

Analysis with the Pulsed Flame Photometric Detector (PFPD)

Pesticide Applications





S

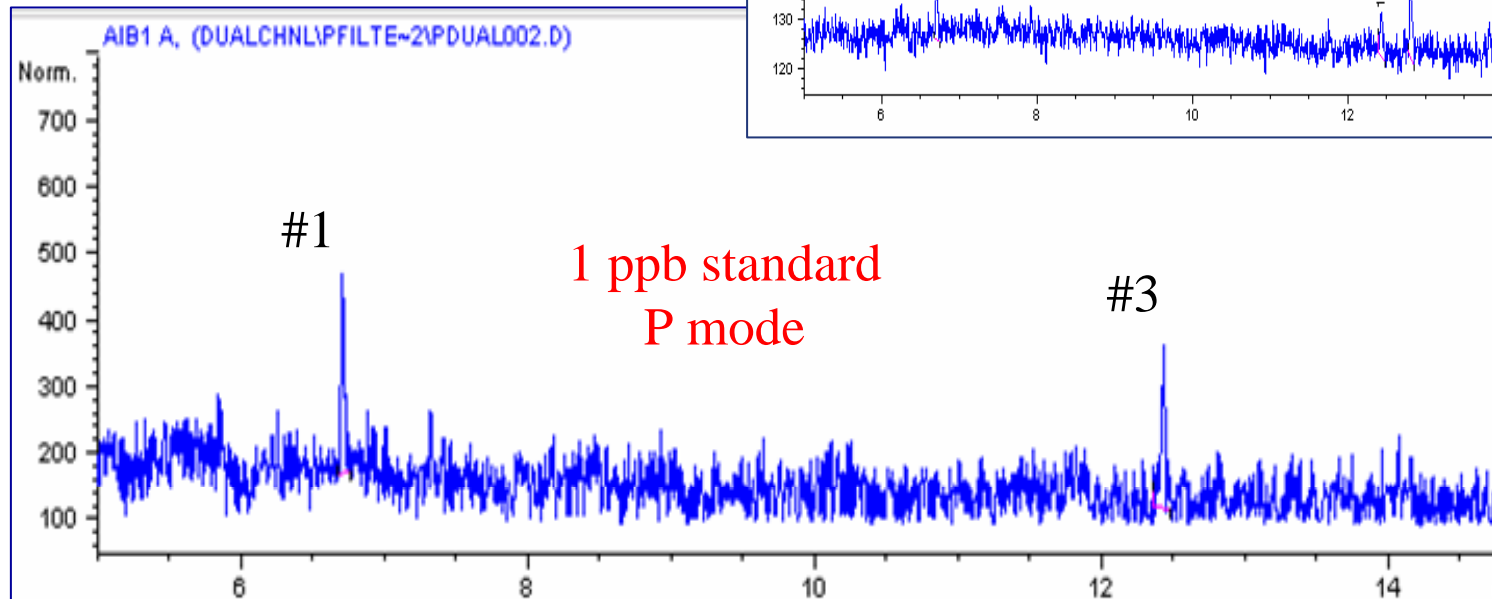
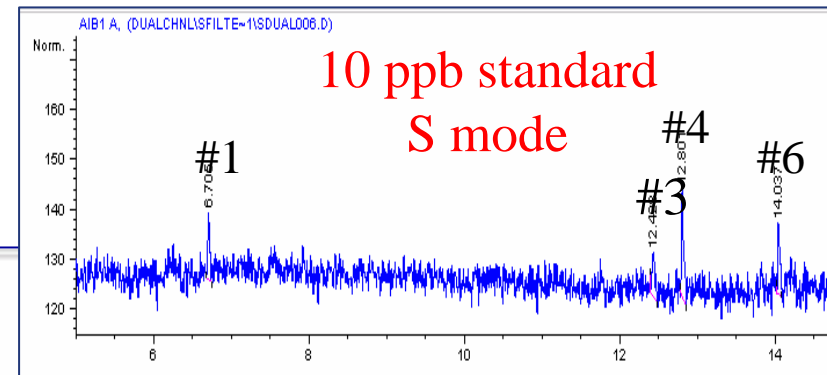
CI

