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## Applications of a Novel Flame Ionisation Detector for Liquid Chromatography

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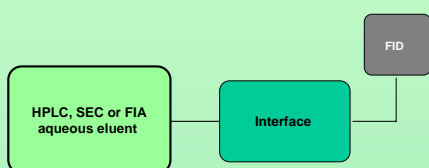
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Over the last twenty years liquid chromatography has come to dominate analytical chemistry because of its ability to analyse a wide range of products from pharmaceuticals to environmental and forensic samples but some groups of analytes still cause practical difficulties in detection.

The most common detector for HPLC is the UV-Visible spectroscopic detector, which is both sensitive and linear. However, detection is limited to analytes containing chromophores. For other analytes the analyst has to either rely on derivatisation or employ a "universal detector", such as the less sensitive refractive index detector or the evaporative light scattering detector, which cannot easily detect small, volatile compounds.

The universal flame ionisation detector when interfaced to LC has had problems in the past because of the signal from the organic component of the mobile phase, however, the use of superheated water as the eluent overcomes this problem and enables reversed-phase separations with the ability to detect analytes with and without chromophores. A revised design of interface (patent pending) enables a wide range of columns to be employed with differing flow rates.



### Separations using superheated water as the eluent

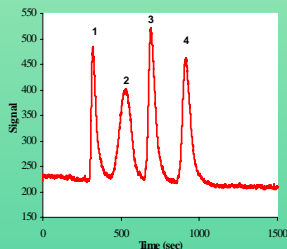
In earlier work we have shown that on raising the temperature of water to superheated conditions (greater than 100 °C under slight pressure) it can act as an eluent for reversed-phase chromatography replacing conventional methanol-water and acetonitrile eluents. A range of columns from PS-DVB, Hypercarb and Zirconia-PBD can be used under these conditions without degradation. A number of other analytes of widespread interest can be separated at lower temperatures by making only minor changes to the conventional eluents again eliminating organic solvent additives.

### Separations using aqueous eluents

Typical problem analytes lacking chromophores in LC are carbohydrates and amino acids, conventionally both require derivatisation before detection.

#### Detection of sucrose, fructose, sorbitol and mannitol

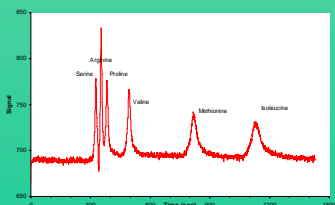
Separation on HiPlex Ca column at 40°C  
Mobile phase 100% water at 0.24 ml/min



1. Sucrose
2. Fructose
3. Mannitol
4. Sorbitol

#### Detection of amino acids using FID

Separation on PLRP-S column at ambient  
Flow rate of water containing 0.02% TFA at 0.5 ml/min



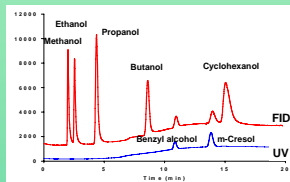
For further information contact  
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### Applications

With UV detection problems can arise when mixtures of neutral aliphatic and aromatic analytes are examined. Only the aromatic compounds are seen but with the FID all the components are detected both aromatic and aliphatic

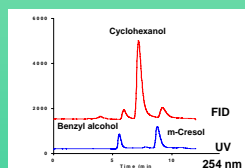
#### Mixture of alcohols and phenols

PS-DVB Column at 140 - 180 °C at 7 min<sup>-1</sup>



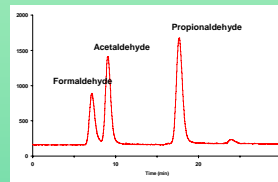
#### Alcohols and phenols – different selectivity

C<sub>18</sub> Diamond bond column at 180 °C



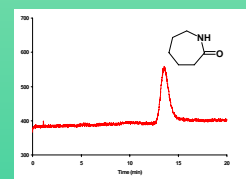
#### Mixture of C<sub>1</sub> to C<sub>3</sub> Aldehydes

PLRP-S column at 140 °C  
Mobile phase 100% water at 0.2 ml/min



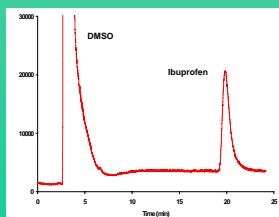
#### Caprolactam

PS-DVB at 160 °C



#### Ibuprofen

As solution in DMSO  
PBD-zirconia column at 100 - 170 °C



#### Steroids

Solution in methanol  
PBD Zirconia column at 70 - 170 °C

