



The effect of hospital wastewater discharge of Medical City, Baghdad on heavy metals concentration of the Tigris River

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ABSTRACT

Tigris River is one of the main sources of water in Iraq; therefore, it is important to assess the quality of its water and determine the pollutants that may affect its quality. Several sources of contamination that impact the water quality of the Tigris River are located in Baghdad. The hospital of Baghdad Medical City is considered an important source of pollution to the Tigris River. This study examined the change of the heavy metals concentrations of Tigris River water as a result of the discharge of the hospital wastewater of Baghdad Medical City to the river. The water quality index was used to assess and evaluate the type of water quality. The period of the study started in January 2020 and ended in October 2020. In this study, three points to collect the water samples from the river were selected. The first point was 700 m before the Medical City complex. The second one was at the discharge point of the wastewater of the Medical City into the river. The third point was located at 400 m after the discharge point. Water samples were collected from these sites at a depth of approximately 10–30 cm below the water surface. Several variables such as Pb, Cd, Fe, Cu, Zn, Mn, Cr, Ni, Ag were used to determine the quality of the water. Results indicated that the concentration of the selected heavy metals of site 3 was much higher than that of site 1. For example, the concentration of Pb in January at site 1 was 0.0125 mg/L compared to that of site 2 which was 0.3213 mg/L. In addition, the concentrations of the constituents of site 3 were lower than that of site 2. For instance, the concentration of Pb of site 3 (0.0781 mg/L) was lower than that of site 2 (0.3213 mg/L) but still higher than that of site 1 (0.0125 mg/L). The lower concentration of site 3 indicates the presence of dilution by the river water body; however, it is not a solution since there are multiple sources of pollutants to the river. Moreover, the results showed that the concentration of most of the selected heavy metals of site 1 was either not deducted or very low compared to sites 2 and 3 which indicated the significant amount of pollution discharged to the river by the hospital wastewater. Overall, most of the findings highlighted that the concentration of the heavy metals exceeded the river maintenance system permissible of the Iraqi standard and the World Health Organization (WHO).

Keywords: Tigris River; Medical City; Wastewater; Heavy metals; Water quality index

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