P

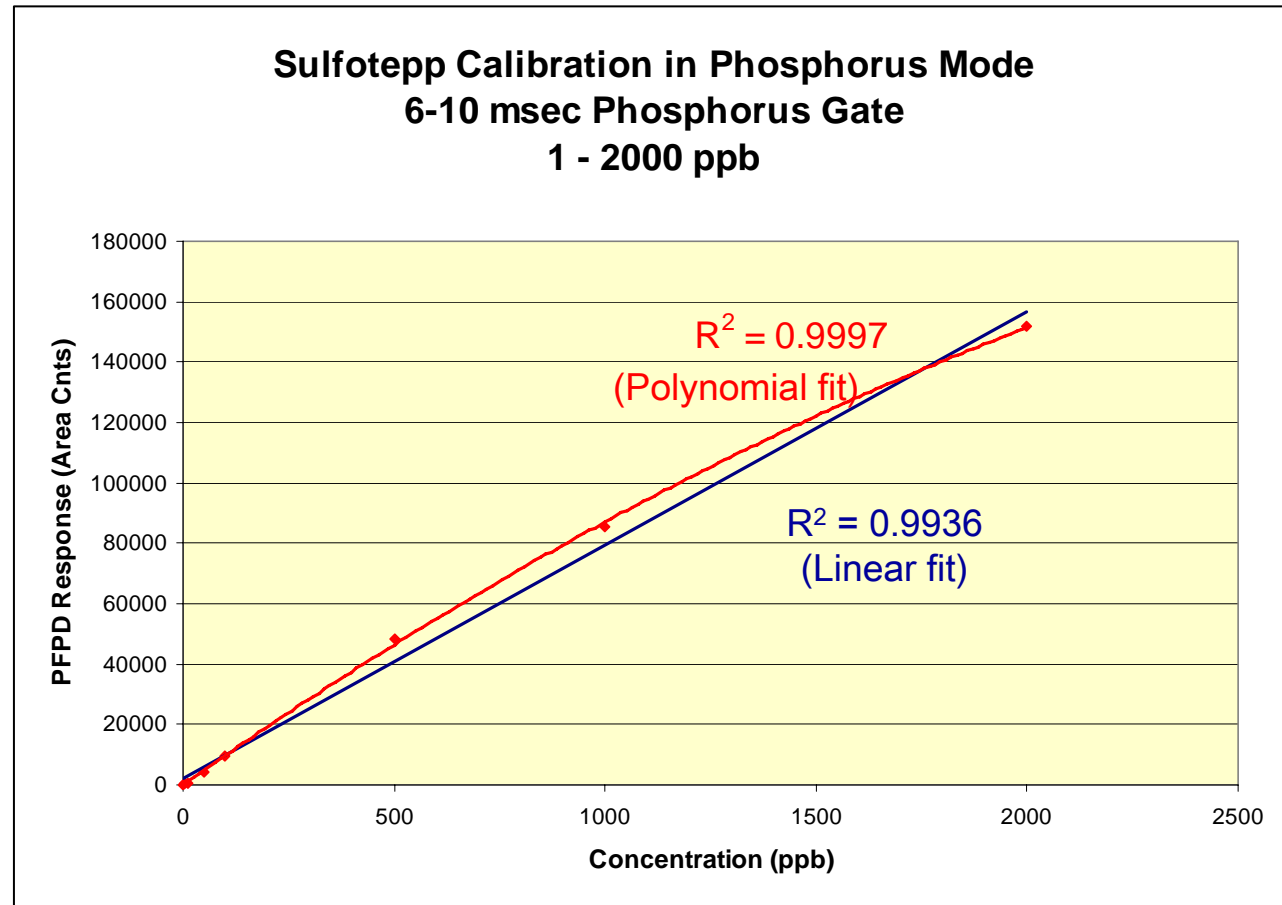
Organophosphorus Pesticides

OP Pesticide Detection Limits

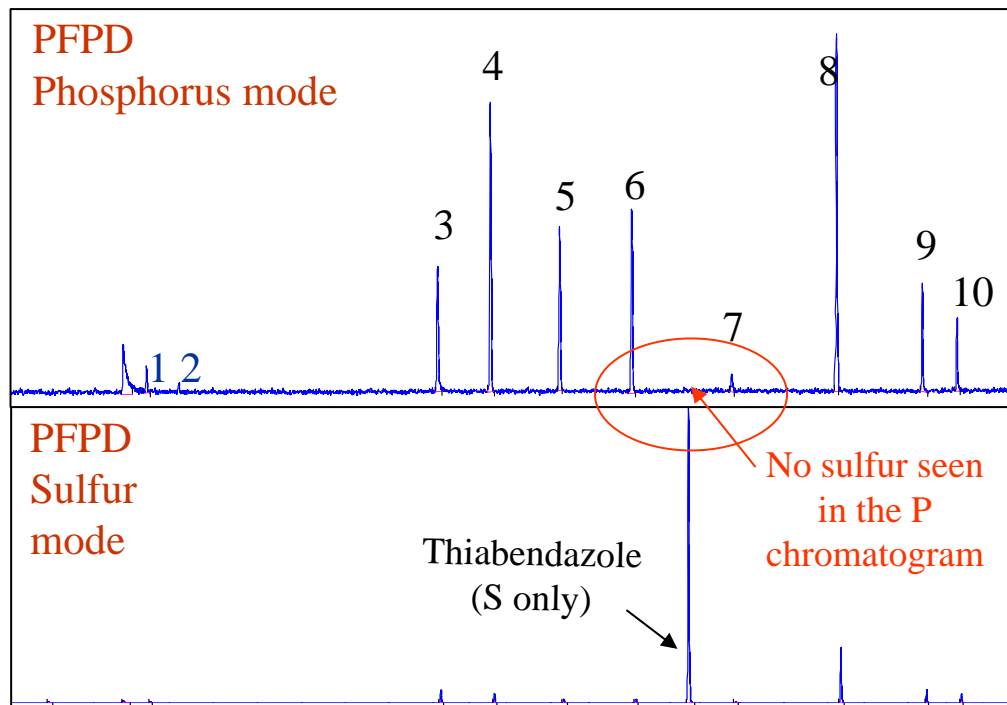
- Two compounds detected at 1 ppb
- #1 with one P atom
- #3 with two P atoms
- Compare to 10 ppb in S mode



