

NATURAL RADIOACTIVITY MEASUREMENTS OF SOIL SAMPLES FROM SORAN DISTRICT IN KURDISTAN REGION-IRAQ

Ali Hassan Ahmed^{1,*} and Abdulbast Ali Gafur²

¹*Department of Physics, College of Science, Univ. Of Salahaddin-Erbil, Kurdistan-Iraq*

²*Technical Institute of Soran, Erbil, Kurdistan-Iraq*

Corresponding author: aha66sara@yahoo.com

ABSTRACT

The amount of radioactivity in soil samples, thirty six samples at different depths (surface, 15cm, 30cm), were collected from twelve different locations at Soran district in the northeastern of Iraqi Kurdistan region. The samples have been studied by using gamma-ray spectrometry, NaI(Tl) Scintillation detector and CR-39 Solid State Nuclear Track Detector (SSNTD) . Activity concentrations of each of K-40, Cs-137, Ra-226 (U-238) , Th-232 (Ac-228) and Radon radionuclides were measured; Radon activity concentration was ranged from (135.301 to 770.727) Bq.m⁻³. Within the studied area the value of radium equivalent activities Ra_{eq} have been calculated and ranged from (0.1130-0.3292) Bq.g⁻¹, these values are below the internationally accepted value of 0.370 Bq.g⁻¹. The value of absorbed dose rate D has been calculated and ranged from (0.0528 to 0.1510) nGyh⁻¹, these calculated values were through the estimate of average global terrestrial radiation of 0.055 nGyh⁻¹. Indoor annual effective dose rate E_{ied} , outdoor annual effective dose rate E_{oed} , external hazard indices H_{ex} and internal hazard indices H_{in} have been computed and found to be below the permissible values.

Keywords: Natural Radioactivity; Gamma-ray Spectroscopy; CR-39; Absorbed Dose; Hazard Indices;

REFERENCES

- [1]. A. Abbady, A.M. El-Arabi, Adel G.E. Abbady and S. Taha, Gamma- ray measurements of natural radioactivity in cultivated and reclaimed soil, Upper Egypt (2005).
- [2]. D.Vučić, J. Stepanović, Working and Living Environmental Protection Vol. 1, No 4, (1999).
- [3]. A.F. Hafez, A.S. Hussein, N.M. Rasheed, *Applied Radiation and Isotopes* **54** (2001).
- [4]. S. Harb, K. Salahel Din, A. Abbady and M. Mostafa, Proceedings of the 4th Environmental Physics Conference, , Hurghada, Egypt, 10-14 March (2010).
- [5]. M. I. Hussein, M.Sc. Thesis, University of salahaddin, Kurdistan Region, Iraq (2011).

- [6]. A. El-Taher, A.G.E.Abbady, *Indian journal of pure and applied physics*, **50** April (2012).
- [7]. H. M. Diab, S. A. Nouh, A. Hamdy, S. A. EL-Fiki, *Journal of Nuclear and Radiation Physics*, **3**, No. 1, (2008).
- [8]. M. O.El-Ghossain , R. M. Abu Saleh, M. El-Ghossain et al., *J. Al-Aqsa Univ.*, 10 (S.E.) (2006).
- [9]. M.I. Yousef, A.Abu El-Ela and H.A. Yousef, *Journal of Nuclear and Radiation Physics*, **2**, No. 1, (2007)..
- [10]. H. H. Aziz, M.Sc. Thesis, University of salahaddin, Kurdistan, Iraq, (2010).
- [11]. Wallo , M. Moscovitch, J.E. Rodgers (Georgetown University), D. Duffey (University of Maryland) and C. Soares (National Institute of Science and Technology), The Health Physics Society 39th Annual Meeting Student III – Environmental and Radon Session (1994).
- [12]. S. Harb, A. H. El-Kamel, A. I. Abd El-Mageed, A. Abbady, and W. Rashed, Proceedings of the 3 rd Environmental Physics Conference, Aswan, Egypt, 19-23 Feb. (2008).