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STRATEGIES FOR MULTICOMPONENT SEPARATION OF NADOLOL STEREOISOMERS BY SIMULATED MOVING BED AND JO PROCESSES

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The Simulated Moving Bed (SMB) chromatography is an interesting alternative technique for the production of fine chemicals and pharmaceuticals. The pioneer classical SMB concept was designed for the separation of binary mixtures or to the recovery of one single component from a multicomponent mixture. In recent years, this technology has undergone through several important technical developments, allowing the exploitation of better preparative separation performances. The introduction of a wide range of new and more powerful preparative stationary phases allied to the development of new and more versatile strategies and modes of SMB operation are now a reality. Several configurations have been proposed in order to extend the SMB technology to the separation of multicomponent mixtures by using a cascade of SMBs in series or other complex SMB related techniques like multi-zone SMB, intermittent SMB and JO processes [1-3].

Nadolol is a pharmaceutical drug marketed as a mixture of its four stereoisomers and its prescription is related with some severe risks such as heart failure. This four component mixture will be used as a case study for the development of chromatographic strategies for multicomponent separation. Recently, our research group reported the pseudo-binary separation of nadolol stereoisomers by SMB chromatography [4]. A SMB pilot unit with Chiralpak AD chiral stationary phase was used to obtain the more retained stereoisomer 100% pure. A different strategy was also recently published based on a three column intermittent SMB unit [5].

A new methodology for the design, optimization and experimental implementation of the multicomponent separation will be introduced, including the use of different chiral and achiral adsorbents, the screening and choice of the best adsorbent-solvent combinations, and the use of different SMB operating modes and strategies.

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