ENANTIOSELECTIVE SEPARATIONS OF PROLINE ANALOGS WITH MACROCYCLIC GLYCOPEPTIDE-BASED CHIRAL STATIONARY PHASES

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Abstract

High-performance liquid chromatography (HPLC) is a widely used technique, which can be applied to both preparative and analytical chromatography. Chiral chromatography is a specific field of chromatography. While the pharmaceutical industry pays outstanding attention to chiral compounds, it is important to realize, that they are also present as food additives, agricultural chemicals, or fragrance materials.

The chiral stationary phases (CSPs) are the backbone of direct chiral chromatography. There is a wide range of CSPs, this way a wide range of chiral analytes can be separated. These columns are also compatible with a wide range of eluents, which also helps in optimizing the separations. The development of CSPs follows the development of achiral stationary phases and nowadays there are a lot of ultrahigh-performance columns too.

These columns can be utilized in ultrahigh-performance liquid chromatography (UHPLC) instruments. UHPLCs can work at higher pressures (up to 1500 bars) compared to HPLCs, which come with several benefits. They can operate at higher flow rates, and utilize narrower capillaries, which mean they have low dead volumes, and the columns can have smaller internal volume and can be filled with smaller particles. This means we have shorter retention times and higher chromatographic performance in most cases.

Macrocyclic glycopeptides were introduced by Armstrong and co-workers as chiral selectors in 1994. The family of macrocyclic glycopeptides contains several hundreds of different structures, but only a small number of them are used as chiral selectors, such as vancomycin, teicoplanin, teicoplanin aglycon, and rifampicin. They can have multiple groups (hydroxyl, amino, carboxylic, etc.) that can interact with the sample molecules and can also contain multiple aromatic groups.

In our studies, the enantioseparation of proline analogs was investigated, and teicoplanin, teicoplanin aglycon, and vancomycin were used as selectors. The experiments were conducted on a UHPLC system.

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