

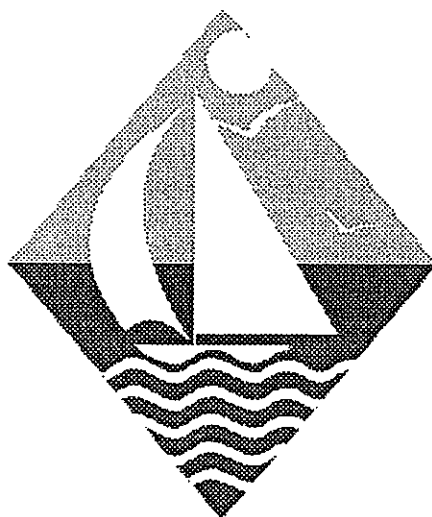
TRICKY TESTING?

Pesticide Analysis: A Complex Subject

Probably no other group of materials causes as much analytical confusion as pesticides and herbicides. There are many thousands of these on the market and literally thousands more appear each year. To add to the confusion, many pesticides have more than one trade name, which makes identifying and keeping track of them increasingly difficult.

One of the things that makes analysis so difficult is that pesticides and herbicides don't fall into a single, neat analytical method. Because they are composed of many different chemical species they require many different methods for analysis. In fact, this group probably requires more instruments/ detectors than any other class of compounds. To successfully analyze for even the most common pesticides might require GC/MS, GC/FID, GC/NPD, GC/ECD, and HPLC with several detectors. Very few laboratories in the U.S. have this variety of instrumentation.

The most common misconception most requesters of analysis have is



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that they can find out what pesticides are in a sample by requesting "pesticides" or perhaps method 608 or 8080. The target compounds in this method are the old EPA banned materials such as DDT and other chlorinated pesticides. These were discontinued long ago and thus are rarely seen today. Unfortunately, the most commonly used pesticides today are not part of this method. Materials such as diazinon, atrazine, and chlorpyrifos (nitrogen/phosphorus containing pesticides) are now the most prevalent pesticides and yet analysis is seldom requested.

--(cont. on back. see *PEST*)

TAKE A LOOK!

Diazinon Update

Diazinon is found throughout the Southeastern and Southwestern parts of the U.S. according to the EPA. Tests by the National Effluent Toxicity Assessment Center *detected diazinon in 65% of municipal effluents tested*, with the highest concentrations occurring in southern states during warm weather months. A wide spectrum organophosphate pesticide, Diazinon is used in commercial and agricultural applications to control insects, nematodes, flies, and as seed treatment. It's also used extensively by homeowners for control of grub worms and fire ants on lawns, as well as general household insect control.

Because the pesticide is used by a variety of potential dischargers, Diazinon can enter a WWTP system at many collection points. Storm water inflow and infiltration may also contribute to effluent toxicity levels.

—from "Piperonyl Butoxide as a Tool in Aquatic Toxicological Research with Organophosphate Insecticides" by G.T. Ankley, J.R. Dierkes, D.A. Jenson, and G.S. Peterson. 1991.



(PEST cont.)

To make matters more confusing for those wanting to test for these newer materials, there is no single method that encompasses all of them. In fact, it may take three or four methods to successfully detect even a small group. Some methods are even specific to only one or two pesticides.

There is a lesson here...if you are looking for a pesticide or herbicide be as specific as possible. *Specify one by name if you can or use a specific method number which contains the pesticide as part of the target compound list.*

_____ by George Drye

See Table 1. on page 3 for a list of Pest. Methods

May we offer you some suggestions?

In the article "Finding Your Way Through the Nightmarish Maze of Environmental Analysis" Randall Wedin notes some important questions that you should ask when making an environmental analysis...

- Which analytical method should be used?

- Is the testing lab qualified and certified to do the particular test you need?

- How does one testing lab compare with another in terms of quality, service, and cost?

- What sort of quality assurance is required?

- by R. Wedin. *Today's Chemist at Work*, March 1995. 36-42.



Quality Assurance

"The cornerstone of all analytical testing programs is QA. Two tools that can help with your QA program are site visits and blind samples.

