Evaluation of industrial based adsorbents for simultaneous removal of arsenic and fluoride from drinking water

SADIA BIBI[1] AND ABIDA FAROOQI[2]

[1]Faculty of Biological Sciences, Department of Environmental Sciences, Quaid-i-Azam University, Islamabad, Pakistan.
[2]Faculty of Biological Sciences, Department of Environmental Sciences, Quaid-i-Azam University, Islamabad, Pakistan.

Present study aimed to assess selected industrial waste materials for simultaneous removal of arsenic and fluoride from drinking water. Commercially available Hydrated Cement, Marble Powder (waste) and Brick Powder (waste) were used. The surface morphology of adsorbents was studied by Scanning Electron Microscopy (SEM). Batch adsorption tests were performed to evaluate the percent removal and adsorption capacity of adsorbents, under optimum conditions of time, dose, pH and adsorbate concentration. Removal %age of studied adsorbents followed the decreasing trend: Hydrated Cement>>Bricks Powder>Marble Powder. Hydrated Cement showed highest percentage removal, 97% and 80% for As and F respectively. The applicability of the adsorbents for As was assessed under natural conditions with As contaminated groundwater. In order to determine maximum adsorption capacity of adsorbents and to understand the nature of reaction on their surfaces, Langmuir and Freundlich isotherm were calculated. This study revealed that this new adsorbent (Hydrate Cement) is indigenous, easily available and could be easily applied in order to diminish the arsenic and fluoride pollution in drinking water e.g., in rural areas of Pakistan.