

Assessment of Naturally Occurring Radionuclides of the Surface Water in Vaal River, South Africa

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Abstract : Anthropogenic activities near water bodies contribute to poor water quality, which degrades the condition of the biota and elevates the risk to human health. The Vaal River is essential in supplying Gauteng and neighboring regions of South Africa with portable water for a variety of consumers and industries. Consequently, it is necessary to monitor and assess the radioactive risk in relation to the river's water quality. This study used an inductive coupled plasma mass spectrometer (ICPMS) to analyze the radionuclide activity concentration in the Vaal River, South Africa. Along with thorium and potassium, the total uranium concentration was calculated using the isotopic content of uranium. The elemental concentration of ^{238}U , ^{235}U , ^{234}U , ^{232}Th , and ^{40}K were translated into activity concentrations. To assess the water safety for all users and consumers, all values were compared to world average activity concentrations 35, 30, and 400 Bqkg^{-1} for ^{238}U , ^{234}Th , and ^{40}K , respectively, according to the UNSCEAR report. The results will serve as a database for further monitoring and evaluation of the radionuclide from the river, taking cognisance of potential health hazards.

Keywords : Val Rivers, ICPMS, uranium, risks

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