



APGC

NO COMPROMISE GC/MS

Waters
THE SCIENCE OF WHAT'S POSSIBLE.™

What is APGC?

- Atmospheric Pressure GC (APGC) is an ionization source that allows all Waters™ Universal source based systems (Xevo™, SYNAPT™, and Vion™) to be coupled with a GC.
- It is a soft ionization technique with both excellent ionization efficiency and high sensitivity.
- Change from LC to GC is quick and simple and requires no break in vacuum.
- GC capability is maximized as there is no vacuum restriction meaning that a wider range of GC columns and flow rates can be used.

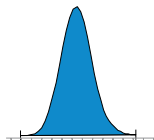
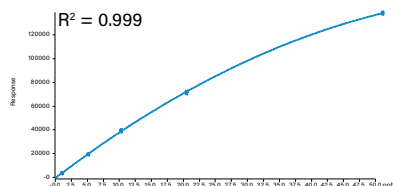
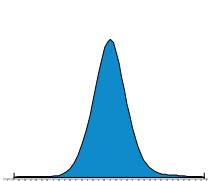
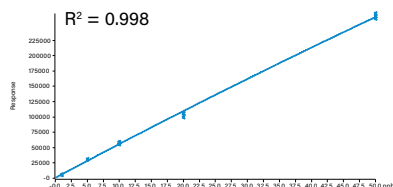


LC AND GC ON THE SAME PLATFORM

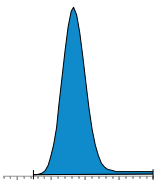
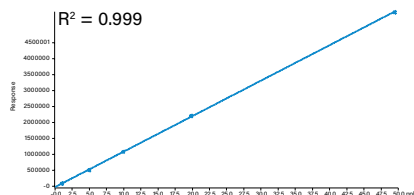
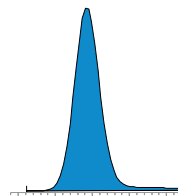
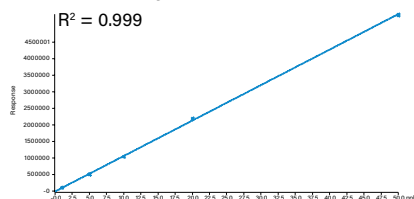
Analyzing GC and LC amenable compounds often requires two dedicated systems. The Waters universal source and APGC design allows systems to be changed from LC to GC and back again, quickly and simply.

This allows for complete compound coverage in applications such as pesticide screening and improves laboratory efficiency while maintaining required levels of sensitivity.

APGC Analysis of Leptophos



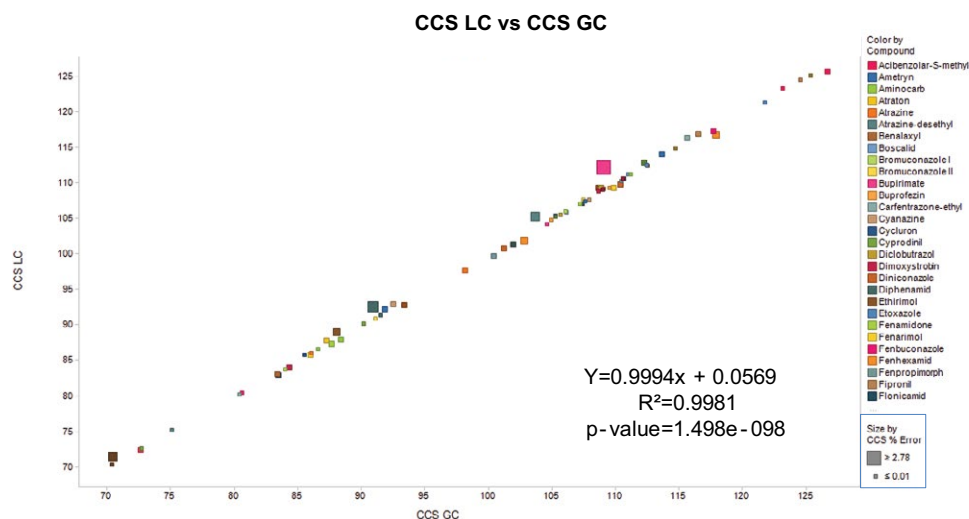
UPLC Analysis of Carbofuran



Matrix matched calibration curves and chromatograms for standards at 0.001 mg/kg for peaks from: A. APGC analysis of leptophos in celery and lemon; and B. UPLC analysis of carbofuran in corn and kale.

