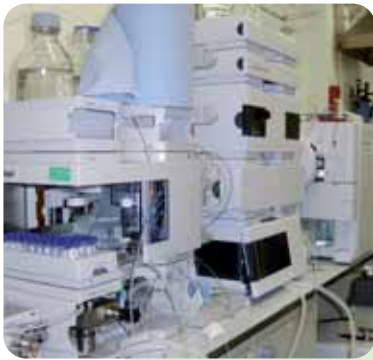




Agilent 6410 LC-MS QQQ 'Potable Water' Neutral Herbicides Analysis System

Our measure is your success.





Agilent LC-MS system for the routine measurement of neutral herbicides in drinking water samples according to **EU Directive 98/83/EC**

This document describes a fully automated system, incorporating sample preparation and analysis for the measurement of trace levels of neutral herbicides in drinking water samples, according to the requirements of the **European Union drinking water Directive 98/83/EC**.

The targeted suite of compounds can be edited from the method supplied according to individual laboratory requirements, and new compounds added subject to consideration of their enrichment chemistry and ESI QQQ detection.

The system is also suitable for other applications requiring online enrichment of aqueous samples prior to ESI QQQ detection.

The system is built and configured with Agilent 1200 HPLC modules which are fully integrated into the Mass Hunter workstation providing for the highest degree of automation and control.

Limits of Detection – the analytical requirements of a herbicide drinking water suite currently demand Limits of Detection of 10 ng/l (10 ppt) for individual compounds. The complete system also allows for further optimisation to lower levels if required.

Calibration Range – the system is operated over a range from 1-100 ppt which can be extended if required.

Sample injection volumes – typically 900 -1800 µl from a 2 ml sample vial to achieve the required LOD's for the listed compounds.

Larger injection volumes are possible up to 4.5 ml from a 6 ml vial although not required for this application.

Extended sample volume option – an additional 'pump based' loading option is available via a multi-position stream selection valve enabling sample volumes up to 100 ml.

Sample types – typically potable waters, clean ground waters and surface waters (filtered if required).

Sample Preparation – 1.975 ml of sample is accurately measured into a standard 2 mL vial using a positive displacement pipette together with 25 µl of deuterated internal standard to give a total sample volume of 2 ml.

Auto Sampling – the enrichment system uses a standard Agilent autosampler which has capacity for 100 2 ml vials.

The enrichment autosampler is equipped with a 900 µl injection head for highest sample throughput and minimum loading time.

Sample throughput – typically the total cycle takes ~18-20 minutes per sample for a complete compound suite allowing for ~80 samples in a 24 hour period.

Software and methods – the system is fully integrated and controlled from the Mass Hunter workstation and the supplied method covers the complete system including MRM transitions for compound detection and measurement.

