

Abstract

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Title of Thesis: Chiral separations of borane cluster compounds II.

This diploma thesis focuses on screening and optimisation of chiral separations of borane cluster compounds. Approximately more than half of the currently used medications are chiral compounds whose isomers can differ in biological activity. Borane cluster compounds, some of which are chiral, represent a significant substance category due to their chiral aspects which offer new possibilities in synthesis and modification of drug structures. The aim of this diploma thesis is to propose an optimised approach for the analysis of borane cluster compounds and achieve a successful separation of enantiomers.

The theoretical part of the thesis focuses on the analysis of the basic principles of high-performance liquid chromatography, the importance of optical isomerism, the basic principles of chiral separations and introduction of borane clusters together with the possibilities of their use in modern pharmacotherapy. The practical part of the thesis focuses on experimental assessment of optimal conditions for chiral separation of selected bis(dicarbollides) on a MK ZW zwitterionic column based on quinidine using high-performance liquid chromatography. The analysis was performed in polar-organic mode and the composition of the mobile phase was optimised. The effect of changing the ratio of organic solvents in the mobile phase, changing the ratio and type of organic additives and adjusting the temperature was also tested.

During the experiment there was a partial successful separation of fifteen out of seventeen tested bis(dicarbollides) and then the study described the effects of individual parameters on enantioseparation.