

## Concentration of skim milk using a hybrid system of osmotic distillation and membrane distillation

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### ABSTRACT

For several dairy processes, concentration of milk by removing its water content at certain proportions is a principal step. In this study, milk is concentrated using osmotic distillation. The effect of operation parameters including draw solution concentration, temperature, feed and draw solution rates on flux was assessed. The experimental data were compared with the simulated data and it was shown that theoretical results were coherent with the experimental ones. To avoid brine dilution during osmotic distillation, a hybrid process of osmotic distillation and direct contact membrane distillation was proposed to concentrate milk and brine simultaneously. Final brine concentrations and consequently fluxes obtained with hybrid process were higher than the fluxes obtained with osmotic distillation. The proposed osmotic distillation–membrane distillation hybrid system is promising for concentration of liquid food and dairy products such as milk and whey.

*Keywords:* Osmotic distillation; Membrane distillation; Milk concentration; Membrane contactors; Brine recovery

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