

Analysis of natural occurring radionuclide activity concentration of fish in west coast waters of Sabah, Malaysia

ABSTRACT

Fish is an important source of protein in human diets, but concerns arise due to natural radionuclide contamination in food and water sources. The study aimed to assess the concentration radionuclides activities (^{232}Th , ^{238}U , and ^{40}K) in three commercial fish species from west coast waters of Sabah, Malaysia. Additionally, the annual effective dose and cancer risk for adults consuming these fish were evaluated. The concentration analysis was conducted using the inductively coupled plasma-mass spectrometer (ICP-MS) technique. The average concentration levels of radionuclide activity detected, and the annual effective dose was estimated to be much lower than UNSCEAR recommendations. The collective effective dose was estimated at $1.88 \mu\text{Sv y}^{-1}$ for ^{232}Th , $1.11 \mu\text{Sv y}^{-1}$ for ^{238}U , and $15.12 \mu\text{Sv y}^{-1}$ for ^{40}K . The cancer risk for adults from the annual effective dose was also found to be much lower than UNSCEAR and ICRP recommendations. Based on the study's findings, consuming fish from west coast waters of Sabah is deemed safe. However, it is recommended to establish a long-term monitoring system for radionuclide bioaccumulation in fish to gather valuable information for assessing the potential health risks associated with radionuclides in Malaysia, particularly in the Sabah.