

ABSTRACT:

This article presents a mathematical model to assess and optimize the separation performance of an enantioselective inclusion complexation-organic solvent nanofiltration process. Enantiomer solubilities, feed concentrations, solvent compositions, permeate solvent volumes, and numbers of nanofiltrations were identified as key factors for process efficiency. The model was first tested by comparing calculated and experimental results for a nonoptimized process, and then, calculations were carried out to select the best operating conditions. An important finding was that the optimal configuration varied with the objective function selected, e.g., resolvability versus yield, with a boundary on product optical purity. The model also suggested that the process efficiency could benefit from diafiltration of the distomer and from the use of higher feed concentrations. However, the latter strategy would result in higher losses of eutomer. To address this drawback, a multistage process was evaluated using the verified process model.