

Dewatering of VFAs solution Using Forward Osmosis membranes

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Volatile fatty acids (VFAs) produced via anaerobic fermentation can be used as feedstock for various biochemicals as well as mixed alcohols. The most crucial issue for the practical application of the fermentation-based VFA process is finding a low-cost dewatering process. Forward osmosis (FO) membrane technology is a promising dewatering process because the driving force for separation is an osmotic pressure gradient between the feed and draw solutions without any external pumps. In this study, the dewatering of VFAs solution using the FO mode was conducted to test the feasibility of the FO-membrane-based dewatering process. Under membrane orientation, the water flux and rejection of VFAs in the FO mode were higher than those in the PRO mode. Both the flux and rejection rate were pH-dependent for the VFA solution. In a fermentation broth, the flux behaviors were different from those in a chemical solution because the remaining nutrients and by-products increased the osmotic pressure in the feed solution. The flux behavior findings obtained under various experimental conditions provide clues to the mechanisms and parameters for the dewatering of VFAs solution.