Bio-Sand filter to treat arsenic contaminated drinking water

Syed Hasnain Shah\textsuperscript{a}, Qaisar Mahmood\textsuperscript{a,*}, Iftikhar Ahmed Raja\textsuperscript{a}, Arshid Pervez\textsuperscript{a}, Abida Kalsoom\textsuperscript{b}

\textsuperscript{a}Department of Environmental Sciences, COMSATS Institute of Information Technology, Abbottabad Campus University Road, Tobe Camp Postal Code 22060, Abbottabad, Pakistan
Tel. +92 992 383591; Fax: +92 992 383441; email: mahmoodzju@gmail.com
\textsuperscript{b}Department of Chemistry, COMSATS Institute of Information Technology, Abbottabad Campus University Road, Tobe Camp Postal Code 22060, Abbottabad, Pakistan

Received 20 June 2013; Accepted 20 November 2013

\textbf{ABSTRACT}

The global presence of arsenic (As) in drinking water has endangered the safety of human health. The present research investigated the removal of As in drinking water using bio-sand filtration (BSF). Various treatments i.e. T1 (Pinus bark), T2 (brick powder), and T3 (mixture of T1 and T2) were used to investigate the As removal from drinking water by batch mode column experiments at room temperature (15–20°C) for 90 d. Batch experiments were conducted to check the As removal efficiency of Pinus bark and brick powder. Adsorption studies involved changing of the As and adsorbent concentrations. The BSF containing Pinus bark having depth of 5 cm showed the maximum As adsorption i.e. 95% over the time period of 80 d and adsorbed the maximum As concentration of 13.843 mg. The BSF may serve as good option for the treatment of potable water especially in the developing countries.

\textbf{Keywords:} Arsenic; Bio-Sand filter; Brick powder; Pinus bark; Reduction; Adsorbent; Treatment