SMB Chromatography for Separation of Eicosapentaenoic Acid (EPA) from Fatty Acids

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Eicosapentaenoic acid (EPA) is an important pharma-ceutical precursor mainly contained in extracted fish oil. EPA with over 90% purity is applicable for pharmaceutical ingredient. Simulated moving bed (SMB) has been an attractive process in industrial separation because of its technical merits, such as high purity and productivity with lower energy consumption. In this study, a SMB process for EPA separation from other fatty acids was designed. Elution tests and frontal analysis of EPA and its impurities were also carried out to determine the retention behaviors of those in C18 column. The elution order was Impurity 1, EPA, Impurity 2, Impurity 3, and Impurity 4. In general, operating condition for successful separation may be obtained inside the triangle, but the optimum operating condition in multi-component separation found in the region outside the triangle. Following the triangle analysis based upon the isotherms of EPA and Impurity 2, purity of EPA in product port increased from 75.8% to 85.2%. With operating condition of the region which was inside the triangle of impurity 1 and 3, the separation was successful with the purity of EPA of 91.3%.