



## LC-MS/MS Analysis of Pesticides in Water Using a Luna™ 3 μm Polar Pesticides HPLC Column

Luigi Margarucci, PhD<sup>1</sup>, Aidan Harrison, PhD<sup>2</sup>, Jorg Baute, PhD<sup>3</sup>, Samuele Scurati, PhD<sup>4</sup>, Richard Jack, PhD<sup>5</sup>, Ramkumar Dhandapani, PhD<sup>5</sup>, Sean Orłowicz<sup>5</sup>, and Bryan Tackett, PhD<sup>5</sup>

<sup>1</sup>Phenomenex Italy, Via M. Serenari, 15/D, 40013 Castel Maggiore (BO), Italy

<sup>2</sup>Phenomenex Ltd., Queens Avenue, Hurdsfield Ind. Est., Macclesfield, Cheshire SK10 2BN, UK,

<sup>3</sup>Phenomenex Ltd., Deutschland, Zeppelinstr. 5, 63741 Aschaffenburg, Germany,

<sup>4</sup>AB Sciex S.r.l. Via Montenapoleone, 8 21181 Milano CF e P.IVA: 06734220962 Italy

<sup>5</sup>Phenomenex, Inc., 411 Madrid Ave., Torrance, CA 90501, USA,

### Overview

Pesticides have the potential to contaminate drinking water supplies as they are applied to farmlands, gardens, and lawns making their way into groundwater and surface water systems. In this application note we show a fast and robust method for the LC-MS/MS determination and quantification of polar pesticides in water. The Luna Polar Pesticides HPLC column was effective in retaining anionic pesticides with good peak shape across the entire concentration range (**Figure 1**). The linearity of the method was confirmed for concentrations between 20 parts per trillion (ppt) and 1000 ppt with R<sup>2</sup> values >0.992 (**Table 2**).

### Sample Preparation

Each pesticide was mixed into water at 4 different concentrations: 20 ppt, 100 ppt, 250 ppt, and 1000 ppt. Samples were direct injected into the LC instrument.

