



Analysis of Catecholamines on ZirChrom®-PBD

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Historically, catecholamines are difficult molecules to elute on zirconia-based HPLC columns due to the strong interaction between the catechol group and the Lewis acid site dominated surface. Catecholamines are zwitterionic and are also known to be good metal chelators. However, under the right mobile phase conditions the separations of catecholamines on zirconia-based stationary phases is facile and the multi-modal surface chemistry of zirconia allows for a unique selectivity. Here we report the separation of several catecholamines and the effect of ionic strength and percent organic on the resolution of these compounds: L-dopa, tyramine, epinephrine, dopamine, and 3,4-dihydroxynorephedrine.

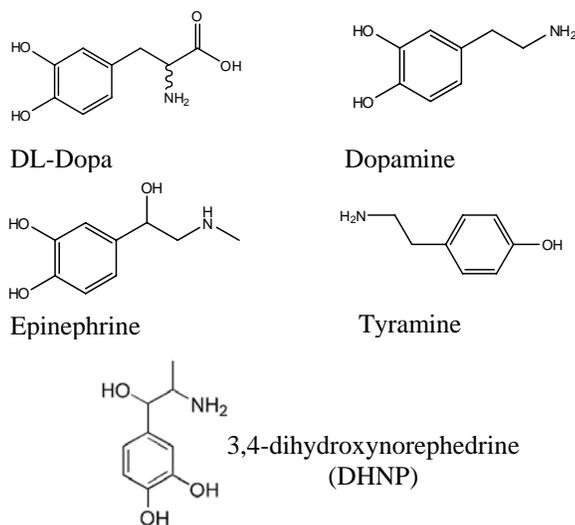


Figure 1. Structures of Catecholamines

Introduction

Catecholamines are hormones important in causing general physiological changes that prepare the body for physical activity such as the fight or flight response. The unparalleled stability of ZirChrom®-PBD allows for a much longer column lifetime and more robust separation when compared to traditional silica-based ion-pairing techniques. The multi-modal separation capabilities of ZirChrom®-PBD allow for the unique selectivity for these ionic molecules. To achieve optimum peak shape and selectivity for these ionic molecules a mobile phase containing both a sufficient amount of Lewis base additive (phosphate), ionic strength (acetate) and organic modifier was developed. The following details the separation of five catecholamines using a multi-modal separation on a ZirChrom®-PBD column.

Experimental

Five catecholamines were separated at 35 °C using a ZirChrom®-PBD column. The separation conditions were as follows:

Column: ZirChrom®-PBD, 50 mm x 4.6 mm i.d.
(Part Number: ZR03-0546)
Mobile Phase: 85/15 Acetonitrile/10mM Ammonium Dihydrogen Phosphate, 30mM Ammonium Acetate, pH 3.4
Temperature: 35 °C
Flow Rate: 1.5 ml/min.
Injection Vol.: 5 µl
Detection: UV at 254 nm

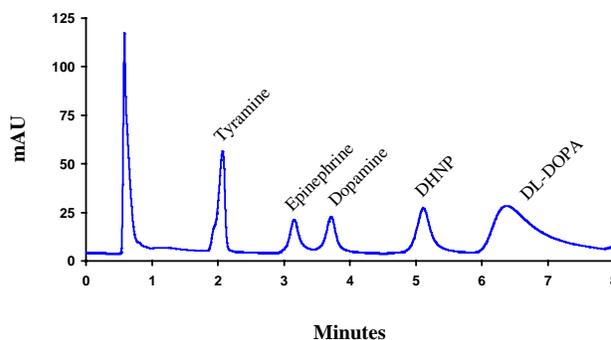


Figure 2. Separation of Catecholamines

This method can be tailored to your specific application needs. 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.

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

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