

ARSENIC POISONING OF GROUNDWATER IN PARTS OF MIDDLE GANGETIC PLAIN, BHAGALPUR DISTRICT, BIHAR, INDIA

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Abstract

The present article provides an overview of the problems pertaining to the occurrences of arsenic (As) in the groundwater of Bhagalpur district, Bihar, India. Although it is a newly exposed area for arsenic contamination, it is of prime concern because it carries a large human population. Since enrichment of this dissolved ion may cause health hazard, a field survey is carried out based on questionnaire to get health status. It is found that ~ 37% of the population are suffering from minor or major ailment related to arsenic poisoning. Nearly one million people from 11 out of 16 blocks surveyed are likely at risk of arsenic exposure, and quite a few hundreds have by now been affected by keratosis and skin exfoliation. Total As concentration in water samples varies from 19.1 to 118 $\mu\text{g/L}$, with a dominance of As (III) species (66–67%). Through saturation index using PhreeqC it was found that most of the samples are saturated for mineral goethite, while some of samples are saturated for calcite and dolomite but with any of the arsenic minerals. Mobilization of arsenic from the alluvial aquifers is mainly effected through reductive dissolution of the iron oxyhydroxides present as coatings on sand grains as well as altered mica (biotite). Near to the Gangetic flood plain more than 60% of the tube wells (shallow aquifers) are affected. Groundwater is characterized by slightly alkaline pH with a moderate to strong reducing nature. The waters are generally of Ca-Cl and Ca-HCO₃ type, with HCO₃ as the principal anion. Low SO₄ and NO₃ are distinctive chemical characteristics of groundwater.

Keywords: Arsenic, Middle Gangetic Plain, PhreeqC, Health perspective, Groundwater.