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A statistical experimental design for the separation of zinc from aqueous solutions containing sodium chloride and *n*-butanol by micellar-enhanced ultrafiltration

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ABSTRACT

This paper reports the removal of zinc from aqueous solutions containing n-butanol and sodium chloride by micellar-enhanced ultrafiltration using the anionic surfactant sodium dodecyl sulfate. Statistical experimental design was used to analyze the effect of initial concentration of zinc ions, *n*-butanol, sodium dodecyl sulfate and sodium chloride, transmembrane pressure and membrane nominal molecular weight limit on the process performance for screening purposes. The linear models developed for the estimation of the effects of the process parameters were excellent. Pressure and nominal molecular weight limit, and feed concentration of sodium dodecyl sulfate and sodium chloride were the main factors affecting the absolute permeate flux and rejection coefficient towards zinc removal, respectively. Zinc was successfully removed obtaining rejection coefficients up to 99% in the most favorable experimental conditions. On the contrary, no rejection of *n*-butanol was observed.

Keywords: Micellar-enhanced ultrafiltration; Screening fractional factorial design; Zinc; *n*-butanol; Electrolyte

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