

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

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Overview

Phosphonic Acid is a degradation product of the fungicide Fosetyl Aluminum (fosetyl-Al). In this application note we show a fast and robust method for the LC-MS/MS determination and quantification of Phosphonic Acid in water.

The Luna Polar Pesticides HPLC column was effective in retaining Phosphonic Acid (**Figure 1-3**). The LOD for the analysis of Phosphonic Acid was 0.6 µg/L and the LOQ was 2.0 µg/L for water samples with high salt content. The linearity of quantification was confirmed for concentrations between 2.0 µg/L and 15.0 µg/L with a recovery between 92 and 120 % (**Table 3**).

LC Conditions

Column: Luna 3 µm Polar Pesticides

Dimension: 100 x 2.1 mm

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

Mobile Phase: A: 0.1 % Formic Acid in Water

B: 0.1 % Formic Acid in Acetonitrile

Gradient: Time (min)	%B
0	5
1	5
7	90
10	90

Flow Rate: 0.4 mL/min

Injection Volume: 20 µL

Temperature: 60 °C

Instrument: Agilent® 1290 Infinity I

Detection: MRM

Detector: Agilent 6495a Triple Quadrupole MS

MRM Conditions

Gas Temperature: 200 °C

Gas Flow: 14 L/min

Nebulizer: 30 psi

Sheath Gas Heater: 270 °C

Sheath Gas Flow: 12 L/min

Capillary: 4000 V

VCharging: 400

Table 1. MRM Transitions

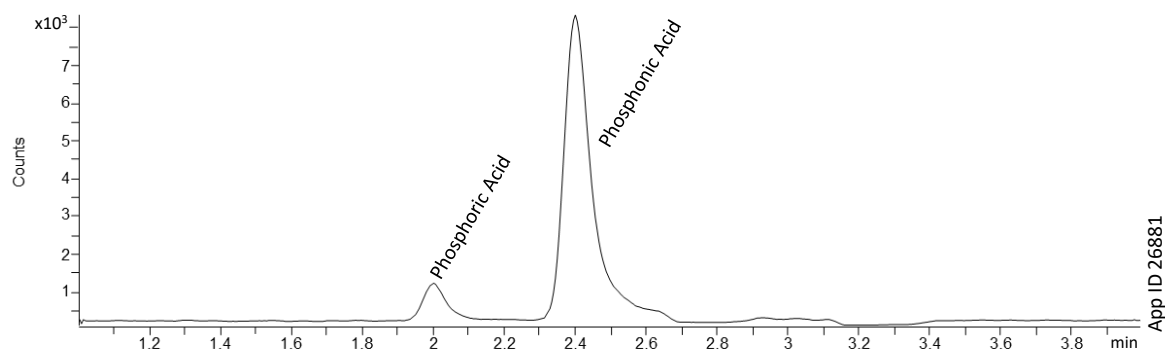
Analyte	Precursor Ion (m/z)	Product Ion (m/z)	CE (V)
Phosphonic Acid 1	81	79	15
Phosphonic Acid 2	81	63	38

Table 2. Composition of EPA AAP Media.

Component	Concentration (mg/L)
NaNO ₃	25.5
MgSO ₄ · 7H ₂ O	14.7
K ₂ HPO ₄	1.04
NaHCO ₃	15.0
MgCl ₂ · 6H ₂ O	12.16
CaCl ₂ · 2H ₂ O	4.41
FeCl ₃ · 6H ₂ O	0.160
Na ₂ EDTA · 2H ₂ O	0.300
H ₃ BO ₃	0.186
MnCl ₂ · 4H ₂ O	0.415
ZnCl ₂	0.00327
CoCl ₂ · 6H ₂ O	0.00143
CuCl ₂ · 2H ₂ O	0.000012
Na ₂ MoO ₄ · 2H ₂ O	0.00726



Figure 1. Total Ion Chromatogram of a Water Sample Containing 2.0 µg/L Phosphonic Acid.



App ID 26881

Figure 2. MRM Transition 81 -> 79 of Phosphonic Acid in Water Sample.

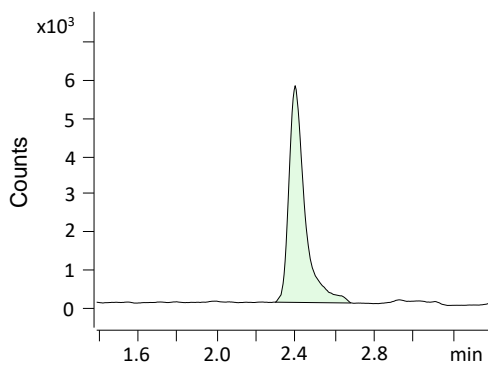


Figure 3. MRM Transition Overlay of 81 -> 79 (Black) and 81 -> 63 (Blue) of Phosphonic Acid in Water Sample.

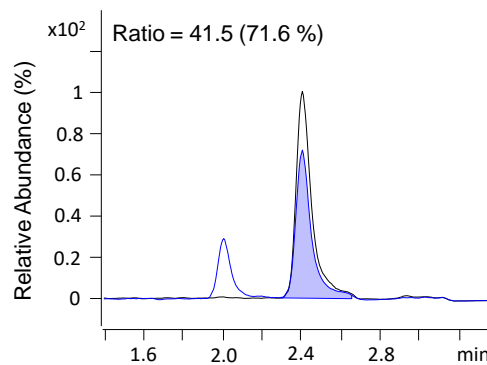


Figure 4. Calibration Curve

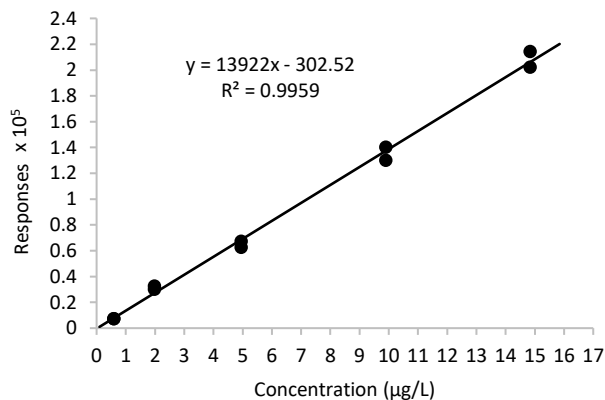


Table 3. Calibration Data

Sample	Analyte	R _t (min)	Response	Concentration (µg/L)	Expected Concentration (µg/L)	Accuracy (%)
LIN 1 ACID	Phosphonic Acid	2.405	7,375	0.5515	0.5937	92.89
LIN 2 ACID	Phosphonic Acid	2.400	32,723	2.3721	1.9792	119.85
LIN 3 ACID	Phosphonic Acid	2.405	67,494	4.8697	4.9479	98.42
LIN 4 ACID	Phosphonic Acid	2.410	140,292	10.0986	9.8958	102.05
LIN 5 ACID	Phosphonic Acid	2.410	214,575	15.4342	14.8437	103.98



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