Radionuclide Assessment of Oil Palm Plantation Soils in Ondo and Ekiti State, Nigeria.

Odudu, A. I.,[1*] Oyebanjo, O. A[2] and Adelayi, M. O.[1]

[1] Department of Physics, Adeyemi Federal University of Education, Ondo, Ondo State, Nigeria.

[2] Department of Physics and Telecommunication, Tai Solarin University of Education, Ijagun, Ogun State, Nigeria

** email: oduduai@aceondo.edu.ng*

Abstract

This research investigated the natural radionuclide elements in soils from oil palm plantation farmlands within Ondo and Ekiti states with the associated risk factors because these states are known for massive production of palm oil which forms a component part of human daily foods. Forty (40) soil samples were collected determine the concentrations of the naturally occurring radionuclides elements using Gamma Ray Spectrometer comprising a 7.6 cm x 7.6 cm NaI(TI) detector coupled to a multichannel analyser for spectral analysis. The results showed that the average concentration levels of K-40, Th-232 and U-238 in Ondo state are: 126.40 $\pm$ 2.74 Bq/kg, 29.20 $\pm$ 1.19 Bq/kg and 18.64 $\pm$ 0.97 Bq/kg respectively and that of Ekiti state are: 110.95 $\pm$ 2.88 Bq/kg, 23.05 $\pm$ 1.15 Bq/kg and 17.31 $\pm$ 0.93 Bq/kg respectively. Further analysis showed that the average values of radium equivalent (Ra_{eq}), external hazard index (H_{ex}), internal hazard index (H_{in}), absorbed dose rate (D) and annual effective dose equivalent (AEDE) were 70.12 Bq/kg, 0.19, 0.24, 24.13 nGy/h and 38.70 µSv/y for Ondo state respectively and that of Ekiti state was recorded as: 58.80 Bq/kg, 0.16, 0.21, 26.58 nGy/h and 32.60 µSv/y respectively. These values lower than the average range of worldwide specification and were concluded to be less hazardous. However, further and constant monitoring of these soils was recommended, particularly that of Ondo state which has bitumen deposit.

Keywords: Ekiti state, Gamma ray spectrometer, Oil palm, Ondo state, Plantation, Radionuclides, Soil, Spectrometric.