EXPANDING CAPABILITIES

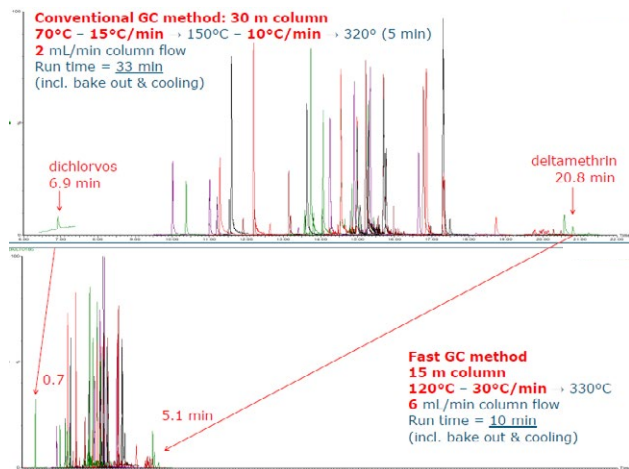
As well as laboratory flexibility the interchangeable source enables access to Waters advanced MS technologies. For example CCS measurement for enhanced confirmation on SYNAPT or Vion and exact mass precursor and fragment ions in a single run using MS^E and Xevo G2-XS QTof.



CCS value regression analysis of GC and LC analyses, indicating conversely to the RT comparisons, a strong correlation between CCS measurements obtained under GC and LC analyses for the 73 pesticides.

INCREASE CHROMATOGRAPHIC FLEXIBILITY

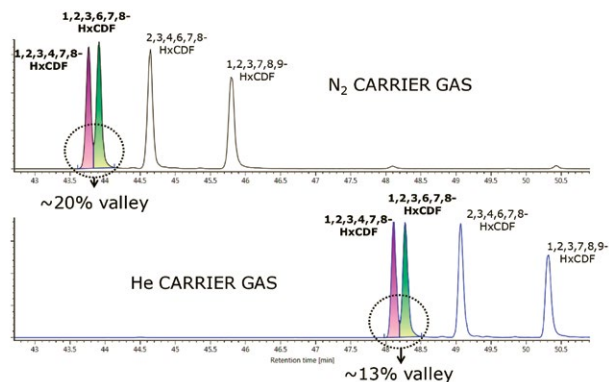
APGC ionization occurs at atmospheric pressure which eliminates any restrictions in flow or carrier gas type that are limitations of a vacuum system GC. Therefore the use of higher flow rates and wider bore columns is possible resulting in reduced run times increasing sample throughput.



Comparison of a fast GC method (6 mL/min, 10 min) with a conventional GC method (2 mL/min, 33 min) showing a time saving of 23 mins per run.

