12-Minute GC Analysis for 33 Organochlorine Pesticides

Using an Rtx®-440 / Rtx®-CLPesticides2 Column Pair

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- High sample throughput.
- Excellent resolution and responses.
- Equivalent column lifetimes.

A ubiquitous and persistent presence in the environment, and possibly carcinogenic properties, make organochlorine pesticides one of the most commonly analyzed groups of compounds in environmental assays. Because of this prevalence, it is important to use columns that can 1) separate these numerous and varying compounds, to ensure accurate data, and 2) provide short analysis times, to ensure adequate throughput for the laboratory. Further, the columns must be compatible with analytical conditions that ensure good response for these active, difficult-to-analyze compounds. An Rtx®-440 / Rtx®-CLPesticides2 column pair fulfills these requirements.

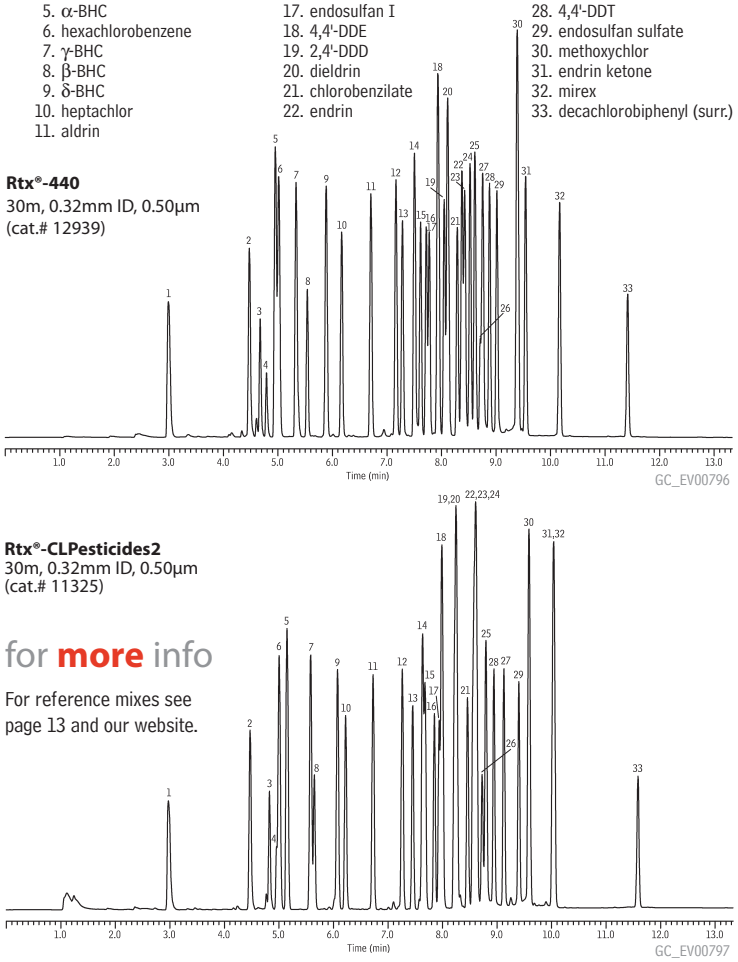
To illustrate the capabilities of these columns, we chose the 33 organochlorine pesticides in the target list for Revision 1 of US EPA Method 8081A. Several of these compounds are described as possibly co-eluting pairs on the columns listed in the method, but all are resolved on the unique Rtx®-440 stationary phase. A combination of a 30m x 0.32mm ID x 0.5µm Rtx®-440 column and an Rtx®-CLPesticides2 column in the same configuration (cat. # 12939 and cat.# 11325, repectively), is an excellent choice for the analysis.

Figure 1 shows all 33 compounds elute in 12 minutes, allowing high throughput. Splitless injection at 275°C, with a 0.75 minute hold time and using an inert Siltek® treated splitless single gooseneck inlet liner (cat.# 20961-214.1), assures good responses. Oven temperature conditions are optimized to allow excellent resolution, quickly, by the Rtx®-440 phase. Because conditions are identical for the two analyses, and analysis times are equal, an efficient way to monitor these pesticides is by splitting a single injected sample to the two columns, and two detectors. This eliminates the need for a separate confirmation run, or for GC/MS analysis, and can markedly improve productivity.

The new 0.5µm stationary phase thickness makes the 30m x 0.32mm ID x 0.5µm Rtx®-CLPesticides2 column compatible with the 30m x 0.32mm ID x 0.5µm Rtx®-440 column, or with other pesticide columns of like phase ratio, eliminating disparity in potential column life expectancies. For accurate, high throughput analyses of organochlorine pesticides, we highly recommend this Rtx®-440/Rtx®-CLPesticides2 column pair.

Figure 1 Separate 33 organochlorine pesticides in 12 minutes, using conditions optimized for an Rtx®-440 column.

1. hexachlorocyclopentadiene
2. 2,4,5,6-tetrachloro-*m*-xylene (surr.)
3. *cis*-diallate
4. *trans*-diallate
5. α-BHC
6. hexachlorobenzene
7. γ-BHC
8. β-BHC
9. δ-BHC
10. heptachlor
11. aldrin
12. isodrin
13. heptachlor epoxide
14. 2,4'-DDE
15. γ-chlordane
16. α-chlordane
17. endosulfan I
18. 4,4'-DDE
19. 2,4'-DDD
20. dieldrin
21. chlorobenzilate
22. endrin
23. 2,4'-DDT
24. 4,4'-DDD
25. endosulfan II
26. kepone
27. endrin aldehyde
28. 4,4'-DDT
29. endosulfan sulfate
30. methoxychlor
31. endrin ketone
32. mirex
33. decachlorobiphenyl (surr.)



for **more** info

For reference mixes see page 13 and our website.

Sample:	Organochlorine Pesticides Mix AB #2 (cat.# 32292), Chlorobenzilate (cat.# 32211) 1000µg/mL in methanol, Diallate (*cis* & *trans*) (custom) 1000µg/mL in hexane, Hexachlorobenzene (cat.# 32231) Hexachlorocyclopentadiene (cat.# 32232), Isodrin (custom) 1000µg/mL in hexane, Kepone (custom) 1000µg/mL in hexane, Mirex (custom) 1000µg/mL in hexane, 2,4'-DDD (cat.# 32098), 2,4'-DDE (cat.# 32099), 2,4'-DDT (cat.#32200), TCMX (cat.# 32027), DCB (cat.# 32029)
Inj.:	1.0µL splitless (hold 0.75 min.), 2mm Siltek® treated single gooseneck inlet liner (cat.# 20961-214.1). Sample divided to two columns, using Siltek® treated 0.32mm ID tubing (cat.# 10027) and a SeCure™ "Y" connector (cat.# 20277).
Inj. temp.:	275°C
Carrier gas:	hydrogen, constant pressure
Linear velocity:	51 cm/sec. @ 140°C
Oven temp.:	140°C (hold 1 min.) to 240°C @ 30°C/min. (hold 2 min.) to 330°C @ 30°C/min. (hold 4 min.)
Det.:	ECD @ 330°C
Instrument:	Shimadzu GC-2010 with ECD and FID

Rtx®-CLPesticides2 Column (fused silica)

ID	df (µm)	temp. limits	length	cat. #
0.32mm	0.50	-60 to 320/340°C	30-Meter	11325

Rtx®-440 Column (fused silica)

ID	df (µm)	temp. limits	length	cat. #
0.32mm	0.50	20°C to 320/340°C	30-Meter	12939