

ENANTIOSELECTIVE SEPARATIONS WITH HIGH- AND ULTRAHIGH-PERFORMANCE CHIRAL LIQUID CHROMATOGRAPHY STATIONARY PHASES

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Abstract

High-performance liquid chromatography (HPLC) is a widely used technique. It can be applied for both preparative and analytical chromatography, for example in the food industry, bioanalytics, pharmaceutical industry, or environmental analysis. One important application area of HPLC is the so-called chiral separations; i.e. for the efficient separations of chiral compounds, techniques based on liquid chromatography employing chiral stationary phases (CSPs) are the most frequently applied solutions nowadays. The intense development of achiral stationary phases observed in the last decades resulted in a striking evolution of CSPs; reducing the physical dimensions of the HPLC columns CSPs with significantly higher theoretical plates have become commercially available. The full potential of these high-efficiency columns can only be exploited on chromatographic hardware specialized to ensure elevated pressures and low dead volumes, i.e. on ultrahigh-performance liquid chromatography, UHPLC.

The main technical difference between the two systems is the backpressure limit. Since the UHPLC systems can operate up to 1500 bars, smaller particles in the column can be employed, with lower column diameters, and shorter retention times, better resolutions and peak capacities can be achieved.

Macrocyclic glycopeptides are a relatively new type of selectors, but they are widely used nowadays in chiral separations. They can have multiple groups (hydroxyl, amino, carboxylic, etc.) that can interact with the sample molecules and can also contain multiple aromatic groups. Because of this wide range of possible interactions, macrocyclic glycopeptide-based columns are able to separate a lot of chiral components. For our experiments, we used teicoplanin and teicoplanin-aglycon as selectors.

We studied the enantiomeric separation of some β^2 -amino acids by performing experiments in an HPLC and a UHPLC system in a comparative manner.

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