Janet Lee, QA supervisor at Monsanto, reviews and signs off on the analytical data for two corporate research groups at the company: the environmental sciences and analytical sciences centers. An important part of her job is to visit testing labs around the country and assess their operations. As a former employee of a contract lab, she has been on both sides of the lab bench. When she visits a lab, she looks for the following items:

- **Management systems.** Does the lab have a management system in place that provides some level of review? Who oversees the day-to-day operations, and who signs off on the data?

- **Written methods.** Do lab workers maintain and use detailed written procedures for their analytical methods? Written methods help ensure that the results are consistent from analyst to analyst within a lab and from lab to lab across the country.

- **Employee morale.** Lee tries to get an intuitive feel for the laboratory and its climate. She says, "If there is a sweatshop attitude, you won't get high-quality results."

Another useful QA tool is the blind sample. Some users routinely prepare blind reference samples, which they include with the regular samples sent to testing

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labs. The testing labs don't know that it is a blind reference sample, so it is treated just like regular samples." -from R. Wedin's, ...*Through the Nightmarish maze... Today's Chemist at Work*, March 1995. 36-42.

New Instruments

During the past six months, Accurate has added several new Gas Chromatographs which will aid our efforts in pesticide analysis. The first is a Hewlett-Packard 5890 dual column GC with an ECD detector. This detector uses radioactive nickel to produce an electronic field which can detect chlorine molecules released when a chlorinated organic such as a pesticide or PCB is decomposed. This allows the analysis, at very sensitive levels, of these chlorinated compounds.

The second is a Hewlett-Packard 5890 GC with a Nitrogen/Phosphorus Detector (NPD). This detector uses a Rubidium salt and heat to ionize groups containing nitrogen or phosphorus, and thus can give a sensitive identification of the organo-nitrogen or organo-phosphorus pesticides and herbicides. These two instruments will allow Accurate to analyze for a much wider variety of materials than ever before.

_____ by David Kidd

Remember: *Accurate Inc.* is ready to serve your needs in Oklahoma and Kansas!

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Representative List of Pesticide Methods

- 604.1.....Hexachlorophene and Dichlorophen
- 608.1.....Organochlorine Pesticides
- 608.2.....Certain Organochlorine Pesticides
- 614.....Organophosphorus Pesticides
- 614.1.....Organophosphorus Pesticides
- 615.....Chlorinated Herbicides
- 616.....Certain Carbon-, Hydrogen-, and Oxygen-Containing Pesticides
- 617.....Organohalide Pesticides and PCB's
- 618.....Volatile Pesticides
- 619.....Triazine Pesticides
- 620.....Diphenylamine
- 622.....Organophosphorus Pesticides
- 622.1.....Thiophosphate Pesticides
- 627.....Dinitroaniline Pesticides
- 629.....Cyanazine
- 630.....Dithiocarbamate Pesticides
- 630.1.....Dithiocarbamate Pesticides
- 631.....Benomyl and Carbendazim
- 632.....Carbamate and Urea Pesticides
- 632.1.....Carbamate and Amide Pesticides
- 633.....Organonitrogen Pesticides
- 633.1.....Neutral Nitrogen-Containing Pesticides
- 634.....Thiocarbamate Pesticides
- 635.....Rotenone
- 636.....Bensulide
- 637.....MBTS and TCMTB
- 638.....Orysalin
- 639.....Bendiocarb
- 640.....Mercaptobenzothiazole
- 641.....Thiabendazole
- 642.....Biphenyl and Ortho-Phenylphenol
- 643.....Bentazon
- 644.....Picloram
- 645.....Certain Amine Pesticides and Lethane
- 646.....Dinitro Aromatic Pesticides
- 1656.....Organohalide Pesticides
- 1657.....Organophosphorus Pesticides
- 1658.....Phenoxy-Acid Herbicides
- 1659.....Dazomet
- 1660.....Pyrethrins and Pyrethroids
- 1661.....Bromoxynil
- 8140.....Nitrogen/Phosphorus (Organophosphorus) Pesticides
- 8141.....Organophosphorus Compounds