ENVIRONMENT

APPLICATION NOTE

Analysis of organochlorine pesticides by Gas Chromatograph Chromatec-Crystal 5000 with MSD

Summary

Organochlorine (OC) pesticides were widely used in agriculture and pesticides control until research and public concern regarding the hazards of their use led to government restrictions and bans. Despite restrictions and bans on the use of many organochlorine pesticides in the 1970s and 1980s, they continue to persist in the environment today.

GC-MSD is the most effective instrument for OCP environment control.

Analysis methods

1. US EPA Method 525. Determination of semivolatile organic chemicals in drinking water by solid phase extraction and capillary column gas chromatography / mass spectrometry (GC/MS).

Instrument configuration

- Gas chromatograph Chromatec-Crystal 9000
- Split-splitless (SSI) inlet or Programmable Split/Splitless Inlet (PSSI)
- Column BP-5ms (30 m × 0.25 mm × 0.25 µm), Cat. # 054310
- Detector – MSD
- Carrier-gas – helium

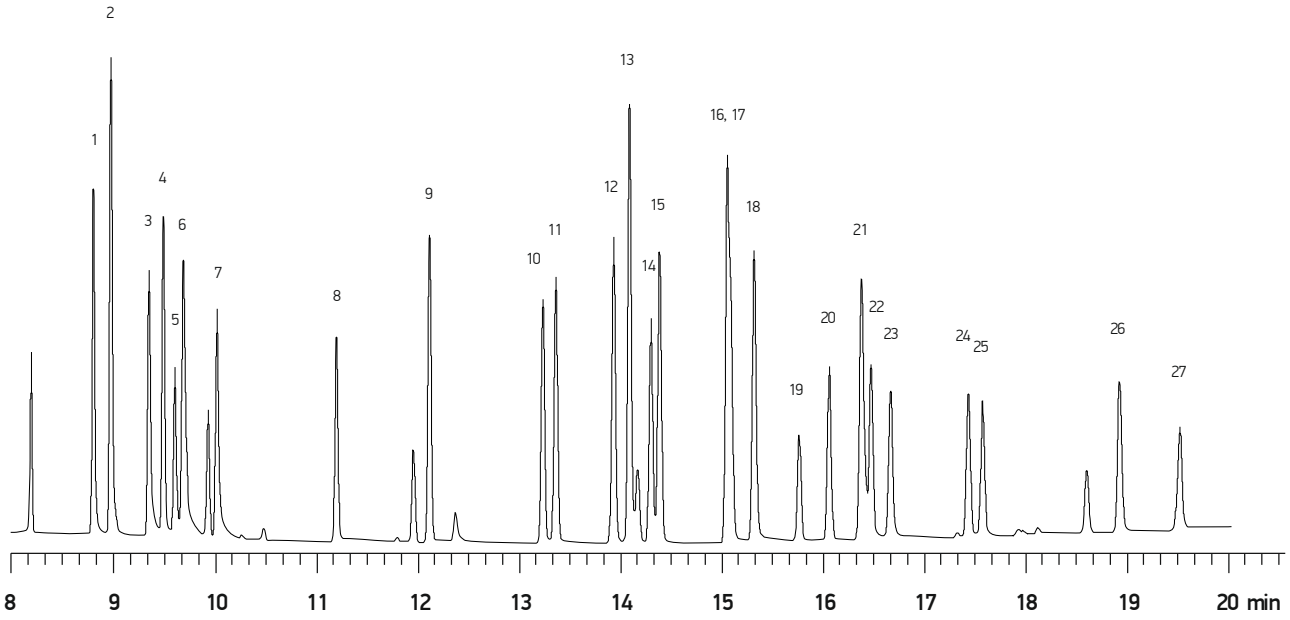
Analysis mode

Chromatograph			
Analysis time		25 min	
Column			
Carrier-gas flow		1 ml/min	
Column temperature			
Isotherm 1:	80 °C	1 min	20 °C/min
Isotherm 2:	180 °C	0 min	5 °C/min
Isotherm 3:	270 °C		
Split/splitless Inlet			
Temperature		250 °C	
Injection Mode		Splitless	
MSD			
Ion source temperature		300 °C	
Transfer line temperature		300 °C	
Scan Mode		Full Scan	
Mass Range		45 - 550 amu	