### LC Conditions

**Column:** Luna 3 μm Polar Pesticides

**Dimension:** 100 x 2.1 mm

**Part No.:** [00D-4798-AN](#)

**Guard:** SecurityGuard™ ULTRA for Polar Pesticides: [AJ0-8789](#)

**Mobile Phase:** A: 0.4 % Formic Acid in Water

B: 0.4 % Formic Acid in Acetonitrile

Gradient: Time (min)	%B
0	2
0.5	2
6	20
7	90
9	90
9.1	2

**Flow Rate:** 0.3 mL/min

**Injection Volume:** 50 μL

**Temperature:** 40 °C

**Detection:** MS/MS

**Detector:** SCIEX® 7500

### MRM Conditions

**Gas Temperature:** 450 °C

**GS1:** 35 psi

**GS2:** 25 psi

**CUR:** 25 psi

**CAD:** 9 psi

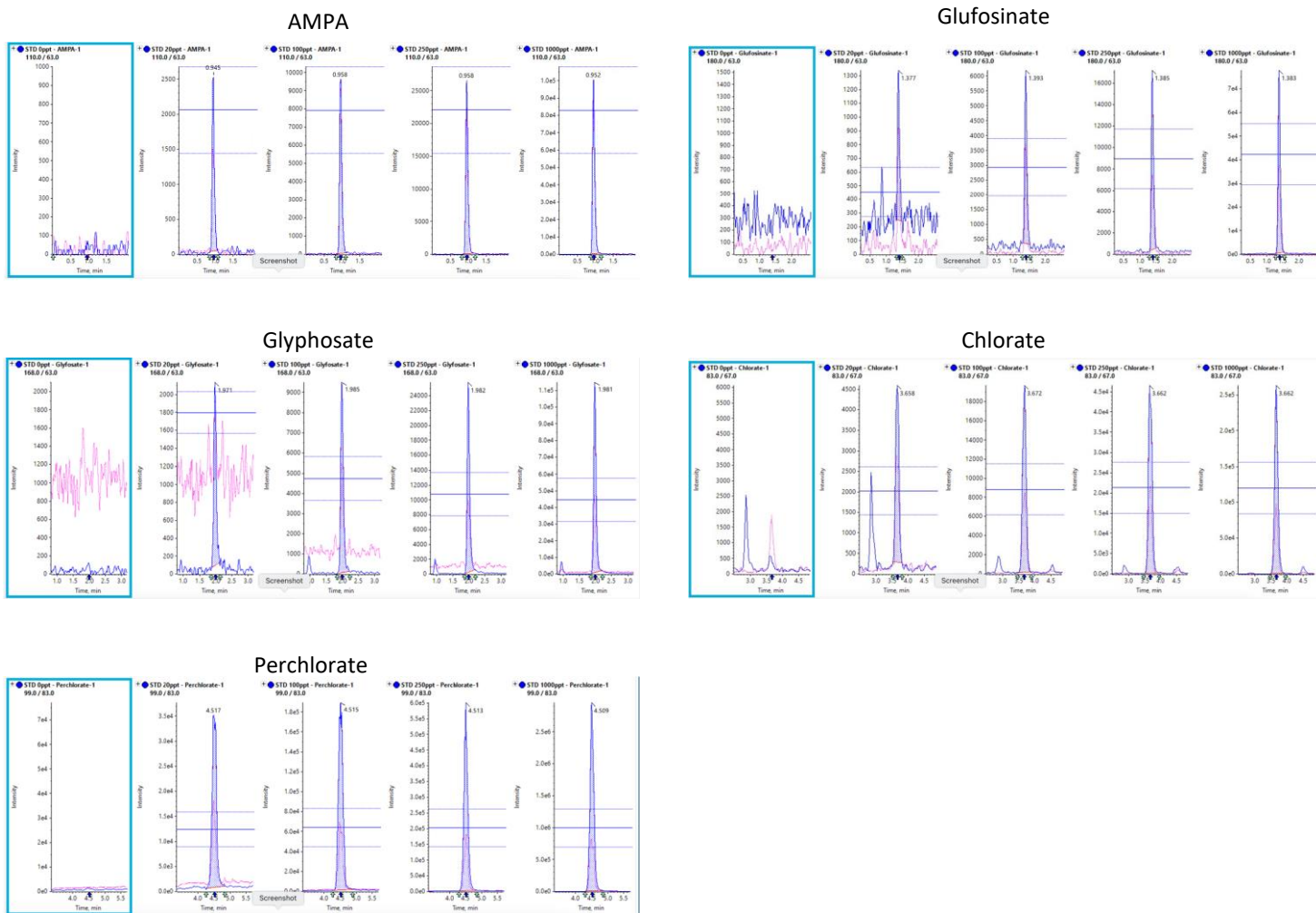
**IS:** 4500 V

**Table 1.** MRM Transitions

Analyte	Q1 (m/z)	Q3 (m/z)
AMPA-1	110	63
AMPA-2	110	79
Chlorate-1	83	67
Chlorate-2	85	69
Chlorate-SI	89	71
Glufosinate-1	180	63
Glufosinate-2	180	85
Glyfosate-1	168	63
Glyfosate-2	168	81
Glyfosate-SI	170	63
Perchlorate-1	99	83
Perchlorate-2	101	85
Perchlorate-SI	107	89



**Figure 1.** Chromatograms of a Pesticides in Increasing Concentrations in Water.



**Table 3.** Pesticide Analyte Data

Pesticide	Retention Time (min)	R <sup>2</sup>	Concentration Range (ppt)
AMPA	0.958	0.99950	20 – 1000
Glufosinate	1.393	0.99627	20 – 1000
Glyphosate	1.988	0.99683	20 – 1000
Chlorate	3.658	0.99276	20 – 1000
Perchlorate	4.515	0.99985	20 – 1000



**Need a different column size or sample preparation format?**

No problem! We have a majority of our available dimensions up on [www.phenomenex.com](http://www.phenomenex.com), but if you can't find what you need right away, our super helpful Technical Specialists can guide you to the solution via our online chat portal [www.phenomenex.com/Chat](http://www.phenomenex.com/Chat).

