application note

Determination of DDT by C18 RP-HPLC

Abstract

A method is described for the determination of DDT by C18 reversed phase HPLC with UV detection. Sensitivity of the method is at the sub-ppm level with the retention time for DDT being approximately 5 minutes.

Keywords:
DDT, Chlorophenothane, Insecticide, Chlorinated Hydrocarbon, Agrochemical, Environmental

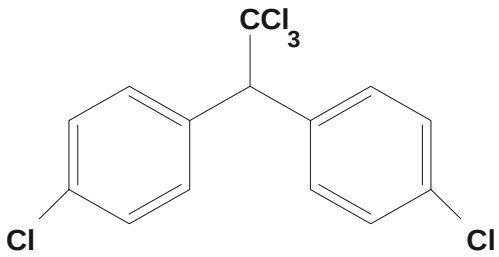
'...low vapor pressure of DDT is the cause of its remarkable persistence, killing insects for months and years on treated surfaces...'

Since the discovery of its insecticidal effects in 1939 by Paul Muller, p,p'-DDT (Chlorophenothane U.S.P.) has been phenomenally successful and for many years, has been considered the ideal insecticide. It is cheap, 'nontoxic',[1] persistent, and has a wide spectrum of insecticidal activity. The mechanism of action of DDT is by no means clear. It probably interferes with nerve conduction. It has been postulated that DDT orients itself in a special fit in a nerve-membrane-pore channel that distorts the ion passage through the nerve membrane.[2]

More recently however DDT has fallen into disfavor because of its potentially harmful effects on wildlife, the steady increase in insect resistance, and its accumulation in plants and animals. Its use is currently banned in many countries.[3] The low vapor pressure of DDT is the cause of its remarkable persistence, killing insects for months and years on treated surfaces.

It is unusually nonpolar, making it extremely oil-soluble and water-insoluble, which contributes to its accumulation in the food chain. It is chemically stable and insensitive to sunlight, which is beneficial for its insecticidal effects but undesirable from an ecological point of view.

Commercially available DDT contains approximately 80% of the p,p'-isomer and about 20% of the o,p'-isomer.[4] Some of the toxic effects of DDT have been attributed to the presence of the o,p'-isomer. HPLC offers a simple but effective method for the analysis of DDT at sub-ppm levels under isocratic conditions with UV detection.



Conditions

Column:	Spherisorb S5 ODS2, 250 x 4.6 mm ID
Mobile Phase:	Water/Acetonitrile (10:90)
Flow Rate:	1.0 ml/min
Temperature:	30°C
Detection:	UV at 254 nm
Injection Vol:	20 µl
Standard Conc.:	500 µg/ml

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GBC HPLC Instrumentation

LC1110 Dual Piston HPLC Pump
LC1200 Variable Wavelength UV/Vis Detector
LC1445 System Organiser
LC1650 Advanced Autosampler
WinChrom Chromatography Data Management System

References

1. R.D.O'Brien, 'Insecticide - Action and Metabolism', N.Y., Academic Press, 1967.

2. L.J.Mullins, Science, 122, (1955), 118.

3 'Report of the Secretary's Commission on Pesticides and Their Relationship to Environmental Health', U.S. Department of Health, Education and Welfare, Washington D.C., U.S. Government Printing Office, 1969.

4. Haller, J. Am. Chem. Soc., 67, (1945), 1591.

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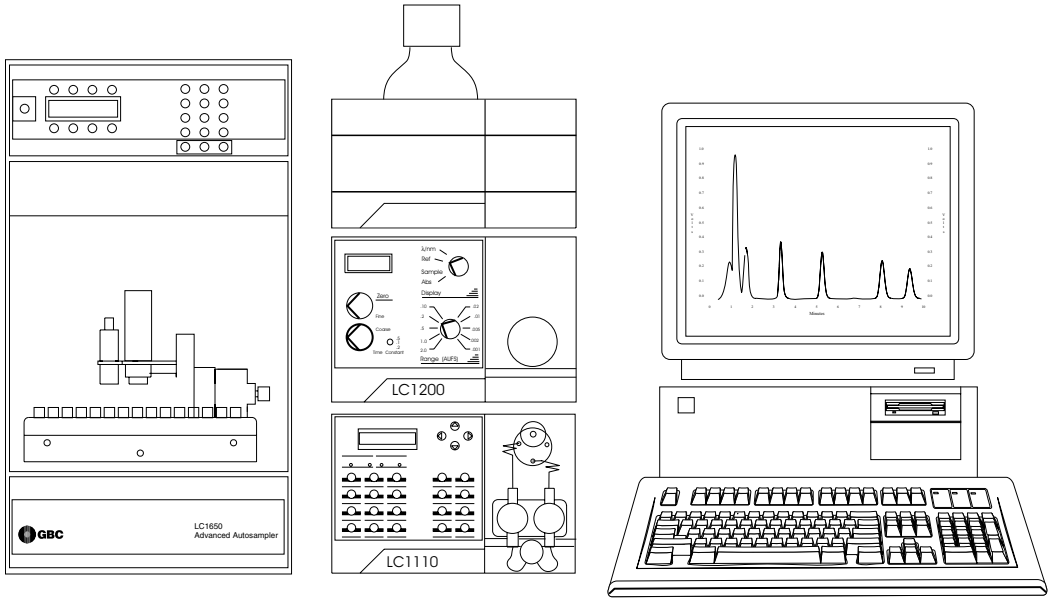

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