Determination of isotherms of L-ribose and L-arabinose on Dow99CA/320 for the design of pilot-scale SMB

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In the previous study, the isotherms of L-ribose and L-arabinose on Dow 50WX4-400mesh (modified to the Ca^{2+} form) was measured by single-step frontal analyses and those were confirmed by simulations. And, Lab-scale SMB unit was applied for the separation of L-sugars with high purities above 99%. In this study, Dow99CA/320 resin was chosen for scale-up study of pilot-scale SMB (Simulated Moving Bed) process. A small column (1.5 cm inner diameter and 15 cm bed height) was employed to measure the isotherms on Dow99Ca320. The isotherms of L-ribose and L-arabinose are the Langmuir isotherms with competitive behavior. Pilot-scale columns (5 cm inner diameter and 50 cm bed height) were made by BioCNS Co. and one of the pilot-scale columns was tested by upward and downward elution with short-pulse injection. The elution results were compared with simulations with Aspen Chromatography™. The comparison results between experiments and simulations were not agreed well. Several reasons for the unmatched results were considered and a study to improve is ongoing.