Water Quality Assessment of Euphrates River Using Heavy Metal Pollution Indices Within Fallujah City Reach, Anbar Province, Iraq

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Abstract

This study aims to assess the water quality of the Euphrates river in the section Fallujah Euphrates Reach (FER), in the city of Fallujah, western Iraq. Six heavy metals: $Cr3+$, $Fe2+$, $Zn+2$, $Mn+2$, $Ni+2$ and $Pb+2$ and ten water stations were chosen for the purpose of knowing whether or not these minerals are available in this important section of the Euphrates river and their concentrations in the river water because these minerals are harmful to health due to its lack of decomposition and accumulation within the organs of the body of living organisms. The samples were analyzed using Inductively Coupled Plasma Atomic Emission Spectrometry ICP-OES. Heavy Metal Pollution Index (HMPI), Heavy Metal Evaluation Index (HMEI), and Contamination Degree (CD) were employed to evaluate water quality. The findings were revealed that concentration of $Fe2+$, $Ni+2$, and $Zn+2$ exceeded the permissible limits based on Iraqi standard IQS, World Health Organization WHO, and United States Environmental Protection Agency USEPA standards, whereas $Cr3+$, $Pb+2$, and $Mn+2$ concentrations were non-existent. Based on HMPI, HMEI and CD values, pollution of the Euphrates river is low. which indicates a small amount of pollution, and because the Euphrates water discharge is high, the concentration of heavy metals does not affect the river water. According to national and international guidelines, FER suffers from a low level of heavy metal pollution. However, the (CD), (HMPI), and (HMEI) indices indicated that FER water quality was satisfactory. In other words, the water quality of the Euphrates river in the current study reach is good, but that does not mean that the water is used without treatment to be pumped into the city. It has a low pollution rate, but that may have a negative impact on the health of consumers