OP Pesticide Calibration Range



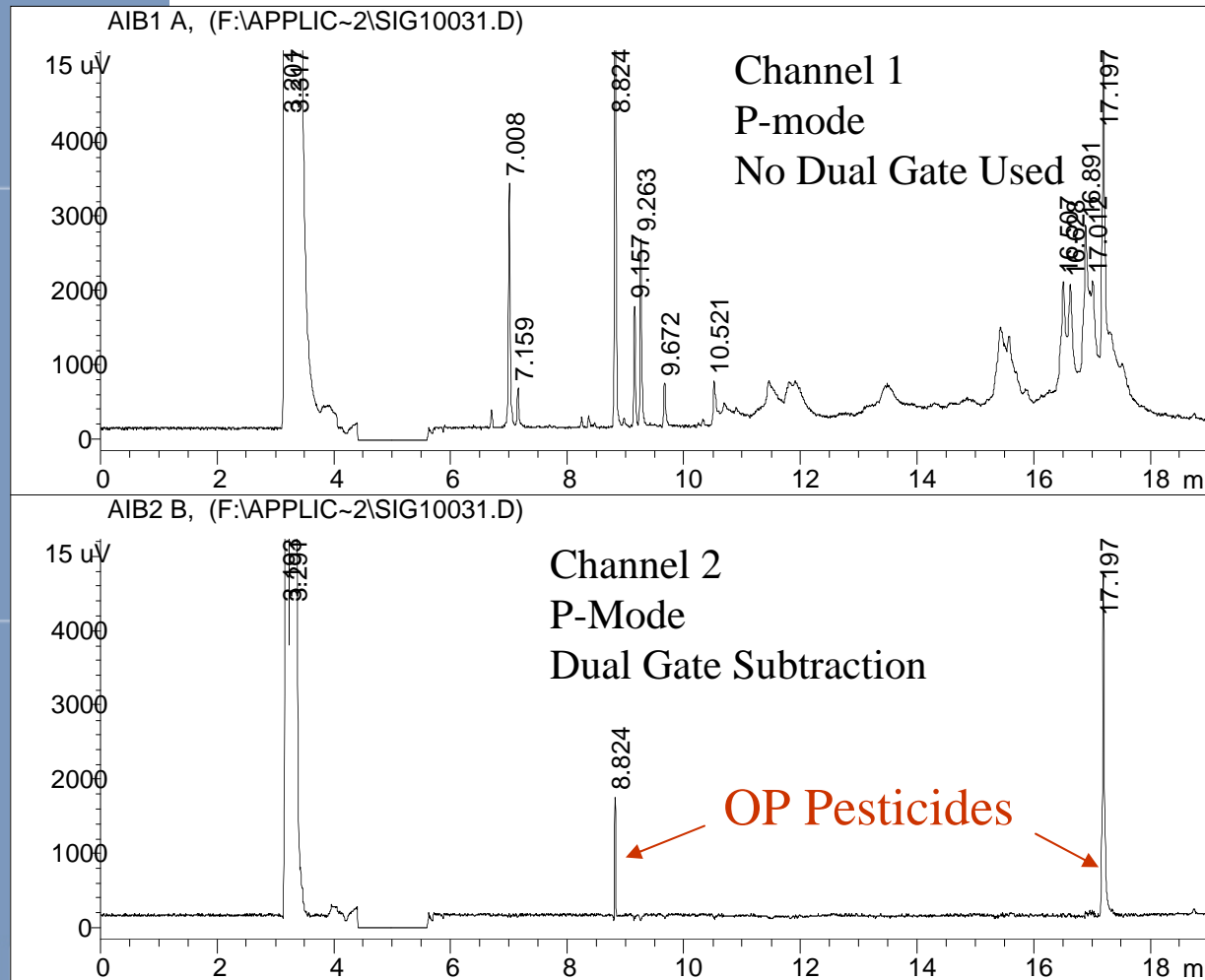
Simultaneous Phosphorus & Sulfur



- Compounds 1-10 contain both P and S
- Thiabendazole contains only S
- PFPD produces simultaneous, mutually selective phosphorus and sulfur chromatograms using Dual Gate Subtraction