**Australia**

t: +61 (0)2-9428-6444  
auiinfo@phenomenex.com

**Austria**

t: +43 (0)1-319-1301  
anfrage@phenomenex.com

**Belgium**

t: +32 (0)2 503 4015 (French)  
t: +32 (0)2 511 8666 (Dutch)  
beinfo@phenomenex.com

**Canada**

t: +1 (800) 543-3681  
info@phenomenex.com

**China**

t: +86 400-606-8099  
cninfo@phenomenex.com

**Czech Republic**

t: +420 272 017 077  
cz-info@phenomenex.com

**Denmark**

t: +45 4824 8048  
nordicinfo@phenomenex.com

**Finland**

t: +358 (0)9 4789 0063  
nordicinfo@phenomenex.com

**France**

t: +33 (0)1 30 09 21 10  
franceinfo@phenomenex.com

**Germany**

t: +49 (0)6021-58830-0  
anfrage@phenomenex.com

**Hong Kong**

t: +852 6012 8162  
hkinfo@phenomenex.com

**India**

t: +91 (0)40-3012 2400  
indiainfo@phenomenex.com

**Indonesia**

t: +62 21 5019 9707  
indoinfo@phenomenex.com

**Ireland**

t: +353 (0)1 247 5405  
eireinfo@phenomenex.com

**Italy**

t: +39 051 6327511  
italiainfo@phenomenex.com

**Japan**

t: +81 (0) 120-149-262  
jpinfo@phenomenex.com

**Luxembourg**

t: +31 (0)30-2418700  
nlinfo@phenomenex.com

**Mexico**

t: 01-800-844-5226  
tecnicomx@phenomenex.com

**The Netherlands**

t: +31 (0)30-2418700  
nlinfo@phenomenex.com

**New Zealand**

t: +64 (0)9-4780951  
nzinfo@phenomenex.com

**Norway**

t: +47 810 02 005  
nordicinfo@phenomenex.com

**Poland**

t: +48 22 104 21 72  
pl-info@phenomenex.com

**Portugal**

t: +351 221 450 488  
ptinfo@phenomenex.com

**Singapore**

t: +65 6559 4364  
sginfo@phenomenex.com

**Slovakia**

t: +420 272 017 077  
sk-info@phenomenex.com

**Spain**

t: +34 91-413-8613  
espinfo@phenomenex.com

**Sweden**

t: +46 (0)8 611 6950  
nordicinfo@phenomenex.com

**Switzerland**

t: +41 (0)61 692 20 20  
swissinfo@phenomenex.com

**Taiwan**

t: +886 (0) 0801-49-1246  
twinfo@phenomenex.com

**Thailand**

t: +66 (0) 2 566 0287  
thaiinfo@phenomenex.com

**United Kingdom**

t: +44 (0)1625-501367  
ukinfo@phenomenex.com

**USA**

t: +1 (310) 212-0555  
[www.phenomenex.com/chat](http://www.phenomenex.com/chat)

**🌐 All other countries/regions  
Corporate Office USA**

t: +1 (310) 212-0555  
[www.phenomenex.com/chat](http://www.phenomenex.com/chat)

**www.phenomenex.com**

Phenomenex products are available worldwide. For the distributor in your country/region, contact Phenomenex USA, International Department at [international@phenomenex.com](mailto:international@phenomenex.com)

**BE-HAPPY™**  
GUARANTEE

Your happiness is our mission. Take 45 days to try our products. If you are not happy, we'll make it right.

[www.phenomenex.com/behappy](http://www.phenomenex.com/behappy)

**Terms and Conditions**

Subject to Phenomenex Standard Terms and Conditions, which may be viewed at [www.phenomenex.com/phx-terms-and-conditions-of-sale](http://www.phenomenex.com/phx-terms-and-conditions-of-sale).

**Trademarks**

Luna, SecurityGuard, and BE-HAPPY are trademarks of Phenomenex. SCIEIX is a registered trademark of AB SCIEIX Pte. Ltd.

**Disclaimer**

Comparative separations may not be representative of all applications.

SecurityGuard is patented by Phenomenex. U.S. Patent No. 6,162,362

**CAUTION: this patent only applies to the analytical-sized guard cartridge holder, and does not apply to SemiPrep, PREP, or ULTRA holders, or to any cartridges.**

FOR RESEARCH USE ONLY. Not for use in clinical diagnostic procedures.

© 2023 Phenomenex, Inc. All rights reserved.

