

# APPLICATIONS

## Glyphosate Analysis by LC/MS/MS using FMOCC Derivatization and Gemini® 3 µm NX-C18

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### Overview/Summary

The glyphosate molecule is small and polar (Log P of -3.1), which makes conventional reversed phase HPLC difficult. The FMOCC (fluorenylmethyloxycarbonyl chloride) derivatization protocol described here is an effective analytical approach for analyzing this otherwise very challenging polar herbicide.

### Sample Preparation

#### Derivatization:

In a 2 mL vial, spike 50 µL of 10 µg/mL Glyphosate and AMPA standards into 1 mL of 0.4 M borate buffer. Add 200 µL of 2 mg/mL FMOCC in acetone (make fresh daily) and vortex.

### LC/MS/MS Conditions

**Column:** Gemini 3 µm NX-C18  
**Dimensions:** 50 x 2.0 mm  
**Part No.:** 00B-4453-B0  
**Mobile Phase:** A: 5 mM Ammonium bicarbonate pH 9  
 B: 50:50 Acetonitrile/methanol  
**Gradient:**

Time (min)	% B
0.0	20
4.0	90
4.1	20
7.0	20

**Flow Rate:** 0.40 mL/min  
**Inj. Volume:** 20 µL  
**Temperature:** Ambient  
**Detection:** API 5000™ (AB SCIEX) Tandem Mass Spec (MS/MS)  
 Electrospray ionization (ESI-) in negative mode.  
**Sample:** 1. Glyphosate  
 2. AMPA

### Results and Discussion

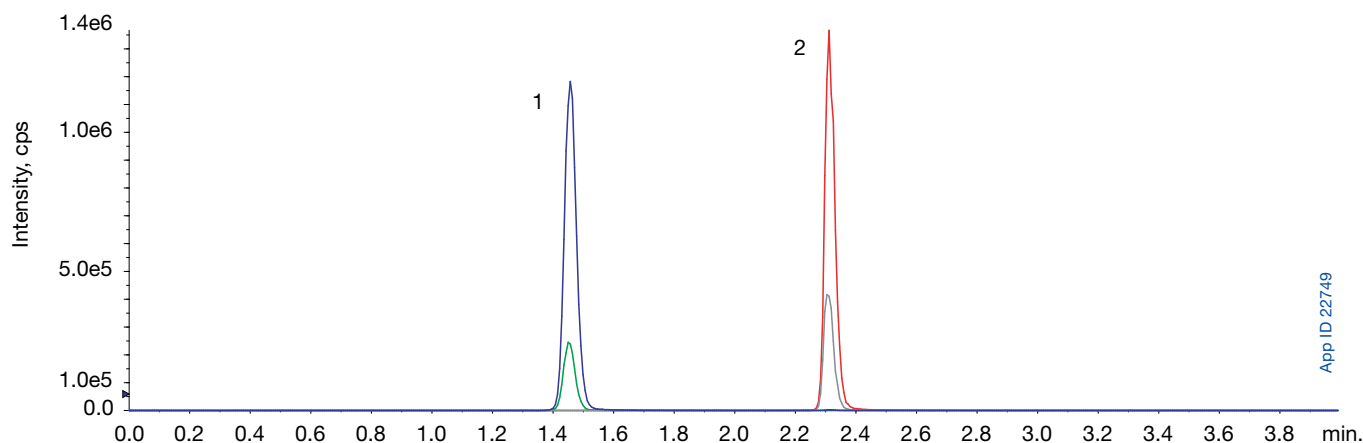
**Figure 1.** displays the chromatography obtained by using the FMOCC derivatized procedure on a high-pH stable Gemini NX-C18 column. The analyte peaks are well resolved and exhibit excellent peak symmetry and efficiency. The derivatization procedure creates more HPLC-amenable molecules, resulting in a robust and sensitive analytical method.

**Table 1.**  
MRM transitions & retention times for FMOCC derivatized Glyphosate and AMPA

Analyte	Q1	Q3	Retention Time (min)	Mode
Glyphosate	390.4	168.0/150.2	1.44	-ve
AMPA	332.2	110.0/135.9	2.32	-ve



**Figure 1.**  
Glyphosate(1) and AMPA(2) standards derivatized with FMOCC on a Gemini 3 µm NX-C18



App ID 22749



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## Gemini Ordering Information

3 µm Microbore, Minibore and Narrow Bore Columns (mm)						SecurityGuard™ Cartridges (mm)			
Phases	20 x 2.0	30 x 2.0	50 x 2.0	100 x 2.0	150 x 2.0	50 x 3.0	100 x 3.0	150 x 3.0	4 x 2.0*
NX-C18	00M-4453-B0	00A-4453-B0	00B-4453-B0	00D-4453-B0	00F-4453-B0	00B-4453-Y0	00D-4453-Y0	00F-4453-Y0	/10pk AJ0-8367
									for ID: 2.0-3.0 mm

3 µm Analytical Columns (mm)				SecurityGuard Cartridges (mm)	
Phases	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	4 x 3.0*
NX-C18	00B-4453-E0	00D-4453-E0	00F-4453-E0	00G-4453-E0	/10pk AJ0-8368
					for ID: 3.2-8.0 mm

\* SecurityGuard™ Analytical Cartridges require holder, Part No.: KJ0-4282

5 µm Minibore and Narrow Bore Columns (mm)						SecurityGuard Cartridges (mm)			
Phases	30 x 2.0	50 x 2.0	150 x 2.0	50 x 3.0	100 x 3.0	150 x 3.0	250 x 3.0	4 x 2.0*	
NX-C18	00A-4454-B0	00B-4454-B0	00F-4454-B0	00B-4454-Y0	00D-4454-Y0	00F-4454-Y0	00G-4454-Y0	/10pk AJ0-8367	
									for ID: 2.0-3.0 mm

5 µm Analytical Columns (mm)				SecurityGuard Cartridges (mm)	
Phases	50 x 4.6	100 x 4.6	150 x 4.6	250 x 4.6	4 x 3.0*
NX-C18	00B-4454-E0	00D-4454-E0	00F-4454-E0	00G-4454-E0	/10pk AJ0-8368
					for ID: 3.2-8.0 mm



If Gemini analytical columns do not provide at least an equivalent separation as compared to a competing column of the same particle size, similar phase and dimensions, return the column with comparative data within 45 days for a FULL REFUND.

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### Disclaimer

Dimensions and chromatographic conditions are the same for all columns unless otherwise noted. Comparative separations may not be representative of all applications.

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