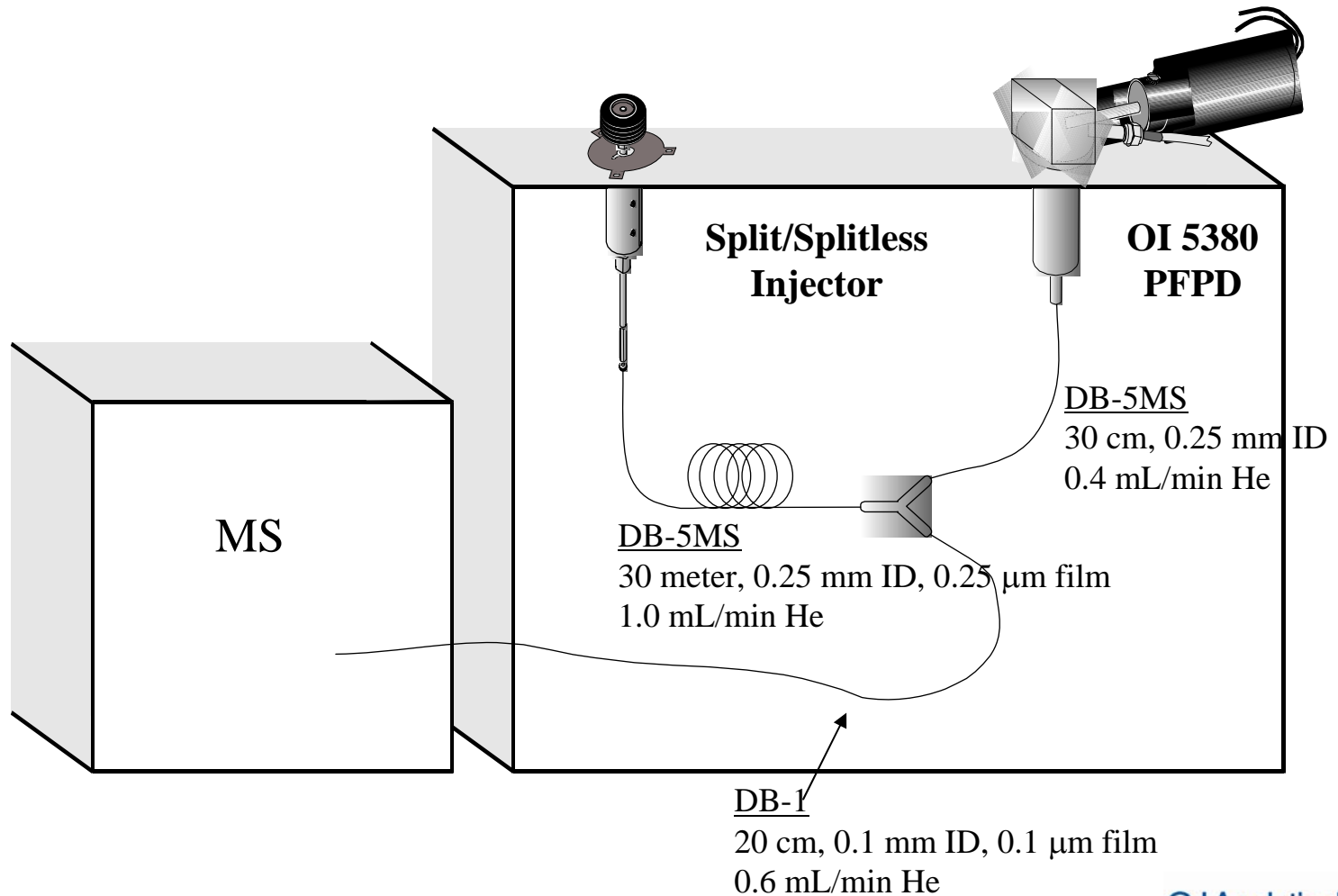
	Compound	ppb
1	Methamidophos	100
2	Acephate	60
3	Dimethoate	60
4	Diazinon	60
5	Chlorpyrifos-Me	50
6	Chlorpyrifos	50
7	Disulfoton sulfone	50
8	Ethiohn	60
9	Phosmet	100
10	Azinphos-Me	150
Plus		
	Thiabendazole	~ 1 ppm (sulfur only)