ALTERNATIVE CARRIER GASES

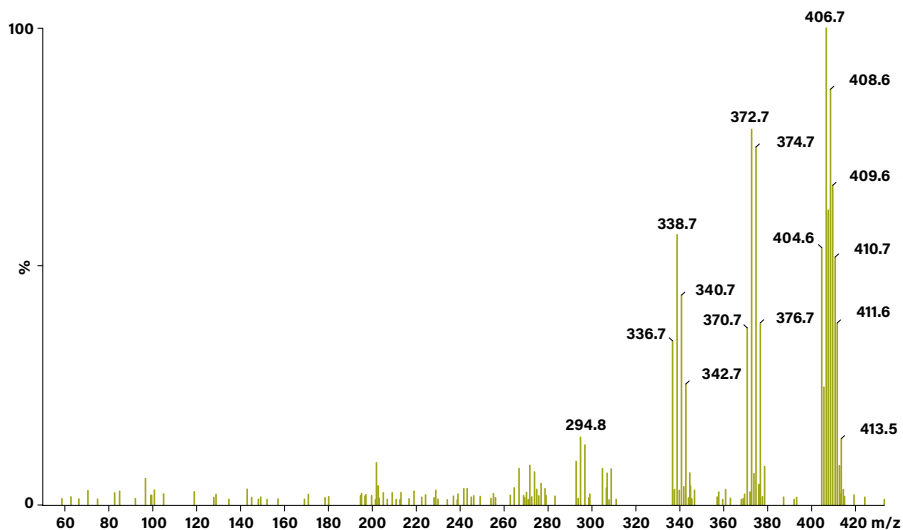
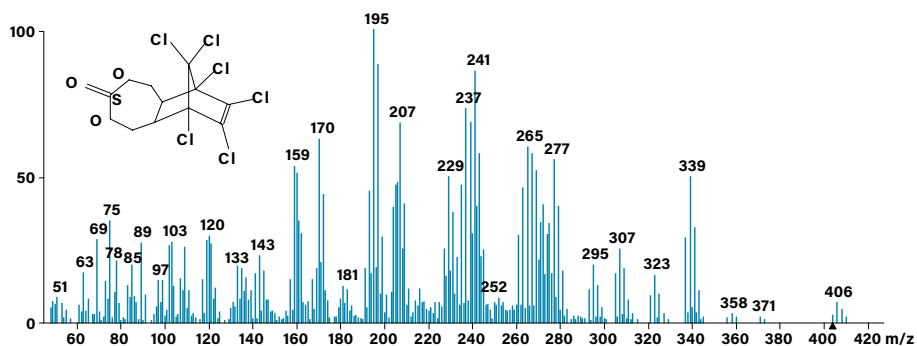
Due to the flexibility in flow rates, alternative carrier gases such as nitrogen can be used. This allows a single gas supply for the GC and MS and eliminates the need for expensive or dangerous carrier gas.



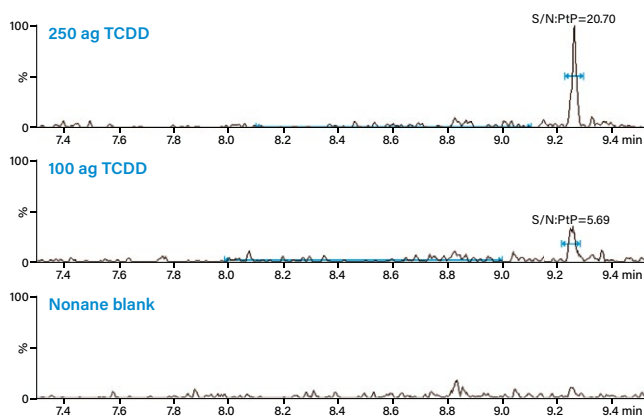
HxCDFs separation contrasting N₂ and He carrier gases, where both gases ensure the method requirement of 25% valley separation is achieved for the congeners specified.

ULTIMATE SENSITIVITY WITH XEVO TQ-XS

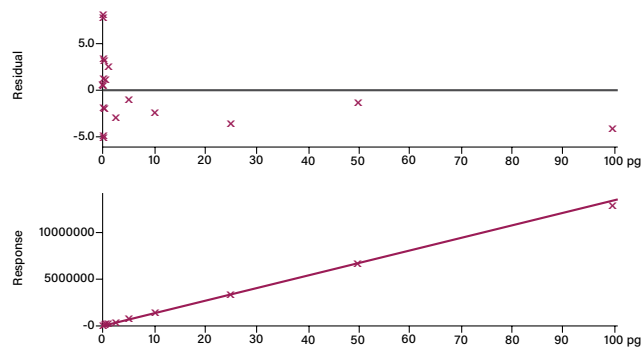
APGC ionization is less energetic than that of EI giving a more intense precursor ion allowing a gain in sensitivity. When APGC is coupled with the Xevo TQ-XS the system is the most sensitive GC-MS/MS system available and allows the most difficult regulations to be met with ease.



Comparison of the highly fragmented NIST spectrum (top) and the APGC spectrum showing an abundant molecular ion, which serves for improved LOQs.



Compound name: 2, 3, 7, 8 TCDD
 Correlation coefficient: $r = 0.999209$, $r^2 = 0.998419$
 Calibration curve: $135255 \times + 12.141$
 Response type: External std. area
 Curve type: Linear; Origin: exclude; Weighting: $1/x^2$; Axis trans: none



2,3,7,8 TCDD at 100 ag on-column.

Linearity of 2,3,7,8 TCDD between 100 ag to 100 pg.



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