

Health risk assessment of heavy metals in drinking water from Iponri water treatment plant, Lagos water corporation Nigeria

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Abstract. Urban water supplied from treatment plants can constitute public health problems if poorly treated or accidentally contaminated. Water quality and health risk assessment of water supplied from Lagos State water treatment plant was performed. Heavy metal concentration was determined using Atomic Absorption Spectrophotometer. The mean concentrations of Pb, Cu, Zn, Fe, Mn, Cd, Ni, As and Cr were within the standard maximum permissible limits for drinking water quality. The mean estimated daily intake through oral ingestion of drinking water for Pb, Cu, Zn, Fe, Mn, Cd, Ni, As and Cr were 0.00024, 0.00117, 0.00158, 0.00665, 0.00736, 0.000271, 0.00148, 0.000563 and 0.000834 mg/kg bw/day respectively, but were within acceptable tolerable daily intake standards for adult population. The values of hazard quotients for the heavy metal in water samples were below one for adult population. Hazard indices of treated water samples were below the threshold value of one ($HI < 1$) while hazard indices of untreated and pre-treated water samples exceeded one, indicating possible associated potential health risks as a result of combined effects of the heavy metals through oral consumption water. Incremental life cancer risk values of Cd, Ni, As and Cr in all the three categories of water samples exceeded the safe limit for cancer risk while the cumulative cancer risk ($\Sigma ILCR$) also exceeded the proposed threshold safe risk limit ($> 1 \times 10^{-4}$), indicating potential carcinogenic lifetime health risk in adult population through oral consumption of the heavy metal in water. Conclusively, the treated water had lowest levels of heavy metals, hazard quotient, incremental life cancer risks values and unsafe for drinking purposes compared to the untreated and pre-treated water.

Keywords: heavy metals; concentration; incremental life cancer risks; water treatment plant.

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