, $^{232}$Th and $^{40}$K respectively and from Beer Fadle area were 1.45 Bq l$^{-1}$, 0.87 Bq l$^{-1}$ and 19.8 Bq l$^{-1}$ for $^{226}$Ra, $^{232}$Th and $^{40}$K, respectively, while that for groundwater samples from Daar-saad area were 1.27 Bq l$^{-1}$, 1.18 Bq l$^{-1}$ and 18.28 Bq l$^{-1}$ for $^{226}$Ra, $^{232}$Th and $^{40}$K, respectively and Al-Masabian area were 1.55 Bq l$^{-1}$, 1.421 Bq l$^{-1}$ and 19.03 Bq l$^{-1}$ for $^{226}$Ra, $^{232}$Th and $^{40}$K respectively. Also annual effective dose equivalent of ingestion of these waters was calculated. The results showed that the annual dose equivalent obtained in the present study was much higher than the recommended value (0.1 mSv year$^{-1}$) as reported by WHO. The results were compared with those for drinking water.

Key words: Radioactivity, South Yemen, Aden, Groundwater, annual Effective dose