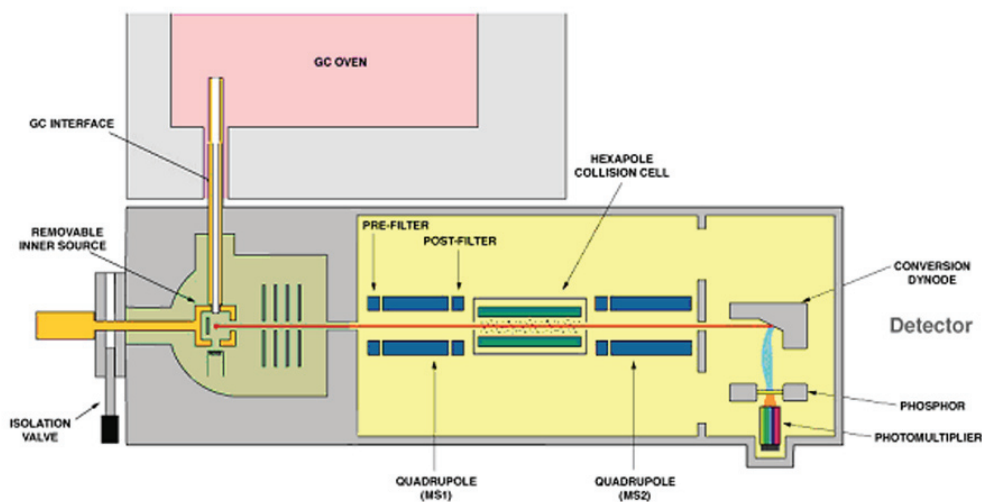


Elimination of Polychlorinated Biphenyls (PCB) Interference

Columbia Analytical Services, Inc. offers the analysis of organochlorine pesticides by isotope dilution Gas Chromatograph/Mass Spectroscopy/Mass Spectroscopy (GC/MS/MS), using our new Waters Quatro triple quadrupole.



It is well known that the analysis of organochlorine pesticides by traditional EPA methodologies that use Gas Chromatographs with Electron Capture Detectors (GC/ECD) are often affected by the presence of PCB congeners and other co-extractable interferences causing false positive identification and/or over estimation. High biased results for organochlorine pesticides can lead to an overall lack of data confidence and unnecessary environmental actions.

To eliminate co-extractable and PCB congener interference, Columbia Analytical has developed a unique method using isotope dilution with Large Volume Injection (LVI) and GC/MS/MS. Using standard extraction procedures combined with this analytical method, Columbia Analytical is able to achieve detection levels up to 20 times lower than typically observed by ECD detection.

The triple-quad LVI/GC/MS/MS provides excellent selectivity in complex matrices by generating unique spectral fingerprints that result in an unambiguous identification resulting in increased data defensibility. This enhancement is essential in further reducing co-extractable interferences. Isotopic standards increase the precision and accuracy in measuring the concentration of the pesticides. This method is applicable to water, soil/sediment and tissue matrices.

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The following table lists organochlorine pesticide target analytes along with their achievable Method Reporting Limit (MRL) by this application.

Organochlorine Pesticides						
Compound	Water		Soil		Tissue	
	MDL (ng/L)	MRL (ng/L)	MDL (µg/Kg)	MRL (µg/Kg)	MDL (µg/Kg)	MRL (µg/Kg)
alpha-BHC	0.27	0.5	0.0069	0.050	0.025	0.10
gamma-BHC	0.15	0.5	0.011	0.050	0.041	0.10
beta-BHC	0.31	0.5	0.012	0.050	0.035	0.10
delta-BHC	0.19	0.5	0.011	0.050	0.047	0.10
Hexachlorobenzene	0.13	0.5	0.015	0.050	0.032	0.10
Heptachlor	0.17	0.5	0.0091	0.10	0.014	0.10
Chlorpyrifos	0.17	0.5	0.0072	0.050	0.023	0.10
Aldrin	0.47	1.0	0.012	0.10	0.047	0.10
Octachlorostyrene	0.28	1.0	0.017	0.10	0.094	0.10
Isodrin	1.10	2.0	0.029	0.20	0.043	0.20
Oxychlordane	0.72	2.0	0.14	0.20	0.18	0.50
Heptachlor epoxide	0.47	1.0	0.030	0.10	0.048	0.10
2,4'-DDE	0.19	0.5	0.0069	0.050	0.026	0.10
gamma-Chlordane	0.20	1.0	0.0081	0.050	0.024	0.10
alpha-Chlordane	0.15	0.5	0.0066	0.050	0.047	0.10
trans-Nonachlor	0.24	0.5	0.014	0.050	0.025	0.10
Endosulfan I	1.20	2.0	0.050	0.20	0.094	0.20
4,4'-DDE	0.13	0.5	0.0055	0.050	0.049	0.10
2,4'-DDD	0.11	0.5	0.0094	0.050	0.035	0.10
Dieldrin	2.30	5.0	0.098	0.50	0.073	0.50
Endrin	0.84	2.0	0.045	0.20	0.12	0.50
2,4'-DDT	0.13	0.5	0.015	0.050	0.048	0.10
cis-Nonachlor	0.31	2.0	0.015	0.20	0.049	0.20
4,4'-DDD	0.20	0.5	0.015	0.050	0.028	0.10
Endosulfan II	0.51	2.0	0.043	0.10	0.14	0.50
Endrin aldehyde	0.67	2.0	0.051	0.10	0.082	0.20
4,4'-DDT	0.23	0.5	0.014	0.050	0.043	0.10
Endosulfan sulfate	0.12	0.5	0.017	0.050	0.039	0.10
Methoxychlor	0.16	0.5	0.018	0.050	0.026	0.10
Endrin Ketone	0.70	2.0	0.036	0.10	0.13	0.50
Mirex	0.12	1.0	0.029	0.10	0.025	0.10