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# LC/MS Compatible Separation of Non-Steroidal Anti-Inflammatory Drugs on ZirChrom®-MS

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## Technical Bulletin #297

The Lewis acidity of zirconia-based supports for HPLC has historically presented problems in the analysis of analytes containing Lewis base moieties, such as carboxylates, particularly in LC/MS applications where volatile mobile phase additives are required. In this application note we demonstrate the utility of a new Lewis acid deactivated zirconia-based column, ZirChrom®-MS.

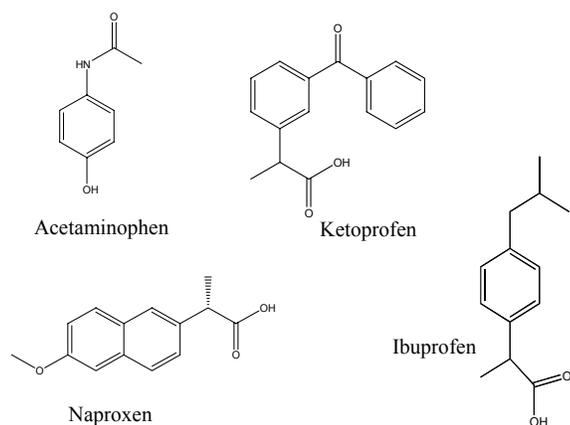


Figure 1: Structures of Non-steroidal anti-inflammatory drugs.

### Introduction

Historically, the Lewis base carboxylic acid moiety on non-steroidal anti-inflammatory drugs required the use of a Lewis base mobile phase additive of a higher strength in the elutropic series (such as phosphate or fluoride) (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 deactivation of Lewis acid sites on the surface of the ZirChrom®-MS particle allows the chromatography of Lewis base analytes using mobile phase additives of the users choice including conventional LC/MS compatible buffers (such as acetate and formate) throughout the pH range of 1-10.

### Experimental

Four non-steroidal anti-inflammatory drugs were separated at 35°C using a ZirChrom®-MS column. 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: 40/60 A/B  
A: acetonitrile  
B: 10mM ammonium acetate, pH 5.0  
Temperature: 35 °C  
Flow Rate: 1.0 ml/min.  
Injection Vol.: 5 µl  
Pressure Drop: 68 bar  
Detection: UV at 254 nm

Four non-steroidal anti-inflammatory drugs were separated using simple acetonitrile/water isocratic elution and a LC/MS friendly acetate buffer. The selectivity of all four compounds is excellent which allows for a very good separation using only a short 5 cm column.

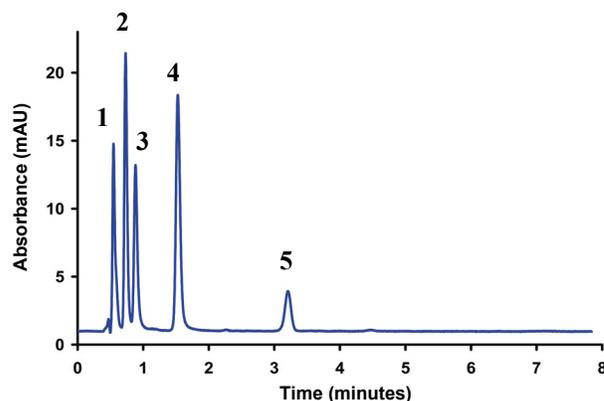


Figure 2: Separation of 1=Acetaminophen, 2=Ketoprofen, 3=Naproxen, 4=Ibuprofen, and 5=Impurity.

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.

### References

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

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