Abstract

This bachelor Thesis is introducing an alternative approach to the synthesis of the pharmaceutically important compound *(R)*-4-chloro-3-hydroxybutyrate (*(R)*-CHBE). This compound is used as a precursor in the production of pharmaceutically valuable products, such as L-carnitine, *(R)*-4-amino-3-hydroxybutyric acid and *(R)*-4-hydroxy-pyrrolidone. At present time these chemicals are predominantly produced by using biochemical methods largely based on enyzmatic reactions in the presence of stereoselective carbonyl reductases. In this Thesis a new approach is described, which is based on stereoselective hydrogenation of ethyl-4-chloracetoacetate catalyzed by an optically pure ruthenium bis(phosphine) complex. The whole process was carried out in a microfluidic reactor system. This assembly is highly promising for a potential scale-up, studies of reaction kitetics, optimization of reaction and process conditions etc. For the reaction described above the optimal reaction conditions, such as temperature, pressure, solvent phase composition and flow rates of gas and liquid phases, were determined. Furthermore, the use of a suitable ionic liquid preserving the catalyst's chiral selectivity was described.

Key words: *(R)-4-chloro-3-hydroxybutyrate, L-carnitine, microfluid chip reactor, hydrogenation*