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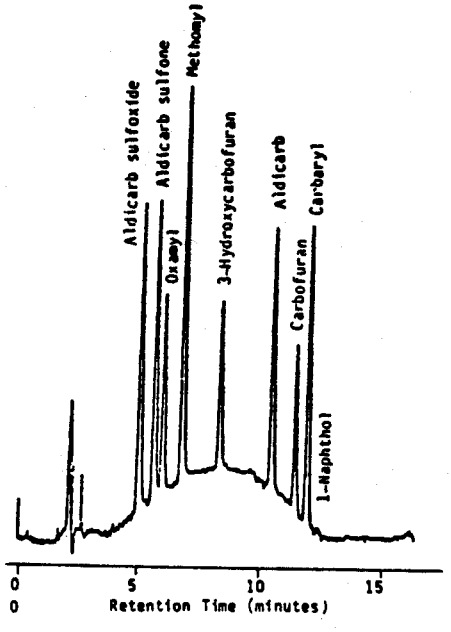
MONITORING DRINKING WATER FOR ALDICARB AND RELATED COMPOUNDS USING RESOLVE™ C_{18} PACKING AND RADIAL COMPRESSION

The US Environmental Protection Agency is currently performing a statewide monitoring survey for Temik (aldicarb) in the drinking water supplies of Florida. Prior to beginning this study, the Environmental Monitoring and Support Laboratory in Cincinnati, Ohio, developed and validated the analytical procedure to be used in this study.

In this work (1) eleven columns were evaluated and **the 8mm ID Radial-Pak™ cartridge with Resolve™ C_{18} packing material and Radial Compression Separation System was selected because it gave the maximum resolution under gradient conditions.** Incorporating Radial Compression into the gradient mode has been documented previously (2) with the demonstrated benefits of high efficiencies at high flow rates and rapid step return to original conditions. Both of these benefits result in high sample throughput.

The final gradient chosen for use with all eight target analytes is shown in Figure 1. This typical chromatogram was obtained using Solvent Delivery System A with pure water and Solvent Delivery System B with a 20:80 mixture of acetonitrile/methanol. Samples can be analyzed every 25 to 30 minutes depending upon how long the column is re-equilibrated at the initial conditions. The authors point out that this is a high throughput for this analysis.



Column:	8mm ID X 10cm Radial-Pak™ cartridge Resolve™ C_{18} packing material
Gradient:	20% to 70% B in 20 minutes (linear)
Flow Rate:	2.0 ml/min
Detector:	Fluorescence: 235 nm/ex; >419 nm/em

Figure 1: HPLC Chromatogram of N-Methyl Carbamoyloximes and N-Methyl Carbamates

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After filtration, the water sample is directly injected into the RCSS. After elution from the column, the pesticide is hydrolyzed with sodium hydroxide and derivatized with o-phthalaldehyde to form a fluorescent derivative. The post-column reaction system described in this work (1) is similar to that described in previous reports (3,4). This procedure, which involves practically no sample workup, is applicable to concentrations from below 10 µg/L to well over 500 µg/L.

The procedure has been validated for aldicarb, aldicarb sulfone, aldicarb sulfoxide, oxamyl, methomyl, 3-hydroxy carbofuran, carbofuran, and carbaryl. The analysis is very amenable to unattended operation, and aldicarb, aldicarb sulfoxide and aldicarb solfone gave minimum detectable limits (MDLs) of 1.3, 0.8, and 0.5 µg/L, respectively.

In addition to the excellent resolution and throughput obtained using Radial Compression, the users of this method would also enjoy four times the column lifetime compared to a steel column (5).

1. D. L. Foerst and H. Ansen Moye, EPA Report 600/D-85/051, March, 1985.
2. J. Korpi, and B. Bidlingmeyer, American Laboratory, June ,1981, p110-117.
3. LAH #119, October, l983.
4. LAH #120, October, 1983.
5. LAH #183, August, 1984.