Effects of Operating Condition and Co-existing Ions on the Rejection Property of Endocrine Disrupter Substances by NF Me

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ABSTRACT

Abstract The objective of this research is to study the effects of operating conditions（including operating pressure, temperature and feed concentration）and co-existing ions（such as NaCl, Na2SO4 and MgSO4）on the rejection properties of the selected endocrine disrupter substances, including Bisphenol-A, Dimethyl Phthalate and Di-n-Butyl Phthalate. Rejections of Bisphenol-A, Dimethyl Phthalate and Di-n-Butyl Phthalate by NF-270 membrane are around 75%, 92% and 30%, respectively. Experimental results indicate that rejection of Bisphenol-A slightly increase with increasing operating pressure. Similary, the increase in solution temperature results in the increaseof the diffusion cofficient of solutes, therefore, the rejection of endocrine disrupter substances will decrease. When the differences of molecular weight and molecular radius among endocrine disrupter substances are not apparent, steric exclusion and the octanol-water partition coefficient are the major factors influencing the rejection. NF-270 membrane has higher rejection to the compound with smaller octanol-water partition coefficient. When the co-existing ions exist, structure of the membrane becomes more compact, so the permeate flux will drop. When NaCl and Na2SO4 exist, the influences on the rejections of Bisphenol-A and Dimethyl Phthalate are more apparent. Comparing with the condition of the single electrolyte, rejections of Na2SO4 and MgSO4 with the existence of endocrine disrupter substances do not show significant difference, because the major rejection mechanism of Na2SO4 and MgSO4 are charge effect.

Keywords : NF-270 membrane ; endocrine disrupter substances ; Bisphenol-A ; Dimethyl Phthalate ; Di-n-Butyl Phthalate ; co-existing ions

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