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Topic of Research: Ecological Risk Assessment of Arsenic in Surface Sediments of Gomti River in Lucknow

Findings

Summary of Abstract: The study was undertaken to analyze the arsenic contamination in surface sediments of Gomti river in Lucknow and the associated risk with the arsenic contamination. To carry out the investigation, pre and post monsoon surface sediments and water were collected. The collection was done from twelve sampling sites which were lying within and outskirts of the city. Indices, namely geoaccumulation index, contamination factor, pollution load index, percentage enrichment factor were calculated to evaluate the level of pollution intensity, heavy metal contamination, heavy metal enrichment and pollution load due to all heavy metals respectively. The results derived bring to the fact that pre monsoon value of these indices were showing greater values than the post monsoon values. According to the I_{geo} values, sampling sites are extremely polluted by cadmium, heavily polluted by arsenic, moderately by lead, unpolluted to moderately polluted by other heavy metals in both the seasons. Contamination due to arsenic and cadmium at all sampling sites are very high, moderate due to zinc, considerable due to lead and low due to other heavy metals. Pollution load index reflects the presence of contaminants at all sampling sites. Heavy metal enrichment is more in midstream followed by downstream and upstream. Of all the employed indices, midstream values have higher pollution intensity followed by lower and upper reaches. In water samples, except cobalt, chromium and zinc, the investigated heavy metals are acting as pollutants in both the seasons. In the end potential ecological risk index values revealed that there is high risk due to arsenic, very high risk due to cadmium and low risk due to other heavy metals. The comprehensive potential ecological risk index due to all investigated heavy metals revealed that all twelve sampling sites are under very high risk. Moreover, the risk in both seasons is maximum in the middle stretch of river followed by upper and lower reaches. There is a relation between the socio-economic status of the people living in arsenic contaminated zone and arsenic poisoning. These respondents were directly or indirectly exposed to the river water and surface sediments. There was absence of chronic arsenic symptoms but the frequency of occurrence of acute symptoms have increased. Despite of heavy pollution status, there is absence of chronic arsenic symptoms because the arsenic poisoning is a recent phenomenon in Lucknow. There might be absence of visible risk but there is potential future risk to humans living in the proximity of the river. The respondents are unaware of arsenic poisoning and its health impacts.