

Abstract

In the present study, seasonal measurements of radon activity concentration were carried out for water and soil of Sawa Lake, Samawa City-South of Iraq. The measurements were conducted in two seasons, winter and spring, using RAD7 continuous radon monitoring detector manufactured by DurrIDGE company, USA.

For winter season, (85) water samples were collected from different locations; the period of assessment was two months (from December, 1st 2018 to February, 1st 2019). Radon activity concentrations were ranged from (0.085 Bq/L) to (0.965 Bq/L), while the average value was (0.322 Bq/L), the annual effective dose (AED) of inhalation was estimated and is found to be ranged from (0.000080 mSv.y⁻¹) to (0.000917 mSv.y⁻¹) with a mean value of (0.000325 mSv/y). Radon measurements during the spring season have been carried out with a period of two months (from March 1st, 2019, to April 26, 2019). Radon concentrations have been determined for (85) collected water samples and found to be in the range of (0.093±0.085 Bq/L) and (1.15±0.35 Bq/L) with an average value of (0.409±0.24 Bq/L), the annual inhalation dose in the spring season varied between (0.0000883 mSv/y) and (0.001065 mSv/y); with an average value of (0.000389 mSv/y). Physiochemical parameters such as pH, EC, TDS, resistivity, and turbidity were determined for the collected water samples during both seasons and the correlation between these parameters and radon concentrations was established.

Radon concentrations in soil gas have been measured during winter and spring seasons. A total of (30) locations around the lake in each season were chosen for in situ analyzing. RAD7 detector is used for this purpose. Radon soil gas activity concentration for the winter season is found to vary from (86.9 ± 54 Bq/m³) and (6448 ± 480 Bq/m³) with an average value of (1963±267 Bq/m³). Associated annual effective dose due to inhalation has been found to be in the range of (0.000826-0.061282 mSv/y), with an average value of (0.01866 mSv/y). For the spring season, radon concentrations in soil gas varied from (40 ± 50 Bq/m³) to (4970±360 Bq/m³), with a mean value of (1434.17 ± 205 Bq/m³). Annual inhalation dose due to these concentrations has been estimated and is found to

vary between (0.000380 mSv/y) and (0.061282 mSv/y), with an average value of (0.01363 mSv/y).