EVALUATION OF HEAVY METAL CONCENTRATIONS IN DIFFERENT LOCAL BRANDS OF BOTTLED DRINKING WATER

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ABSTRACT

EVALUATION OF HEAVY METAL CONCENTRATIONS IN DIFFERENT LOCAL BRANDS OF BOTTLED DRINKING WATER

High concentration of heavy metals in bottled drinking water have affected many people around the world in a long-term effect. The objectives of this study are to determine selected heavy metal, to estimate the health risks, and to compare it with a World Health Organization (WHO), United States Environmental Protection Agency (USEPA), and Ministry of Health (MOH) Malaysia. Four different brands of drinking water were purchased from the supermarket as the samples in this study. All water samples were labelled as Sample A, B, C, and D. The pH, temperature, and types of heavy metals presence in the drinking water samples were identified and the Chronic Daily Intake (CDI), Hazard Quotient (HQ), and Lifetime Cancer Risk (LCR) were calculated. All four samples were analyzed using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES) for determination of heavy metals. The average concentration of heavy metals were compared with WHO, USEPA, and MOH Malaysia guideline. The pH for all drinking water samples were within the limits. The temperature for all samples were slightly higher than the recommended temperature due to the external factors. Types of heavy metal exist in the drinking water samples were Al, Fe, Mg, and Pb. The highest heavy metal concentration found was Pb in the Sample D with 0.46 mg/L and is exceeding the permissible limit. As a conclusion, all drinking water samples are safe to be consumed as all water samples were HQ < 1 and within the acceptable range of LCR values.