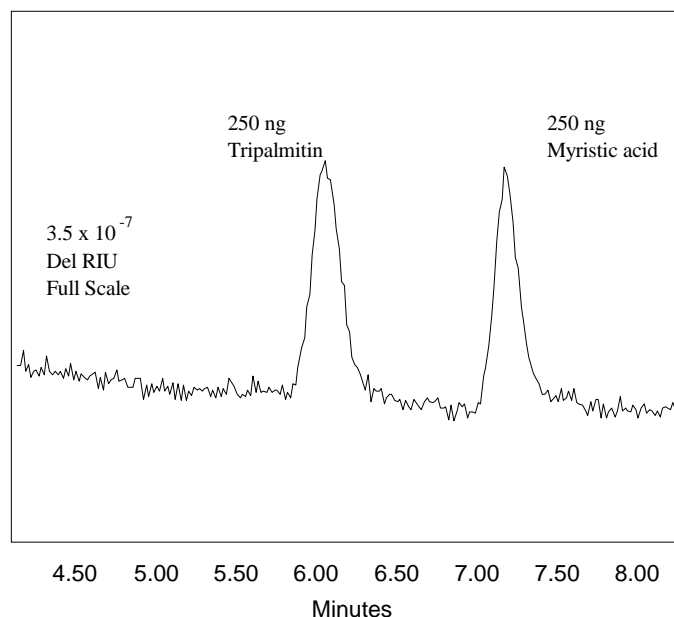


Waters 410 Differential Refractive Index Detector Sensitivity

Refractive index detectors can be considered the universal detector in liquid chromatography given their ability to detect all compounds.

The compromise with differential refractive index (dRI) detectors is that they are generally not as sensitive as other HPLC detection techniques. The excellent sensitivity performance of the Waters 410 dRI Detector is demonstrated here using tripalmitin, a triglyceride, and myristic acid. In this example, 250ng of each was loaded onto a narrowbore GPC column. The resultant signal to noise is more than adequate for easy quantitation of the peaks using integration software in the Millennium Chromatography Manager. This example of small molecule GPC demonstrates that the 410 dRI detector can be used to monitor low levels of analytes that can't be detected by other techniques.



System:	616 LC Solvent Delivery
Autosampler:	717 Plus
Detector:	Waters 410 dRI
Columns:	Styragel HR 0.5, 4.6 x 300 mm
Mobile Phase:	THF @ 0.35 mL/min.
Sample:	2.5 uL of 100ppm each Tripalmitin and Myristic acid in THF

★ Detector Sensitivity

Detector sensitivity is often expressed as a noise specification. Using this specification as a criteria for choosing the most sensitive detector can be misleading. Since the purpose of an HPLC detector is to monitor and measure analyte concentration in a moving stream, factors other than just a noise specification influence sensitivity performance. Chromatographic sensitivity is the signal to noise ratio (S/N). Noise is contributed not only from the detector (specification) but also can be attributed to other system influences such as electronic considerations and smoothness of flow.

Signal is defined as the response of a detector to a given concentration of a compound in the detector cell. With differential refractive index detectors, the response is dependent on the difference between the RI of the mobile phase and the RI of the analyte in the mobile phase. Signal is also dependent on other factors. For example, column diameter and efficiency will influence the signal by affecting the band spreading of the peak and therefore the concentration (dilution) of the analyte at the cell.

★ Waters 410 Differential Refractive Index Detector

The Waters 410 dRI Detector provides sensitivity and stability required to make high sensitivity refractive index measurements during the chromatographic process. Stability is achieved through precise thermal control of the detector cell and chromatographic solvents via thermally shielded optics and counter current heat exchangers. Unique circuitry design and a LED light source generates a noise specification of less than 2×10^{-8} refractive index units (RIU) while providing detectability of analyte levels as low as 125ng of polystyrene in THF. The 410 Detector provides control of up to two external column ovens. Auto purge and auto zero routines can be programmed through IEEE communications with Millennium Chromatography Workstations and PowerLine controllers.