

Effects of malfunctional column configuration on simulated moving bed performance and improvements by using FeedCol strategy

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Simulated Moving Bed (SMB) chromatography has received considerable attention due to its efficient and powerful separation capability. It has been used in fields that need highly pure product even though the separation is difficult (low selectivity). However if the adsorbent ageing occurs in a column during the long-term operation, the adsorption capacity of adsorbent will decrease and there will be deviations among columns characteristics. In this study, the effects of malfunctional column configuration on simulated moving bed performance were studied experimentally and theoretically. Two operation modes, conventional SMB and FeedCol operation were used. The malfunctional column configuration contained one malfunctional column that showed lower adsorption capacity than other columns. Regardless of the operation modes, equivalent or higher purity of extract product and lower purity of raffinate product were obtained with malfunctional column configuration. And when the column configuration was fixed, the FeedCol operation showed better performance than conventional SMB operation even with the malfunctional column configuration because of its operational flexibility.