

Assessment of Arsenic Contamination in Agricultural Soils of Buxar, Bhojpur and Patna Districts in Bihar, India †

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Abstract: Arsenic (As) is a nonessential and toxic metalloid found in sediments, soils, and aquatic environments. Arsenic-contaminated agricultural fields deteriorate plant growth and development around the world. Its exposure has serious impacts on the health of living beings, including humans. In this study, total 71 soil samples were collected from the agricultural fields of 3 different districts; Buxar (n=21), Bhojpur (n=34), and Patna (n=16) in Bihar, India. Arsenic concentration in soil samples was determined by Wavelength Dispersive X-ray Fluorescence (WD-XRF) method. The pH, oxidation-reduction potential (ORP), organic matter (OM), cation exchange capacity (CEC), and available phosphorous of the samples were analyzed. The mean and range of As concentration were found to be 16.72 mg kg⁻¹ (13.9-19.4 mg kg⁻¹), 17.18 mg kg⁻¹ (13.9-21.1 mg kg⁻¹) and 17.16 mg kg⁻¹ (14.8-20.5 mg kg⁻¹) in Buxar, Bhojpur and Patna, respectively. Out of 71 samples, 3 samples were found to have As concentration equal to or higher than the maximum permissible limit i.e., 20 mg kg⁻¹. These 3 samples were taken from Salempur, Benwaliya, and Gundi with As concentrations of 20.4 mg kg⁻¹, 20 mg kg⁻¹ and 21.1 mg kg⁻¹, respectively. To assess the contamination level, various indices like pollution load index and ecological risk assessment were calculated. The study provides information about the As contamination scenario in the middle Gangetic basin.

Keywords: arsenic; agricultural soil; middle Gangetic basin.

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Conflicts of Interest

The authors declare no conflict of interest.