



Arsenic speciation analysis and remediation techniques in drinking water

Vinod Kumar Gupta^{a,e,*}, Arunima Nayak^a, Shilpi Agarwal^a, Rajendra Dobhal^b,
Devi Prasad Uniyal^b, Prashant Singh^c, Bhavtosh Sharma^c, Shweta Tyagi^c, Rakesh Singh^d

^aDepartment of Chemistry, Indian Institute of Technology Roorkee, Roorkee 247 667, India
Tel. +911332285801; Fax: 91-1332-286202; email: vinodfcy@gmail.com

^bUttarakhand State Council for Science and Technology (UCOST), Dehradun 248 001, Uttarakhand, India

^cDepartment of Chemistry, DAV (PG) College, Dehradun 248 001, Uttarakhand, India

^dDepartment of Chemistry, DBS (PG) College, Dehradun 248 001, Uttarakhand, India

^eChemistry Department, King Fahd University of Petroleum & Minerals, Dhahran 31261, Saudi Arabia

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ABSTRACT

Arsenic is present in environment in trace amounts in rocks, soil, water and air but its toxicity effects are highly dependent on its chemical forms; inorganic and organic. There is a direct association between elevated arsenic exposure through drinking water and prevalence of different types of cancers. Present review describes the brief account of arsenic chemistry with reference to water and environment which is relevant to its toxicity arising out of different arsenic species and finally its remediation technologies. The quantification of arsenic species is difficult owing to the low concentration of arsenic in drinking water which is relatively lower than detection limits of modern analytical methods. New hyphenated techniques with more advanced tools have therefore, been discussed in the present paper which are being used in arsenic speciation analysis. The present review also highlights the importance to identify and quantify each chemical species of arsenic as more than 20 arsenic compounds are present in natural environment and in biological systems. Below microgram per liter detection limits are required to quantify arsenic species from these systems and a combination of chromatographic separation with atomic spectroscopy and mass spectroscopic detection is therefore, the most suitable speciation choice. The second important criteria viz. arsenic remediation from contaminated water for supply of safer drinking water is discussed and various remediation technologies are reviewed.

Keywords: Arsenic; Drinking water; Toxicity; Remediation technologies; Speciation analysis; Hyphenated methods

*Corresponding author.