

## Quantitative assessment of arsenic adsorption on mineral - water interface

Concentration of arsenic in ground water sources in South Asian countries exceeds WHO limits. Industrial discharges application of arsenical insecticides and pesticides can elevate the levels of arsenic in soil. In this investigation  $\text{AsO}_3^{3-}$  and  $\text{AsO}_4^{3-}$  adsorption on common minerals such as gibbsite and kaolinite was studied as a function of pH and ionic strength (0.1, 0.01, 0.001 mol  $\text{dm}^{-3}$   $\text{NaNO}_3$ ). Hydride generation atomic absorption spectrophotometry was employed for direct determination of  $\text{AsO}_3^{3-}$  and  $\text{AsO}_4^{3-}$ . Active surface areas of the two minerals were determined by constructing a fluoride adsorption isotherm. It was revealed that, percentage adsorption of  $\text{AsO}_3^{3-}$  and  $\text{AsO}_4^{3-}$  were low (1- 85%) on gibbsite over the pH range of 4 - (when compared to kaolinite (60-95%). Active surface area in gibbsite was 13.467  $\text{m}^2 \text{g}^{-1}$  and in Kaolinite was 17.192  $\text{m}^2 \text{g}^{-1}$  according to this study.

The lowest ionic strength shows the maximum adsorption for  $\text{AsO}_3^{3-}$  and  $\text{AsO}_4^{3-}$  on both minerals. Percentage  $\text{AsO}_3^{3-}$  adsorption on gibbsite was not significant and observed a maximum of 15% when the initial  $\text{AsO}_3^{3-}$  concentration is 0.2669  $\mu\text{mol dm}^{-3}$  in acidic medium (pH 4 - 4.5). Percentage  $\text{AsO}_3^{3-}$  adsorption on kaolinite was significant and low between pH 7.5 - 9.5. When the initial concentration is increased in kaolinite suspension, Percentage  $\text{AsO}_3^{3-}$  adsorption was decreased but observed to be independent from pH and ionic strength.  $\text{AsO}_3^{3-}$  adsorption on both minerals were observed a maximum adsorption at pH 4 -7 and minimum when pH is higher than 7.