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Assessment of heavy metal pollution of Yamuna water in Mathura region through index analysis approach

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Abstract

Heavy metal pollution of Yamuna river water in Mathura region at sites viz., M1, M2, M3, M4 and M5 was assessed for summer. Mean concentration followed the order Zn ($1860 \mu\text{g l}^{-1}$) > Fe ($1222 \mu\text{g l}^{-1}$) > Pb ($656 \mu\text{g l}^{-1}$) > Cd ($254 \mu\text{g l}^{-1}$) \geq Mn ($158 \mu\text{g l}^{-1}$) > Cu ($116 \mu\text{g l}^{-1}$) > Ni ($96 \mu\text{g l}^{-1}$) > Cr ($70 \mu\text{g l}^{-1}$). Fe, Pb, Ni and Cr were within permissible limit for irrigation water quality at all sites whereas Cd, Zn, Cu and Mn were above the limits at specific sites. Mean heavy metal pollution index (HPI) for each sampling site reflected highest pollution at M4 site. Mean HPI for Yamuna water in summer, i.e., 2035, was conspicuously higher than the maximum limit of 100. Metal quality index (MQI) value was highest at M4 site i.e., 75 and mean MQI of the river was 30. Pearson's analysis showed significant positive correlation among all heavy metals indicating common point-source of pollution.

Keywords: Heavy metal pollution index (HPI), Heavy metals, Metal quality index (MQI), Pearson's correlation, Yamuna