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Radiological and chemical toxicity risks of uranium in groundwater based-drinking at Immigration Headquarters Gosa and Federal Housing Lugbe area of Abuja, North Central Nigeria

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Abstract

Inadequate public water supply by the Water Board in Abuja has forced the public to source for groundwater as the only alternative for consumption without consideration for radiological risk. The radiological risk for cancer mortality of uranium in Immigration Headquarters Gosa and Federal-Housing Lugbe groundwater water samples were measured and compared with Water Board and hand-dug well water samples from the same area using inductively coupled plasma mass spectrometry. The highest radiological risks for cancer mortality and morbidity were found to be low, with highest values of 1.24×10^{-7} and 1.64×10^{-7} obtained from Federal-Housing Lugbe borehole. The chemical toxicity risk of ^{238}U in drinking water over life time consumption has a mean value of $4.0 \times 10^{-4} \mu\text{g kg}^{-1} \text{day}^{-1}$ with highest value of $6.0 \times 10^{-3} \mu\text{g kg}^{-1} \text{day}^{-1}$ obtained from Federal-Housing Lugbe. Significantly, this study inferred that the ^{238}U concentrations reported in groundwater based-drinking originated from sheared zone of magmatic metamorphosed basaltic dyke intrusion. Due to the low risk values found in the water samples when compared with the International Reference Standard, radiological and chemical toxicity risks values may not pose any health risk to the public that rely on groundwater in the area.

Keywords

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