Stability of ZirChrom®-PBD for the Fast Separation of Triptans

ZirChrom Separations, Inc.

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The following reviews a published novel analysis of four triptans in rat plasma using the ZirChrom®-PBD. This pioneering work concluded that the ZirChrom®-PBD phase had superior selectivity for these analytes; allowing for an isocratic method with comparatively enhanced selectivity, peak shape and efficiency with an analysis time of less than six minutes (see TB#341). In this application note we present the author's findings regarding the stability of this method on the ZirChrom®-PBD phase.

Introduction

Triptans, a class of seratonin antagonists, are most often prescribed for the acute treatment of migraine headaches. By stimulating the brain's seratonin receptors in a similar manner to seratonin, triptans allow the constriction of dilated blood vessels and thus alleviate pain and pressure associated with a migraine (1,2).

Traditional HPLC analysis of triptans has been complicated by the fact that they are very basic drugs. The amine moieties have a strong affinity for the silanol groups present on silica based HPLC columns causing poor peak shape, short lifetime and irreproducibility (2).

The following rapid analysis, developed and validated by Ahmed and Atia, at Taibah University (Saudi Arabia) and Assiut University (Egypt) respectively, strove to improve upon currently available methods(2). The zirconia-based ZirChrom®-PBD was chosen by Ahmed and Atia for its lack of silanol groups, different selectivity, and unparalleled thermal and chemical stability.

Experimental

Four triptans were analyzed: Sumatritan succinate (SMT), Zolmitriptan (ZLT), Eletriptan hydrobromide (ELT) and Rizatriptan benzoate (RZT). Standard stock solutions were prepared by dissolving the samples in pure acetonitrile to a concentration of 1 mg/mL. The samples were then diluted using the appropriate mobile phase and used to spike a sample of processed rat plasma to a final concentration of 1000 ng/mL. The following chromatographic conditions were used:

Column:	A: ZirChrom®-PBD, 150mm x 4.6mm, 3um (part # ZR03-1546)
Mobile Phase:	A: 20/80 acetonitrile/10mM sodium dihydrogen phosphate buffer pH 3.0
Temperature:	50 ºC
Flow Rate:	1 ml/min.
Detection:	UV at 225 nm

In Figure 1, the stability of the ZirChrom®-PBD was measured over a period of 6000 column volumes. The stability of the column was measured using the k' and N for each of the four compounds. The graphed data clearly demonstrates the superior selectivity and reproducibility of the ZirChrom®-PBD triptans method. In addition to superior stability, the ZirChrom®-PBD column provided an improvement in efficiency (N - theoretical plates) for all analytes, in comparison to a silica C18 column, and for three of the compounds the improvement was ten-fold (2).

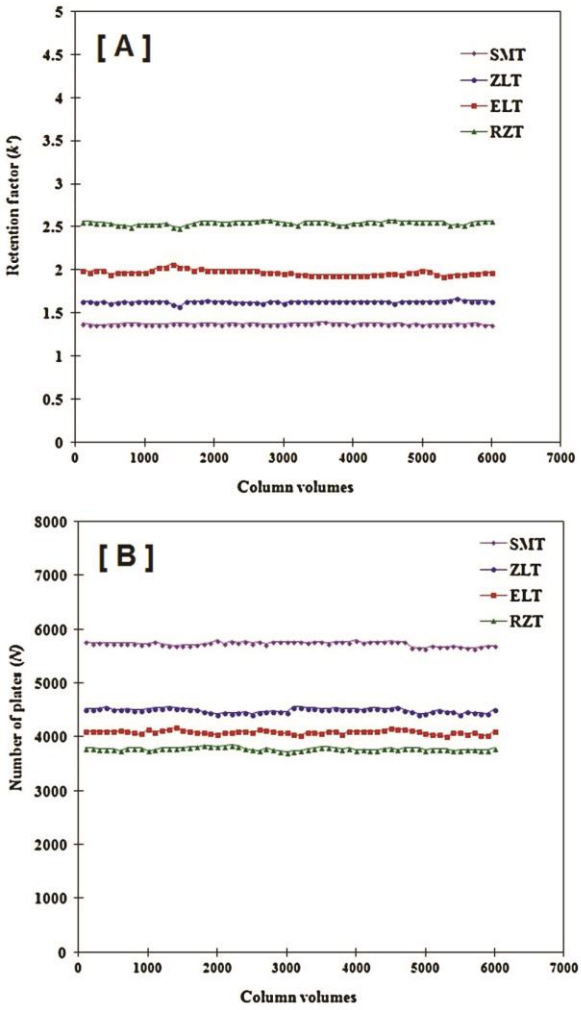

Figure 1: Stability of ZirChrom®-PBD triptans method. Column volumes vs (A) retention factor (k') and (B) number of plates (N). *Used with permission(2)*

ZirChrom technical support 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.

References

(1)Diener, H.C; Kaube, H., *J. Neurol.*, **246**, 515-519 (1999).
(2) Ahmed, S; Atia, N.N., *Journal of Pharmaceutical and Biomedical Analysis*, **143**, 241-251 (2017).

ZirChrom Separations, Inc.
617 Pierce Street, Anoka, MN 55303
1-866-STABLE-1
support@zirchrom.com