



Performance of Iron-oxide Coated Sand for Removal of Arsenic from Drinking Water

Pankaj Sharma, Sunil Garg, and Sanjay Satpute*

Department of Soil and Water Engineering, Punjab Agricultural University, Ludhiana-141004, Punjab, India

**Corresponding author E-mail: sanjay4471@pau.edu*

Abstract

Arsenic (As) is a toxic element, its presence in groundwater causes severe human health issues, which require proper treatment before its use as drinking water. Iron oxide coated sand shows good adsorbent property for removal of arsenic from groundwater. The present study describes method for removal of arsenic, total coliform and faecal coliform from contaminated groundwater using iron oxide coated sand and charcoal in batch studies conducted as a function of adsorption time (30, 120 and 240 minutes), flow rate (1, 2, 4 and 7 l h⁻¹), thickness of filter media (5, 7.5 and 10 cm) and initial arsenic concentration (0.10 and 0.25 mg l⁻¹). The maximum As⁺³ removed was 100 percent for initial concentration of 0.25 mg l⁻¹ and 0.10 mg l⁻¹, respectively for adsorption time of 120 minutes at flow rate of 1 l h⁻¹ for thickness of filter material 10 cm. For concentration less than 0.10 mg l⁻¹, thickness of filter media (IOCS + charcoal) can be taken as 10 and 20 cm, flow rate 1 l h⁻¹ and adsorption time 120 minutes for removal for total coliform and faecal coliform. The batch study suggests that iron oxide coated sand can be effectively used to achieve a low level of arsenic in drinking water.

Key words: Arsenic, Groundwater, Iron oxide coated sand, Drinking water, Adsorption