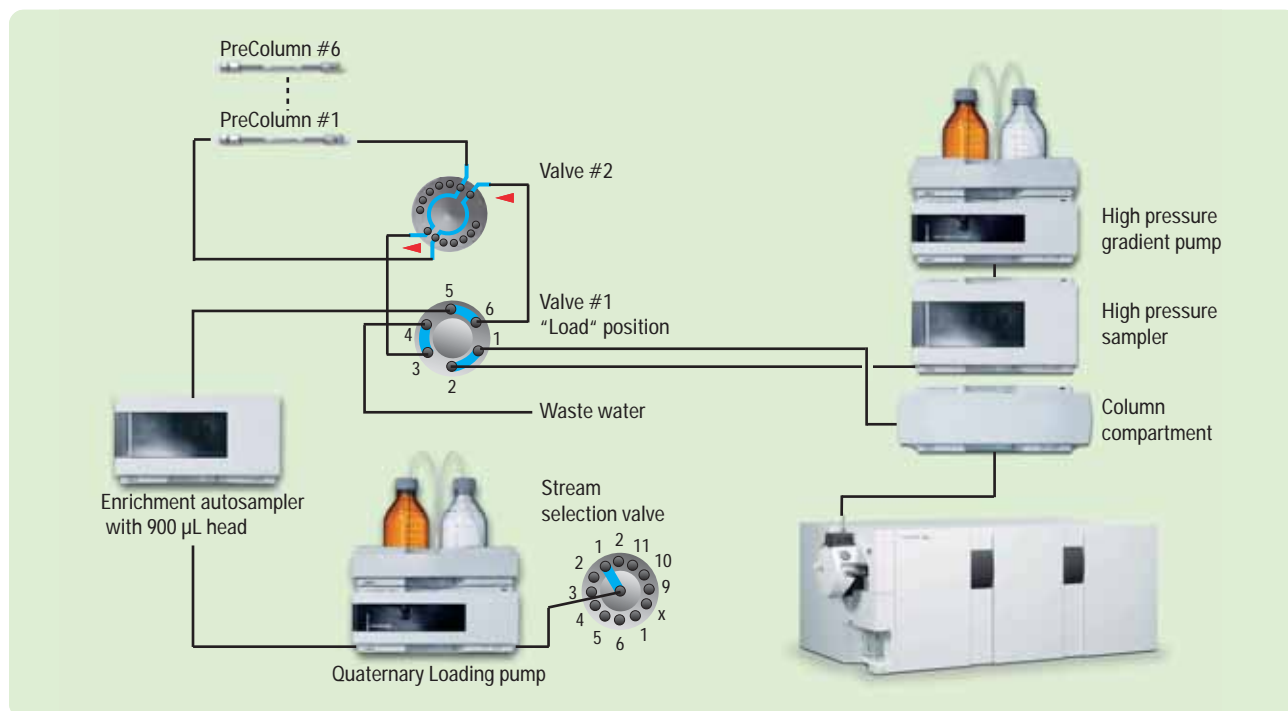
Sequence of Operation

- Aqueous samples (particulate free) are contained in 2 ml glass vials in the enrichment autosampler.
- Samples are injected (900 µl volume) into the holding capillaries on the enrichment autosampler then transferred onto the polymer based enrichment cartridge attached to the 6 position column selection valve (#2) via the 6 port valve (#1). Aqueous effluent is sent to waste.
- After typically ~2 minutes when sample loading is complete Valve #1 is switched to 'elute' and the gradient started on the high pressure gradient pump. Trapped analytes are then desorbed in a 'backflush' mode onto the ZORBAX Eclipse Plus C18 analytical column before LC-MS analysis. This also 'washes' the cartridge in organic solvent.
- During the analytical run with Valve #1 returned to the 'load' position it is also possible to further wash the enrichment cartridge with organic if required using Channel B on the quaternary loading pump and then returning the solvent conditions to 100% A (water) in readiness for the next sample.
- After each run the column selection valve (#2) indexes to the next position in readiness for the following enrichment procedure. This means enrichment cartridge 1 is used for samples 1,7,13,19 in a sequence, cartridge 2 for samples 2,8,14,20 etc.



Enrichment valves

System schematic



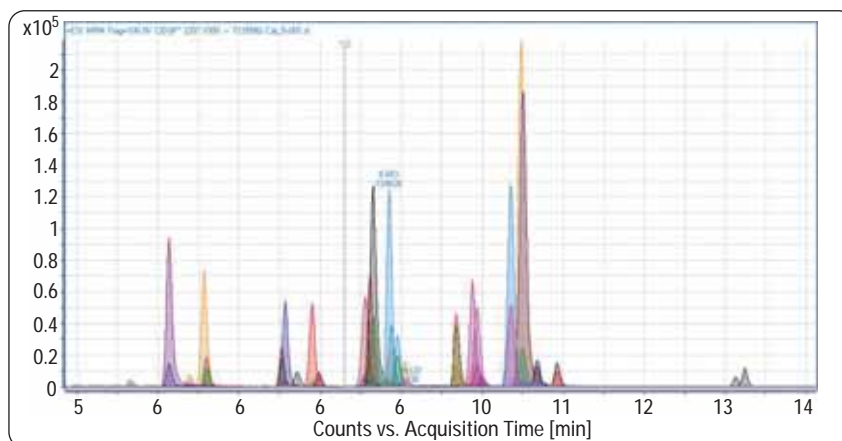
Compound List

Atrazine	Linuron
Carbendazim	Metamitron
Carbetamide	Methabenzthiazuron
Chloridazon	Metoxuron
Chlortoluron	Metsulfuron methyl
Chloroxuron	Monolinuron
Cyanazine	Monuron
Desethylatrazine	Neburon
Desisopropylatrazine	Prometryn
Desmetryn	Propazine
Diflubenzuron	Simazine
Diuron	Terbutryn
Fenuron	Terbutylazine
Irgarol 1051	Trietazine
Isoproturon	

Herbicide suites covered

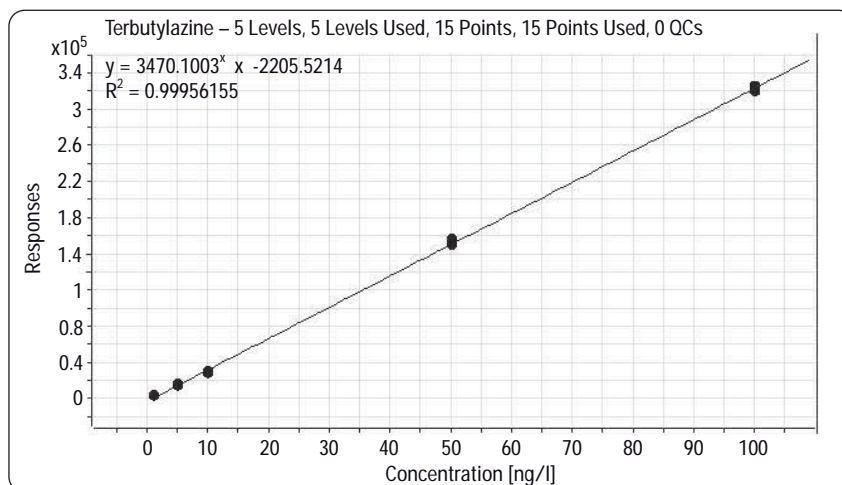
Neutral herbicide extraction suite with positive ion electrospray methodology

Performance Examples



Calibration standard 100 ppt, injection volume 900 µl.

Calibration plot



Terbutylazine 1 to 100 ppt, injection volume 900 µl, calibration points measured in triplicate.

Installation, commissioning and training – the complete Agilent package includes hardware installation, system commissioning and operational training for this application. We also recommend users consider attending the Agilent 3 day LC-QQQ Environmental Masterclass training course.

Further applications consultancy support can be provided.

www.agilent.com/chem/QQQ

Information, descriptions, and specifications in this publication are subject to change without notice.

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Consumables, instrument spares and engineering support – Agilent is supplying a complete package including SPE cartridges and HPLC columns for the application. There is also the option to provide extension to the standard warranty cover and preventive maintenance on the complete LC/MS system.

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