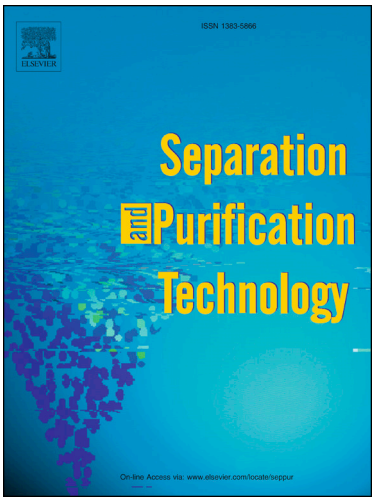

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Performance of commercial composite hydrophobic membranes applied for pervaporative reclamation of acetone, butanol, and ethanol from aqueous solutions: binary mixtures

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Abstract

In this study the efficiency of three various commercial membranes based on poly(octylmethyl siloxane), poly(ether-block-amide), and poly(dimethylsiloxane) polymers were investigated in pervaporative separation of acetone, butanol, and ethanol from aqueous binary solutions (0-5 wt. % of organics) at 60^{o}C. The influence of fermentation broth microfiltration on membrane performances in pervaporative removal of ethanol was also investigated. The use of microfiltration improved the effectiveness of the removal of ethanol from the broth comparing with the unfiltered one. Molar ratios of organics to water fluxes and Pervaporative Separation Index (PSI) values were employed to discuss membranes' performance in removal of organic solvents from binary aqueous mixture. It was found that PDMS based (Pervap4060) membrane shows the best separation efficiency in all tested binary aqueous mixtures. Modelling of the process proved the feasibility of pervaporation process for the removal of acetone, butanol and ethanol from binary and quaternary aqueous mixtures.