Research

Ontario Research Foundation

PESTICIDE RESIDUE AND TRACE CONTAMINANT ANALYSIS

LEAFLET T-14

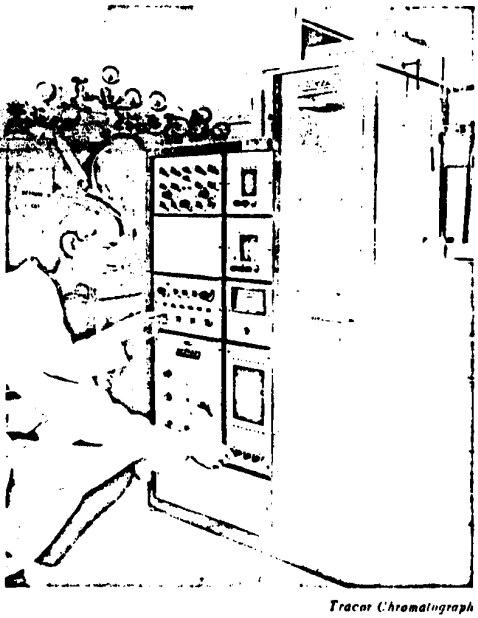
In 1964 the Foundation established a Pesticide Residue Analysis Laboratory for the measurement and monitoring of organochlorine pesticide residues in Canadian wild life. The scope of the laboratory has continually expanded since that time and now encompasses analysis of many other types of insecticides, herbicides, fungicides, and residues of other industrial chemicals found in air, water, foods, soils, packaging, and consumer products.

More recently, with the growing concern over the presence of heavy metals in the environment, facilities have been expanded to include analytical services for traces of mercury, lead, cadmium, and special forms of these, such as organometallics (methyl mercury and similar compounds).

This laboratory has provided a much needed service in Canada, and is also active internationally. It is the official Canadian representative for OECD programs dealing with unintentional residues in the environment.

To ensure the highest possible standards of accuracy, the laboratory participates regularly in international as well as national check sampling programs.

The following is a list of typical analytical services offered.



Tracor Chromatograph

Organochlorine Pesticides

Heptachlor, aldrin, heptachlor epoxide, p,p-DDE, dieldrin, p,p-TDE, o,p-DDT, p,p-DDT, methoxychlor, endrin, technical and gamma chlordane, Kelthane, endosulfan, mirex, Tedion, HCB, α -BHC, β -BHC, γ -BHC (lindane), etc.

Organophosphate Pesticides

Diazinon, parathion, methyl parathion, malathion, ethion, fenitrothion (Sumithion), fensulfothion (Dasanit), dursban, etc.

Herbicides

(2,4-D), (2,4,5-T), (2,4,5-TP), MCPA, picloram, atrazine and other triazines, chlorinated phenols such as PCP, etc.

Polychlorinated Biphenyls (PCBs) and Polychlorinated Terphenyls (PCTs)

These are classes of industrial chemicals which, while not used as pesticides, possess many of the characteristics of the chlorinated pesticides - they are widely distributed, persistent, and physiologically active, and hence present a similar threat ecologically.

Trace Metals

Mercury, organomercury, lead, cadmium, etc.

General Methodology

The above lists are indicative of analyses frequently required by ORF clients. As new compounds or special problems are encountered, the scientific and technical staff of the Pesticide and Trace Contaminant Laboratory are well qualified to evaluate known analytical methods and develop new ones. For example, with increased interest in carbamates and organophosphates as replacements for the more persistent organochlorine pesticides, the laboratory is extending its methodology studies of these two classes of insecticides.

Special Instrumentation

Hewlett Packard Model HP 5713 gas chromatograph connected to:

New linear (constant current) EC detector (Ni^{63})
HP Auto-injector with turntable for 36 samples
Autolab System 1 computing integrator

Tracor Research Gas Chromatograph (Model MT220) including:

Flame photometric detector (Phosphorus and Sulphur)
Linear Ni^{63} electron capture detector (Temp. to 400°C)
Coulson detector (Halogen, Sulphur, Nitrogen)

Varian gas chromatographs (Models 1200, 1400, 1522B, autoprep)

Gas Chromatograph-Mass Spectrometer-AEI MS30

Waters Analytical High Pressure Liquid Chromatograph Model ALC 202/401/6000 equipped with:

U.V. Detector
R.I. Detector
6000 p.s.i. Pump

Chromatography - Thin layer, column

Atomic Absorption Spectrophotometers including:

Varian models AA120 and AA5 with carbon rod atomizer for flameless atomization
Unicam SP90A
Mercury Monitor (Laboratory Data Control)

Spectrophotometers - visible, UV, IR

NMR - JEOL. JNM - 4H - 100

Polarograph (Princeton Applied Research, Model 174)

Low Temperature Asher (LFE Corporation, Model 302)

A list of clients who have made use of these laboratory facilities includes numerous Federal and Provincial Government Agencies and Ministries, at least twenty paper companies across Canada, and a variety of industrial and commercial companies, universities, and commercial laboratories.

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