

Radioactivity Analysis of Soil Samples Taken from the Western and Northern Shores of Van Lake, Turkey

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Abstract

In this study, concentrations of the radioactive isotopes ^{226}Ra , ^{232}Th , ^{40}K and ^{137}Cs were measured in soil samples from the shores of Van Lake using a high purity germanium detector. Activity concentrations obtained for these nuclides were compared with world average values. The average ^{226}Ra , ^{232}Th and ^{40}K activity concentrations calculated for the soil samples were higher than the world average values reported by UNSCEAR. The lowest ^{226}Ra , ^{232}Th and ^{40}K activity concentrations were recorded in sample T-1 whereas the highest values were recorded in sample T-11. Concentrations of ^{137}C in the samples ranged between 0.91 ± 0.01 and 29.68 ± 0.33 Bq kg⁻¹. In order to evaluate the radiological hazards resulting from natural radioactivity, radium equivalent activities, absorbed dose rates, and internal and external hazard indices were calculated and the results were compared with internationally recognized values.

Keywords: Natural radioactivity; Radionuclide; Radium equivalent; Lake Van

1. Introduction

Natural radioactivity is widespread in the earth environment and it exists in various geological formations such as earth crust, rocks, soils, plants, water and air (UNSCEAR, 2000). The level of terrestrial sources of natural radioactivity changes according to the geological structure of the area, geographic location, radiochemical state, and the distribution of radionuclides on Earth.

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