Effects of operating condition and feed water quality on the rejection properties of pesticides by NF membrane

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ABSTRACT

The objective of this research is to study the effects of operating conditions (such as applied pressure and temperature) and feed water quality (such as feed concentration, pH level, and co-existing inorganic ions) on rejections of the selected pesticides, including monocrotophos, atrazine, diuron, and isoproturon. Rejections of monocrotophos, atrazine, diuron, and isoproturon by NF-270 are around 99%, 96%, 56%, and 83%, respectively. Results also show that rejections of four pesticides will decrease with the increase of applied pressure and the decrease of temperature. The explanation for the rejection variations and rejection mechanism are also examined in this work. Change of pH value will affect the rejection of monocrotophos and atrazine, because of their dissociation properties in water. Additionally, the charged pesticides possess higher rejections due to the charge interaction between the NF membrane and the charged analytes. As for the influence of the co-existing ions, only the rejections of isoproturon/Na2SO4 and monocrotophos/NaCl have significant differences, comparing with those of the sole pesticide, based on the statistical analysis of paired comparison. Finally, a model based on the irreversible thermodynamics approach was modified and established to describe the relationship between the permeate flux and rejection. Ked words: NF-270 membrane ; monocrotophos ; atrazine ; diuron ; isoproturon；co-existing ions

Keywords : membrane

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