

Conference abstract SL-01

New Selectors Based on Ligand-Exchange for Enantioseparation by Capillary Electrophoresis

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Sci Pharm. 2009; 77: 168

doi:10.3797/scipharm.oephg.21.SL-01

Capillary electrophoresis (CE) is a high performance separation technique, which has been developed complementary to HPLC. Many separation principles used in HPLC have been transferred to CE successfully, since method development is easy and consumption of electrolyte, selector and analytes is low.

The separation principle of ligand-exchange represents an approach for enantioseparation of analytes bearing at least two complexing moieties, such as hydroxy groups, amino groups or carboxylic groups close to the chiral center. Due to the formation of ternary complexes with metal ions, mostly Cu(II) different mobilities are observed leading to chiral separation. Herein, new chiral selectors based on this principle are presented: Copper(II) complexes of L-tartaric acid or L-threonine were applied successfully for the chiral separation of drugs containing amino alcohol structure [1]. As a result a series of sympathomimetics and β -blockers were resolved. It was found that resolution strongly depends on selector concentration and pH. The optimum for complexation was pH 12, which would be difficult to be managed in HPLC. Furthermore, copper(II), cobalt(II), nickel(II) and zinc(II) complexes of D-gluconic acid, D-saccharic acid and L-threonic acid were found to be suitable for the chiral separation of aromatic amino acids and glycyl dipeptides [2]. Although copper(II) is the most frequently used central ion, in the case of D-gluconic acid cobalt(II) was shown to be an alternative for the chiral separation of amino acids. Glycyl dipeptides, however, were resolved only with copper(II) complexes. Also in this study a broad spectrum of separations was achieved.

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- [2] Hödl H, Schmid MG, Gübitz G. Chiral separation of amino acids and glycyl dipeptides by chiral ligand exchange capillary electrophoresis comparing Cu(II), Co(II), Ni(II) and Zn(II) complexes of three different sugar acids. *J Chromatogr A*. 2008; 1204: 210–218. doi:10.1016/j.chroma.2008.05.071