Results

Figure 1 shows the chromatogram of organochlorine pesticides in TIC mode.
The system was calibrated at 6 levels: 20, 50, 100, 200, 500, 100 ppb. Each calibration level contained 26 pesticides and internal standard (anthracene-d10). The calibration was performed in SIM mode. The chromatogram in SIM mode for 50 ppb level is shown in Figure 2.
Figure 3 shows the calibration curves of some components.

Chromatograms



1. α-BHC
2. Hexachlorobenzene
3. ß-BHC
4. γ-BHC
5. Pentachloronitrobenzene
6. Anthracene-d10
7. δ-BHC
8. Heptachlor
9. Aldrin
10. Heptachlor epoxide A
11. Heptachlor epoxide B
12. cis-Chlordane
13. o,p'-DDE 1
14. Endosulfan I
15. trans-Chlordane
16. p,p'-DDE
17. Dieldrin
18. o,p'-DDD
19. Endrin
20. Endosulfan II
21. o,p'-DDT
22. p,p'-DDD
23. Endrin aldehyde
24. Endosulfan sulfate
25. p,p'-DDT
26. Endrin ketone
27. Methoxychlor

Figure 1 – Organochlorine pesticides mix (500 ppb) using Scan Mode

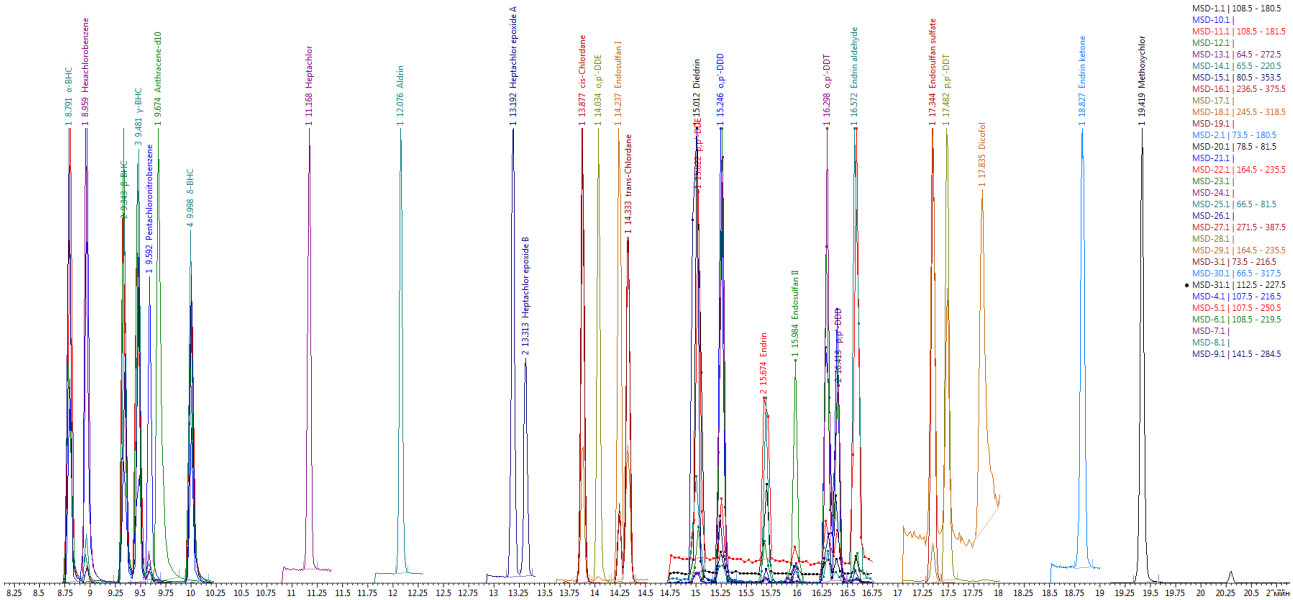


Figure 2 – Organochlorine pesticides mix (50 ppb) using SIM Mode

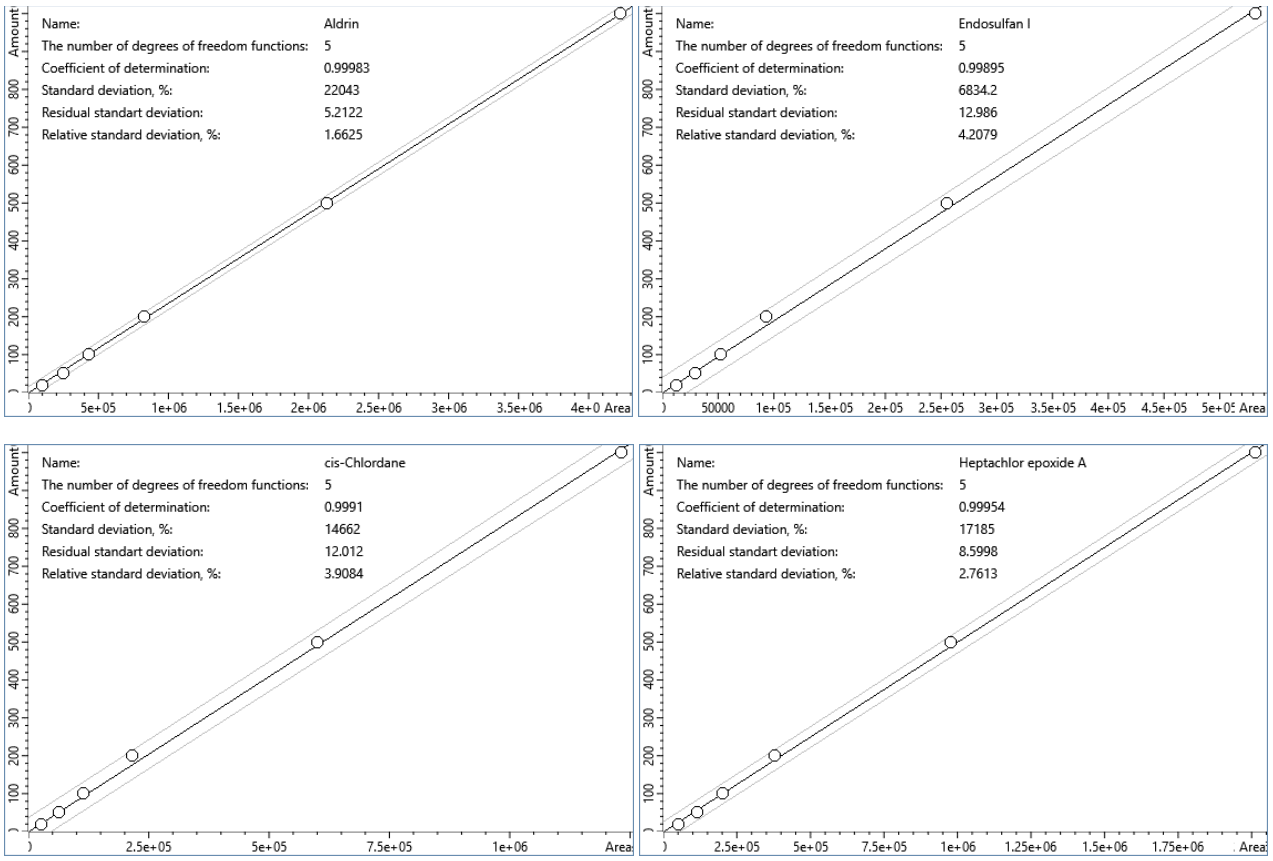


Figure 3 – Calibration curves of some pesticides

Conclusion

Analysis of organochlorine pesticides can be accomplished using GC-MS "Chromatec-Crystal 9000". To achieve high sensitivity, the analysis is performed in SIM mode. The calibration range is from 20 to 1000 ppb.

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