

SMB (Simulated Moving Bed) process for the separation of Furfural and HMF
(Hydroxymethylfurfural)

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Furfural and Hydroxymethylfurfural (HMF) become potential platform chemicals and those are derived from xylose and glucose during cellulose or hemicellulose processing for biorefinery, respectively. The objective in this study is to design a separation process of these two materials having similar chemical structure using SMB (Simulated Moving Bed) chromatography. SMB was a continuous separation process based on the chromatographic technique. Determination of the operating conditions is carefully considered for the successful separation using SMB and that is obtained from the triangle theory. In this study, Aspen chromatographyTM was employed to verify the determined operating conditions by simulations. From a simulation result, both furfural and HMF were separated with purities of 94%. Its operating conditions were, however, founded a region out of triangle. For the reasons, it was considered that the triangle theory is not to satisfy the local equilibrium theory and the dynamic equilibrium is affected by the low parameters of axial dispersion and mass-transfer of materials under the high zone flow-rates and large adsorption isotherms.