



# LC/MS Compatible Separation of Cocaine and Benzoylcongrine

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The Lewis acidity of zirconia-based supports for HPLC has historically been problematic, particularly in LC/MS applications where volatile mobile phase additives are required. In this application note we demonstrate the utility of a new zirconia-based column, ZirChrom®-EZ, for the separation of cocaine and benzoylcongrine using an LC/MS compatible mobile phase.

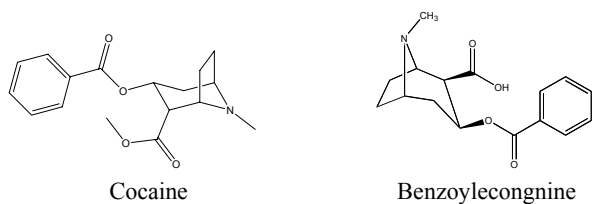


Figure 1: Structures of Cocaine and Benzoylcongrine

### Introduction

Historically, the Lewis base carboxylic acid moiety on benzoylcongrine required the use of a Lewis base mobile phase additive of a higher strength in the elutropic series (such as phosphate or fluoride) to obtain good peak shape (1). While these types of additives work well in applications with UV/Vis detection, their use is almost entirely prohibited in LC/MS applications due to their relatively low volatility.

The use of a ZirChrom®-EZ column allows the chromatography of Lewis base analytes using volatile LC/MS compatible buffers (such as acetate and formate) throughout the pH range of 1-10.

### Experimental

A mixture of cocaine and benzoylcongrine was separated at 35 °C using a ZirChrom®-EZ column. The separation conditions were as follows:

Column: ZirChrom®-EZ, 50 mm x 4.6 mm i.d.  
(Part Number: EZ01-0546)

Mobile Phase: Gradient elution

Time	% A	% B
0	90	10
5	10	90

A: 20mM ammonium acetate, pH 6.0  
B: acetonitrile

Temperature: 35 °C with Metalox™ 200-C column heater  
Flow Rate: 2.0 ml/min.  
Injection Vol.: 10 µl  
Pressure Drop: 168 bar  
Detection: UV at 254 nm

Excellent peak shape and baseline resolution were obtained for cocaine and benzoylcongrine on the ZirChrom®-EZ column using simple gradient elution conditions and a LC/MS compatible acetate buffer.

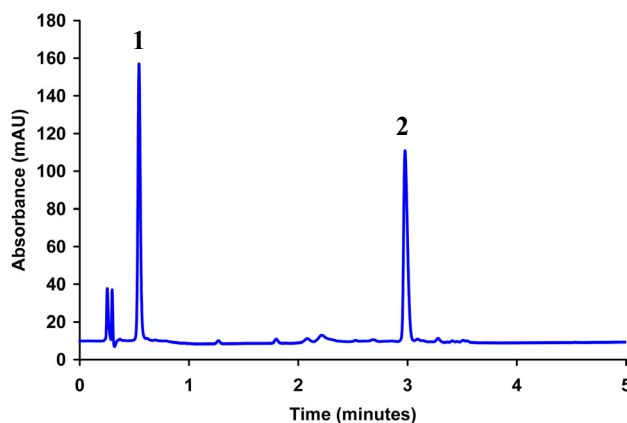


Figure 2: Separation of 1=Benzoylcongrine and 2=Cocaine

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](mailto:support@zirchrom.com) for details.

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

### References

- (1) Blackwell, J. A.; Carr, P. W. *Journal of Liquid Chromatography* **1991**, *14*, 2875-2889.

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