Analysis of a chiral coumpound Using carbohydrate CSPs columns

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Introduction

Chirality is well known in medical chemistry. Indeed, more than 40% of the drugs in use nowadays are chiral, and a new molecule will not be authorized if it is a racemic mixture. One of the several methods to separate enantiomers, is the use of HPLC, with columns created for chiral separation. Columns with carbohydrate CSP (Daicel phases) are more commonly used, when attempting to separate a new chiral molecule. There are 2 kinds of stationary phases that use a linear polysaccharide: those grafted with amylose and those grafted with cellulose. In both cases, polysaccharide can be transplanted with the group, consequently affecting retention. 2 columns were compared: Chiralcel® OJ and Chiralcel® OD. These 2 columns contained silica grafted with cellulose. The compound tested was basic in pH, due to a present pyridine function.

Experimental conditions

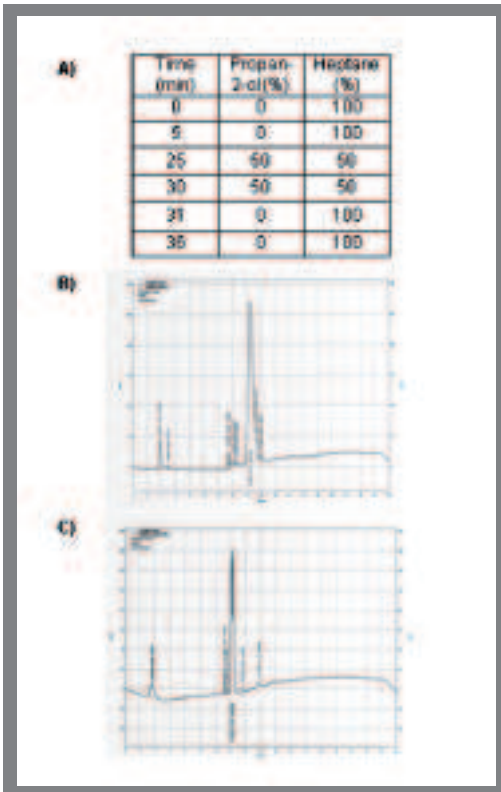
Experiments were led with a HPLC device, and spotting was detected with a UV detector at 245 nm.
The sample was dissolved in acetonitrile. This solvent was chosen because it is not corrosive to the columns.
The 2 tested columns had the same dimensions: 250 46mm, with particle diameter of 10µm. Chiralcel® OJ was filled with cellulose Tris (4-methylbenzoate) whereas the stationary phase of the Chiralcel® OD was cellulose Tris (3,5-dimethylphenylcarbamate). These columns are made to work in a normal phase; therefore, the mobile phase was prepared with n-heptane and propan-2-ol, without additive. A gradient was defined (cf table A), in line with the columns' geometry. The compound was injected into each column, using the same method (the same gradient and flow rate at 0.8 mL/min). Both experiments were performed at room-temperature, around 25°C.

Results and conclusion

Only 1 peak was observed with the Chiralcel® OJ column. Thus, enantiomers from the compound were not separated. Two peaks were observed for the Chiralcel® OD column although there was no return to the baseline. The observed differences between the columns may be attributed to the amide group in the stationary phase of Chiralcel OD® column. The resolution could be further enhanced with an isocratic method, and retention time could be better controlled with the addition of an oven to the HPLC device.

A)

Time (min)	Propan-2-ol (%)	Heptane (%)
0	0	100
5	0	100
25	50	50
30	50	50
31	0	100
35	0	100



A) Used gradient.
B) Chromatogram obtained with Chiralcel OJ column.
C) Chromatogram obtained with Chiralcel OD column.

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