

Modeling and Simulation of the Membrane Process Purifying Volatile Fatty Acids in Bio-fuel Process

김우현, 최진달래, 김태우, 장호남, 박선원*

KAIST

(sunwon@kaist.ac.kr*)

In a bio-fuel process using a fermentation reactor producing volatile fatty acids (VFAs), the low-cost purification of the VFAs is the most important operation to design a cost-effective bio-fuel process because the concentration of the VFAs from a fermentation reactor is generally below 5% by weight. Thus, the application of a forward osmosis (FO) membrane process can be one of the most effective solutions in terms of operating cost since a FO membrane process only utilizes an osmotic pressure gradient. In this work, the dynamic behaviors of the membrane process have been studied by modeling and simulation. The model for the membrane is validated with the experimental data and the dynamic simulation results of the proposed model represent time-varying concentration profiles. Therefore, this work will contribute to designing FO membrane units of commercial bio-fuel production processes.