

ABSTRACT

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Title of thesis:

Optimization of HPLC separations of basic molecules of betablockers - application of new types of stationary phases

Beta blockers are pharmaceutically active substances, which affect on betaadrenergic system of human bodies. These drugs are used for various indications, particularly for the management of hypertension and cardiac arrhythmias. The substances are chemically mostly basic non-polar compounds. In this thesis HPLC separation of seven betablockers on different stationary phases was tested. The optimal conditions for separation were found by changing composition, pH and elution mode of mobile phases. In some cases temperature was also optimized as a variable. The different conditions were compared in terms of retention, resolution and symmetry of peaks. The stationary phases were compared by System suitability test under the optimal found conditions.

The results were acceptable on the Extra Densely Bonded and Double Endcapped C18 stationary phase Zorbax Eclipse-XDB. Zorbax Extend C18 column incorporating a patented bidentate silane with double-endcapping protection enabled measurements with good results even at pH 7.4 but at pH 10 the results were impaired by tailing of the peaks. The hybrid stationary phases (Gemini and X-Bridge) enabled analysis even at higher pH. Especially on X-Bridge column it was possible to make a repeatable analysis under high pH conditions. Very good results were observed also on monolithic stationary phase Chromolith C18. The separation was efficient and the time of analysis was reduced. The best results under the different pH conditions were observed on hybrid stationary phase X-Bridge, therefore the repeatability was measured and the method transfer from HPLC method to UHPLC to speed up the analysis was performed.