

CLICK ON THE UNDERLINED BLUE TEXT FOR DETAILS ON THE PRODUCTS USED IN THIS APPLICATION

Carbamates are used worldwide as commercial pesticides for food crops. The United States Environmental Protection Agency (US EPA) requires that drinking water and raw surface water be monitored for the presence of carbamate pesticides and related compounds using an established EPA Method 531.2. The European Union (EU) regulation regarding drinking water, provides a general rule for pesticides and metabolites. This regulation limits the maximum admissible concentration (MAC) at 0.1 µg/L (ppb) for each individual component, with the total concentration not to exceed 0.5 ppb. Detection of regulated compounds at ever decreasing levels is a challenge faced by many water testing laboratories. Because the concentration of these substances in real samples may be in the low parts per billion (ppb) or µg/L, optimal sensitivity is the ultimate goal.

## SAMPLE PREPARATION

Oasis® SPE Method for Carbamates  
Method for Oasis HLB Cartridge, 6 cc, 200 mg  
(Part Number: [WAT106202](#))

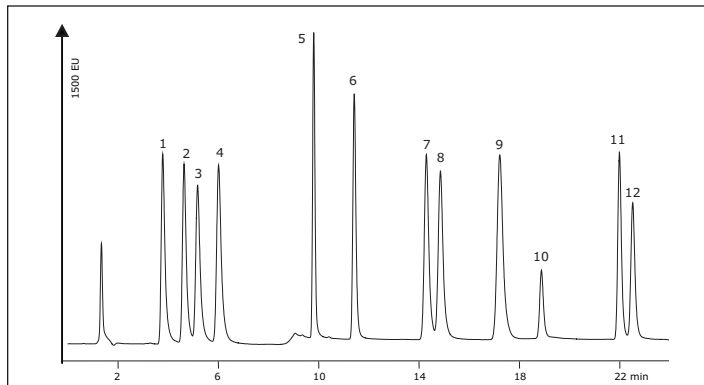
PREPARE SAMPLE: Adjust to pH 3
CONDITION: 3 mL
RINSE: 3 mL
RINSE: 3 mL
LOAD: Up to 500 mL sample
WASH: 2 mL
ELUTE: 6 mL

For LC analysis, exchange to acetonitrile, then adjust to 1 mL.

## HPLC CONDITIONS

Instrument: Waters Alliance® system for carbamate analysis  
Eluent: Water/methanol/acetonitrile  
Column: Waters Carbamate Analysis column 3.9 x 150 mm @ 30 °C  
(Part Number: [WAT035577](#))

For complete sample preparation and HPLC condition, refer to the full application note: [720002726EN](#)



Standard chromatogram of 25 ppb for each analyte.

Peak	Analyte	Retention Time (min)	Detection Limit (ppb)
1	Aldicarb Sulfoxide	3.77	0.019
2	Aldicarb Sulfone	4.66	0.041
3	Oxamyl	5.17	0.050
4	Methomyl	6.03	0.031
5	3-Hydroxy Carbofuran	9.83	0.022
6	Aldicarb	11.46	0.022
7	Propoxur	14.35	0.038
8	Carbofuran	14.94	0.028
9	Carbaryl	17.37	0.013
10	1-Naphthol	18.99	0.053
11	Methiocarb	22.02	0.022
12	BDMC*	22.56	0.031

\* Internal Standard  
EPA Method 531.2 target analytes.

## Ordering Information

Products Used in this Application	Part Number
<a href="#">Oasis HLB Cartridge, 6 cc, 200 mg</a>	<a href="#">WAT106202</a>
<a href="#">Carbamate Analysis Column, 3.9 x 150 mm</a>	<a href="#">WAT035577</a>
<a href="#">Carbamate/Carbamoxloxime Pesticides Standard</a>	<a href="#">186004278</a>

Additional Information	Literature Code
<a href="#">Waters Alliance Systems for Carbamate Analysis</a>	<a href="#">720000126EN</a>
<a href="#">Carbamates in Drinking Water</a>	<a href="#">720000609EN</a>
<a href="#">A Fully Automatic Multi-Analyte Quantification Protocol for Carbamates – A Comparison of LC/MS and LC/MS/MS</a>	<a href="#">720000672EN</a>
<a href="#">LC/MS of 52 Carbamates: A Fully Automated Protocol</a>	<a href="#">WA20274</a>

For a complete carbamate testing solution, use the Waters Carbamate Analysis Kit (Part Number: [176001740](#)).