LC/MS Compatible Separation of Beta-Blockers on ZirChrom®-MS

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The chromatography of basic pharmaceuticals (with amine functionalities) on C18-silica phases can be difficult due to secondary interactions that cause tailed peaks in the neutral pH range where most silica phases are stable[1]. ZirChrom®-MS is a new zirconia-based reversed-phase column that has mixed mode retention characteristics which allow for LC/MS chromatography of highly basic amines with excellent peak shape and efficiency.

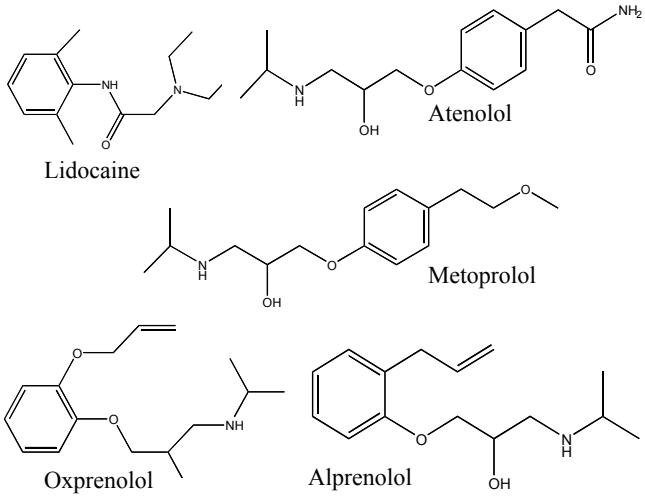

Figure 1: Structures for the Compounds of Interest.

Introduction

The chromatography of basic drugs on C18-silica phases has traditionally been problematic. The surface chemistry of zirconia-based phases is dominated by Lewis acid sites, rather than the Bronsted acid sites, which dominate the surface chemistry of silica phases. The mixed-mode retention character of ZirChrom®-MS (cation-exchange and reversed-phase) allows separations that were previously difficult using conventional silica C18 phases. This application note shows an impressive LC/MS compatible separation of beta-blockers in a highly organic, near neutral pH mobile phase.

Experimental

A mixture of five amine-containing compounds was separated using a ZirChrom®-MS column at 35 ºC. The separation conditions were as follows:

Column:	ZirChrom®-MS, 50 mm x 4.6 mm i.d. (Part Number: MS01-0546)
Mobile Phase:	Isocratic elution: 65/35 A/B A: acetonitrile B: 10mM ammonium acetate, pH 5.0
Temperature:	35 ºC
Flow Rate:	1.0 ml/min.
Injection Vol.:	5 µl
Pressure Drop:	59 bar
Detection:	UV at 254 nm

Five Beta-Blockers were separated using simple acetonitrile/water isocratic elution and an LC/MS friendly acetate buffer. The selectivity of all five compounds is excellent using only a short 5 cm long column.

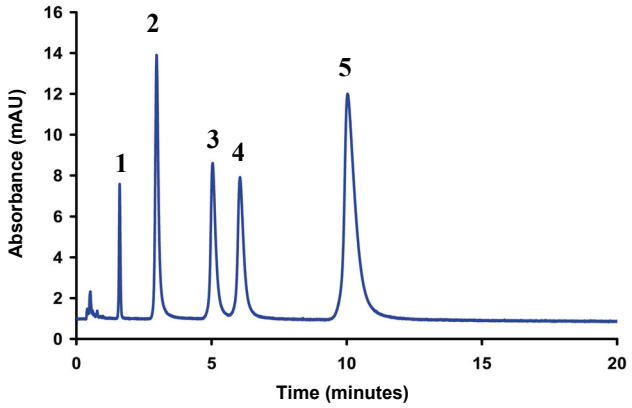

Figure 2: Separation of 1= Lidocaine, 2= Atenolol, 3= Metoprolol, 4= Oxprenolol, and 5= Alprenolol.

This method can be tailored to your specific application needs. ZirChrom method developers can help to optimize and transfer this method to your site. Please contact ZirChrom technical support at 1-866-STABLE-1 or support@zirchrom.com for details.

ZirChrom phases offer unique selectivity, high efficiency, and excellent chemical and thermal stability.

References

1) G.B. Cox, *J. Chromatography A*. **656**, 353, 1993.

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