Dual Gate Subtraction



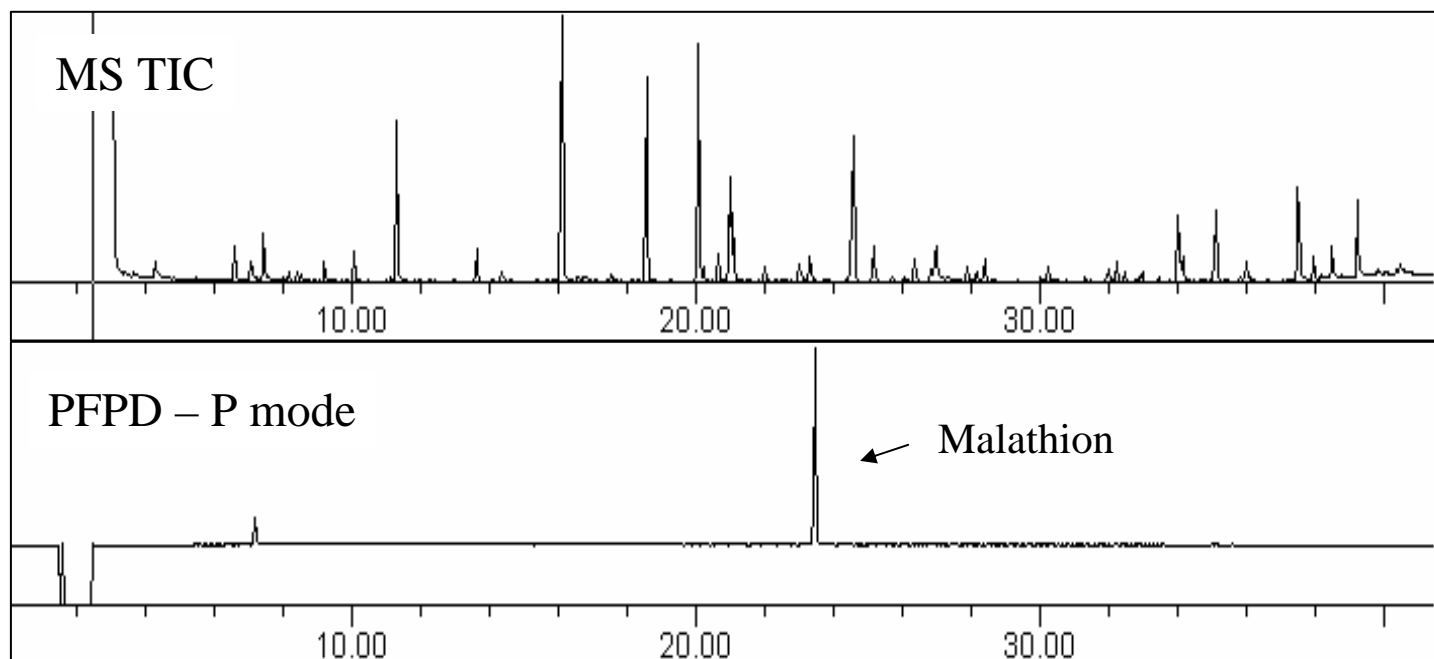
- Onion extract; no clean-up
- Large interfering sulfur background
- Ch1 – No subtraction
- Ch2 – sulfur background subtracted using PFPDView & Dual Gate Subtraction

