Fast Separation of Wood Preservatives on ZirChrom®-PBD

Kelly S. Johnson and Dr. Clayton McNeff
ZirChrom Separations, Inc.

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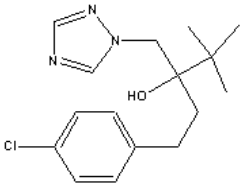
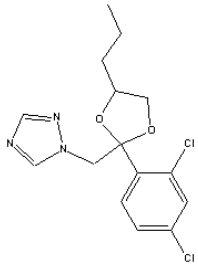
Overlapping phenolic compounds complicate the analysis of the preservatives tebuconazole and propiconazole in wood extract samples. A mobile phase chosen to take advantage of the mixed-mode separation capability of ZirChrom®-PBD speeds and simplifies this separation. Tebuconazole and propiconazole standards were separated on a ZirChrom®-PBD column at 40ºC using a mobile phase optimized to separate the two preservatives while preventing the interference of phenolic compounds also present in real world samples.



Tebuconazole



Propiconazole

Figure 1. Structures of Tebuconazole and Propiconazole

Introduction

Tebuconazole and propiconazole are water-based wood preservatives that prevent decay from fungi in millwork, shingles and shakes, siding, plywood, structural lumber and timbers, and composites that are used in above ground applications. A ZirChrom customer contacted technical support for assistance with the quantification of these compounds from a wood extract sample. The customer reported problems using a silica-gel based column due to interfering phenolic compounds. A new separation was developed to take advantage of the inherent surface chemistry differences of a zirconia-based column when tackling interfering peaks or closely related compounds. Phenolic compounds are known to be Lewis bases; thus a phosphate containing mobile phase is used to prevent the adsorption to Lewis acid sites on the surface of zirconia. In this case, the effect of using phosphate buffer on zirconia is twofold: 1) phosphate will adsorb to bare zirconia sites and 2) phosphate will create a negatively charged surface that will exclude the ionized phenols from the Lewis base negatively charged particles. This results in the phenolic compounds being eluted slightly before or at the deadtime (unretained), while the analytes of interest are retained and resolved. Finally, additional salt (100mM NaCl) was added to the mobile phase to reduce retention due to the ion-exchange mode of retention of the positively charged analytes. The resulting separation achieved baseline resolution in less than four minutes while allowing quantification of these analytes without the interference of other matrix compounds.

Experimental

Tebuconazole and propiconazole were separated at 40 ºC using a ZirChrom®-PBD column. The separation conditions were as follows:

Column:	ZirChrom®-PBD, 150 mm x 4.6 mm i.d. (Part Number: ZR03-1546)
Mobile Phase:	40/60 acetonitrile/20mM ammonium acetate, 20mM ammonium phosphate, 100mM NaCl pH 5.00
Temperature:	40 ºC with Metalox™ 200-C column heater
Flow Rate:	1 ml/min.
Injection Vol.:	5 µl
Pressure Drop:	195 bar
Detection:	UV at 223 nm

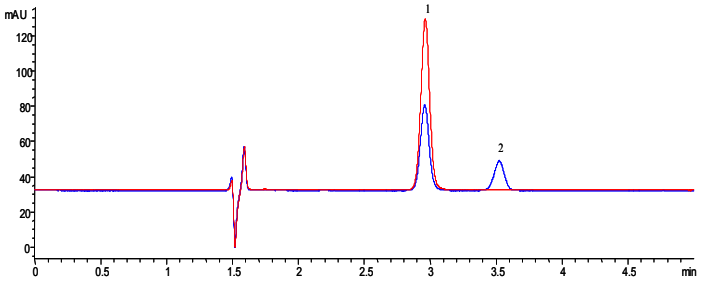


Figure 2. Separation of Wood Preservatives: BLUE TRACE, 1 – Tebuconazole, 2 – Propiconazole; RED TRACE, 1 – Tebuconazole

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.

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

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