ENANTIOSELECTIVE CHROMATOGRAPHY: FROM DISCOVERY TO PRODUCTION OF CHIRAL DRUGS

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The systematic investigation of the biological activity of the individual stereoisomers has become the rule for all new chiral drugs and chiral considerations are now integral parts of drug research and development and of the regulatory process.

In this context, there has been a considerable development of enantioselective synthetic methodologies, which have now reached a high degree of diversity and complexity. Simultaneously, this trend has created an intensive demand for stereoselective separation techniques and analytical assays for accurate determination of the enantiomeric purity of chiral compounds. The development of chiral stationary phases (CSPs) or chiral selectors for gas chromatography (GC), liquid chromatography (LC) and capillary electrophoresis (CE) rapidly opened a new dimension in the area of separation technologies.

While enantioselective chromatography has become the method of choice for analytical determinations of enantiomeric purity, the significance of the technique on a preparative scale is also gaining increasing recognition as a powerful alternative of supplying the pure enantiomers of bioactive compounds [1-2]. In particular, the concomitant introduction of both, efficient chiral stationary phases, and efficient separation techniques, such as simulated moving-bed (SMB) chromatography, offers new possibilities which were not conceivable some years ago in the field of chromatographic separations.

The successful application of enantioselective chromatography as a valuable approach to separate optical isomers on a preparative and even production scale has now considerably attracted the attention of most pharmaceutical companies and the usefulness of the technology will be illustrated with various practical applications.
