SPICA

International Symposium on Preparative and Industrial Chromatography and Allied Techniques

www.spica2012.org

Oral Communications

OPTIMIZATION OF SIMULATED MOVING BED PROCESSES FOR MULTICOMPONENT CHIRAL SEPARATIONS

Ribeiro A.E. (1), Rodrigues A.E. (2), Pais L.S. (1)

(1) Laboratory of Separation and Reaction Engineering, Polytechnic Institute of Bragança, Campus de Santa Apolónia, Apartado 1134, 5301-857 Bragança, Portugal
(2) Laboratory of Separation and Reaction Engineering, Faculty of Engineering, University of Porto, Rua Dr. Roberto Frias, 4200-465 Porto, Portugal

Preparative chiral chromatography has become an attractive technology, used to obtain single enantiomeric drugs in the biotechnology, fine chemical products and pharmaceutical industries. Due to the development of new and more efficient modes of operation, chiral liquid chromatography using the simulated moving bed (SMB) technology has gained a renewed interest. The chiral separation process is a complex task, governed by several different interactions between the chiral solutes, the solvent and the chiral stationary phase (CSP). In a preparative point of view, and when considering the choice of the mobile phase (solvent) composition, a high selectivity of the enantiomers should not be the only goal to be aimed, as it is frequently followed at analytical scale. Besides the choice of a CSP with high loading capacity, a high solubility of the solutes in the solvent and low retention times should also be taken into account, in order to improve the preparative process performance.This work will present and discuss the experimental and simulation results obtained for the analytical and preparative separation of the four stereoisomers of nadolol, an important example of a non-selective beta-adrenergic receptor antagonist (β-blocker) pharmaceutical drug, widely used in the treatment of cardiovascular system diseases, such as hypertension, ischemic heart disease (angina pectoris), congestive heart failure and certain arrhythmias. The main focus will be placed in the selection of the proper CSP/solvent combination for SMB operation. Experimental results will be presented using Chiralpak AD and Chiralpak IA CSP (Daicel, Europe) and different mixtures of alkanes, alcohols and acetonitrile as solvent.