

Separation of enantiomers of chiral basic drugs with amylose phenylcarbamate-based chiral columns and aqueous-acetonitrile mobile phases in high-performance liquid chromatography

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In this work amylose phenylcarbamate-based columns with 4 different chemistries were compared to each other for separation of enantiomers of basic chiral analytes in acetonitrile and aqueous-acetonitrile as mobile phases. For two chemistries the columns with coated and “covalently immobilized” chiral selectors were also compared. The comparison of chiral selectors containing only electron-donating or electron-withdrawing substituents with those containing both, electron-donating and electron-withdrawing substituents, showed some advantage of the latter. Together with the chemistry of chiral selector the attention was paid to behavior of amylose-phenylcarbamates in aqueous acetonitrile versus acetonitrile. It has observed that in contrast to commonly accepted opinion amylose phenylcarbamates do not behave as typical reversed-phase materials. In the range of water content in the mobile phase up to 20-30% v/v the behavior of these materials is similar to hydrophilic interaction chromatography (HILIC)-type adsorbents. This means that with increasing water content in the mobile phase up to 20% v/v retention of analytes mostly decreases. The important finding of this study is that the separation efficiency improved for most of the analytes when switching from pure acetonitrile to aqueous acetonitrile. Therefore, in spite of reduced retention, the separation of enantiomers improves and thus the HILIC-range of the mobile phase is advantageous over pure polar-organic solvent mode offering shorter analysis time and better peak resolution.

Key words: chiral basic drugs, polysaccharide-based chiral selectors, separation of enantiomers.