Separation of enantiomers of selected chiral beta-blocker drugs by using novel polysaccharide-based chiral stationary phases in high-performance liquid chromatography

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The goal of the present study was systematic screening of novel polysaccharide-based chiral column for separation of enantiomers of chiral beta-blocker drugs by using various mobile phase conditions. In our studies the emphasis was placed on the elution order of enantiomers and the mechanisms of enantioselective recognition by these new materials. These studies require spiking the racemic samples with enantiomerically pure forms of chiral drugs. Since many beta-blocker drugs are not available commercially in enantiomerically pure forms, some of them must be resolved in advance by us in the micropreparative way. Up to now 16 representative drugs of this series were analyzed on 6 different chiral columns of Lux series: Lux Cellulose-1, Lux Cellulose-2, Lux Cellulose-3, Lux Cellulose-4, Lux Amylose-2 and SP-6. The instrumentation used was high performance liquid chromatograph (Agilent 1200 HPLC) equipped with the autosampler, binary pump, column thermostate, variable wavelength detector and Chemstation chromatographic software for the instrument management and data accumulation/treatment. With the necessity of the preparative separation in mind the screening was started with pure methanol and acetonitrile as mobile phases. In contrast to older generation of polysaccharide-based chiral columns the Lux series of chiral columns can be used in all 3 principal modes of chromatography (polar organic-, normal- and reversed-phase conditions). Polar organic mobile phases offer certain advantages for preparative separation of samples. The major advantages are higher solubility of analytes in these mobile phases, sharp chromatographic peaks and shorter analysis time. These advantages translate in high productivity of separation. In this presentation the results of our preliminary studies on the separation of 16 chiral analytes on 5 above mentioned columns with methanol and acetonitrile as mobile phases are presented. Several interesting examples of the reversal of enantiomer elution order based on the composition of stationary and mobile phases were observed.