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Soil Measurements Using High Purity Germanium Gamma Spectroscopy for Areas Surrounding Al-Tuwaitha Nuclear Site

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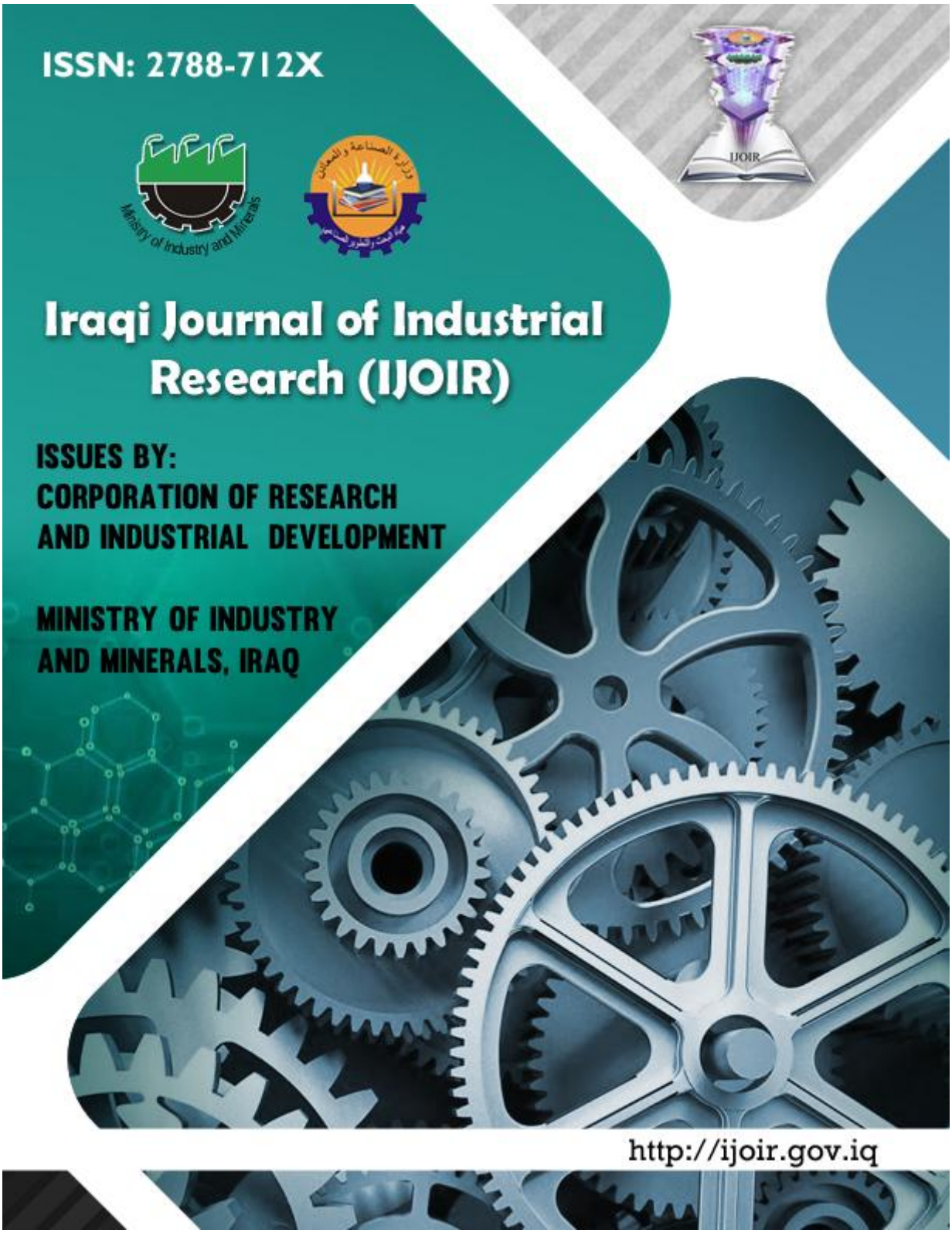
Abstract

This study introduces the calculations of the radiation background, by characterizing the radionuclides and calculating their specific effectiveness in the environment of the city of Baghdad (soil and plants) using the gamma-ray spectroscopy technique. 20 soil samples at a depth of 20 cm were collected for 5 locations on the Rusafa side, where the site coordinates were fixed using the G.P.S device. A modern global gamma-ray spectroscopy system (DSA 2000) was used, with high-purity germanium (HPGe) detector with an efficiency of 50% and an analysis capacity of 2.2 keV with respect to the energy of 1332 keV for the ^{60}Co source. The results of the specific activity rates of the radionuclides (^{214}Bi or ^{214}Pb), (^{228}Ac or ^{208}Tl), (^{40}K), and (^{137}Cs) in soil were: (50.735 Bq/kg or 0.525 Bq/kg) which is close to the value of the previously published results, as the highest value was recorded in Bangladesh (88.1 Bq/kg or 4.8 Bq/kg). The results of the qualitative effectiveness of the soil of the sites showed normal levels within the radiation background of Baghdad's soil. There was a significant convergence of the study's findings with other studies.



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