Simultaneous removal of Cr(VI) from water containing sulfate using nanofiltration

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\textbf{ABSTRACT}

In this paper, various parameters such as pressure, pH, and concentration levels were investigated. The Cr(VI) and sulfate concentrations chosen for the study were the same as the levels found in drinking water sources. The results indicated that a better rejection of Cr(VI) (96\%) was obtained at basic pH and at an optimal pressure of 4 bar in 0.1 mg/L and no significant effect was found between 4 and 8 bar in 0.5 mg/L concentrations. Permeate fluxes were 12.8 and 10.53 L/m\textsuperscript{2} h at 4 bar in 0.1 and 0.5 mg/L concentrations, respectively. In the presence of a fixed sulfate concentration, fluxes declined with the increasing ionic strength of Cr(VI) feed solutions. The simultaneous rejection of sulfate and Cr(VI) (varying from 90\% to 100\%) showed that the influences of the ionic strength of a mixed aqueous solution were found to be weak at the selected concentrations of both Cr(VI) and sulfate. The experiments also showed that the rejection was affected more by the ion strength of Cr(III) than by Cr(VI). To demonstrate the fate of the ions rejected, a mass balance analysis was developed under optimal experimental conditions.

\textit{Keywords:} Nanofiltration; Hexavalent chromium; Sulfate; Rejection; Permeate flux

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