ABSTRACT

The aim of this paper is to study the treatment of 4-chlorophenol bearing water by biological treatment in sequencing batch reactor (SBR) without any adsorbent (blank-SBR) and with an SBR loaded with granular-activated carbon (GAC–SBR) in instantaneous mode. Adsorbent dose used for GAC–SBR was found to be 16 g/L. It was observed that addition of GAC enhanced the ability of activated sludge in resisting the shock load of organics. React phase duration in blank-SBR and GAC–SBR was found to be 6 and 4 h, respectively. Removal efficiencies of blank-SBR and GAC–SBR at optimum conditions and for initial 4-chlorophenol concentrations of 100, 200, 250, and 500 mg/L were found to be 68.6 and 97%; 46.9 and 96.9%; 23.5 and 96%; and 5 and 95.9%, respectively. Kinetics of treatment process has been studied in both blank-SBR and GAC–SBR. Characterization of the sludge was done using scanning electron microscopy (SEM)/energy dispersive atomic X-ray (EDAX) analysis. Settling and filterability characteristics of the sludge have also been studied.

Keywords: Sequencing batch reactor; 4-Chlorophenol; Adsorption; Granular-activated carbon; Kinetics