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BOOK OF ABSTRACTS

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STRATEGIES FOR THE GLOBAL MULTICOMPONENT SEPARATION OF NADOLOL STEREOISOMERS BY CHIRAL AND ACHIRAL FIXED-BED AND SIMULATED MOVING BED CHROMATOGRAPHY

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The design and optimization of a chiral binary separation process is based on a careful selection of the proper combination between the chiral stationary phase and the mobile phase composition to separate a specific chiral binary or pseudo-binary mixture. When considering multicomponent separation, the complexity deeply increases by introducing the necessity of multi-step separation sequences (or a much more complex multi-region separation process), by opening the possibility to combine chiral and achiral stationary phases (when in presence of stereoisomers instead of just one pair of enantiomers) and to combine different separation techniques (fixed-bed and SMB related processes).

The nadolol pharmaceutical drug represents a very interesting case-study of multicomponent chiral separation since it is composed by four stereoisomers, being two pairs of enantiomers. In this way, it introduces the possibility of alternative strategies, using different kind of separation sequences and techniques, the use of different packings (chiral and achiral stationary phases), and the corresponding mobile phase optimization at both normal and reversed phase modes.

The design of the complete separation of nadolol stereoisomers asks for a global experimental and simulation methodology considering both the characterization and optimization of each separation step and its sequences to achieve the four nadolol components pure. New strategies using combinations of achiral and chiral stationary phases and sequences of different separation techniques will be presented. Extensive experimental and simulation results for the complete separation of all the nadolol stereoisomers using Chiralpak IA (chiral) and different Waters C18 (achiral) stationary phases will be presented.

The results recently obtained by our research team for this topic [1-3] clearly supports the capacity to enhance the knowledge on the chromatographic separation of chiral pharmaceuticals using preparative and SMB chromatography. In this communication we will introduce original and innovative challenges through the real separation of multicomponent (quaternary) chiral mixtures which will represent an important step forward for the pharmaceutical industry.

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