

**ASSESSMENT OF RADIONUCLIDES AND HEAVY
METAL IN VARIATION OF BOTTLED DRINKING AND
MINERAL WATER**

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ABSTRACT

ASSESSMENT OF RADIONUCLIDES AND HEAVY METALS IN VARIATION OF BOTTLED DRINKING AND MINERAL WATER

Bottled drinking and mineral water originally comes from underground water sources and treated pipe water source. The contamination of radionuclides and heavy metals may happen before the water were being distributed as they can diffuse into the water sources and then being ingested by the consumers. Ten bottled drinking and mineral water of different brands were used in this study. Radionuclides that were assessed in this study were ^{238}U , ^{232}Th and ^{40}K , while heavy metals assessed were Cd, Pb, Cu, As, Hg, Fe, Mn, Zn and Ni. Radiological risks and heavy metals risk assessment were conducted to calculate and determine the ingestion risks for the water samples to be consumed in long time period. Presence of these elements were traced and detected using EDXRF and ICP-OES. Radionuclides were detected from EDXRF and heavy metals were traced from ICP-OES. From the results, ^{238}U and ^{232}Th were absent from all ten water samples and ^{40}K present in all samples. Radiological risks for radionuclides, annual effective dose rate and external hazard index were determined: showing all values of AED for all samples below standard world limit and values for hazard index does not exceed the unity value of 1. Heavy metals traced from ICP-OES revealed Cd was the only element present in all water sample, Ni and Pb traced in some water samples and the remaining heavy metals totally absent in all water samples. By calculating the heavy metal risk assessment, the value of chronic daily intake does not exceed the standard set by the world health organization. Hazard quotient for all elements traced in the water samples also does not exceed the value of unity of 1.