



Heavy metals and geo-accumulation index development for groundwater of Mathura city, Uttar Pradesh

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ABSTRACT

Heavy metal pollution in urban areas of India is very severe and complex. This study has been conducted to assess the health risk of inhabitants by heavy metals (Cd, Mn, Fe, Cu, Pb, Zn, Ni, and Cr) through the groundwater intake of Mathura city of Uttar Pradesh, India. A total of 65 groundwater samples were collected, and these samples were analyzed for the presence of heavy metals (Cd, Mn, Fe, Cu, Pb, Zn, Ni, and Cr). The total concentration of heavy metals present in groundwater was in the order of Ni > Fe > Pb > Cr > Cd > Zn > Mn > Cu. Sediment quality indicator such as heavy metal pollution index (HPI) and geo-accumulation index (I_{geo}) were also evaluated in addition to multivariate statistical techniques, such as Pearson correlation matrix. The HPI mean value has been found to be 66.61 indicating the groundwater quality is in poor condition. The I_{geo} results confirm the certain extent of heavy metals contamination in the groundwater of Mathura city with respect to Pb, Cd, Ni, Fe, and Cr. The correlation matrix of the heavy metals in the groundwater has also been evaluated. No significant correlations have been observed among most of these heavy metals, indicating different anthropogenic and natural sources of contamination.

Keywords: Heavy metals; Geo-accumulation index; Pearson correlation coefficient

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