عنوان مقاله:

Measurement of Radioactivity Levels and Health Risks in the Surrounding Soil of Shazand Refinery Complex in Arak, Iran, Using Gamma-Ray Spectrometry Method

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خلاصه مقاله:

ntroduction: The purpose of this study was to measure the radioactivity in the agricultural soil of south-east of Shazand Refinery Complex to determine both reliable baseline data on the radiation level and the radiation dose exposure to the farmers and inhabitants of the studied area. Material and Methods: This study was conducted on ۲۱ soil samples collected from two different lands. Sampling spots in each land were selected for the assessment of specific activities of radionuclides of ۲۲۶Ra, ۲۳۲Th, ۴۰K, and۱۳۷Cs by using high purity germanium detector setup. Standards of International Atomic Energy Agency references material gamma ray uranium, reference gamma-ray thorium, and reference gamma-ray potassium were used for quality control and determining efficiency calibration. All samples were examined for radium equivalent, absorbed gamma dose rate, internal hazard index, external radiation hazard, annual gonadal dose equivalent, indoor and outdoor annual effective dose equivalent, and excess lifetime cancer risk. Results: The specific activities of radionuclides ۲۲۶Ra, ۲۳۲Th, ۴۰K, and ۱۳۷Cs varied from۱۳.۱۲ to ۳۳.۰۳, ۱۱.۳ to ۳۵.۸۶, ۲۵۷.۸۲ to ۶۰۵.۵, and ۱.۲۸ to ۱۳.۳۶ Bq/kg, respectively. Moreover, the results of this study were compared with those reported from other countries and worldwide average. Conclusion: Although all samples were polluted by the ۱۳۷Cs fission product, the measured values were within the global reported safety limits. Therefore, there is no risk for farmers and inhabitants in this region.

کلمات کلیدی:

Natural radioactivity, Radionuclides Dosage Radiation Health Risk