PFPD-MS Tandem Configuration



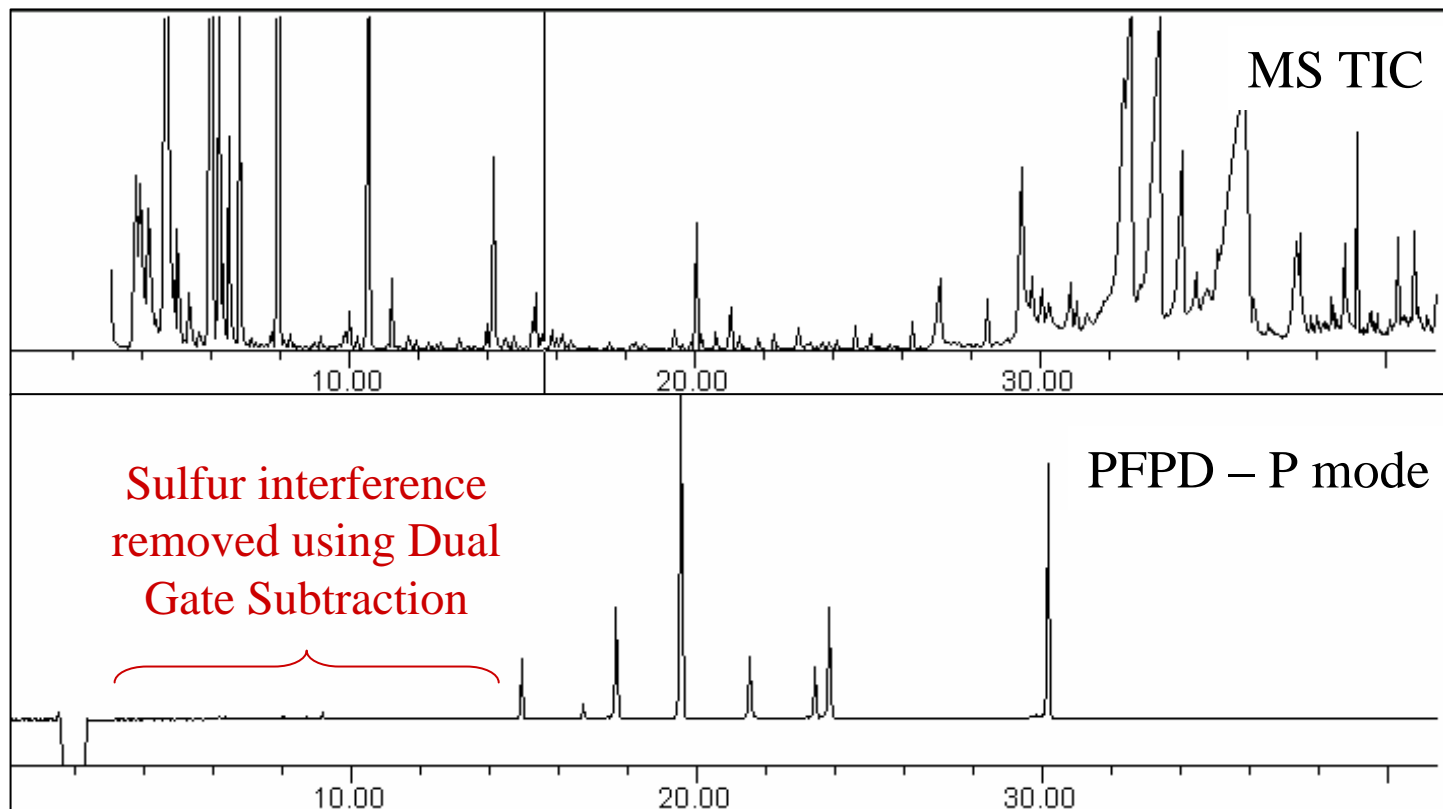
Coriander Spiked With 1-ppm Malathion

The PFPD is used in parallel with the MS to identify RT of OP pesticides in the presence of complex background.

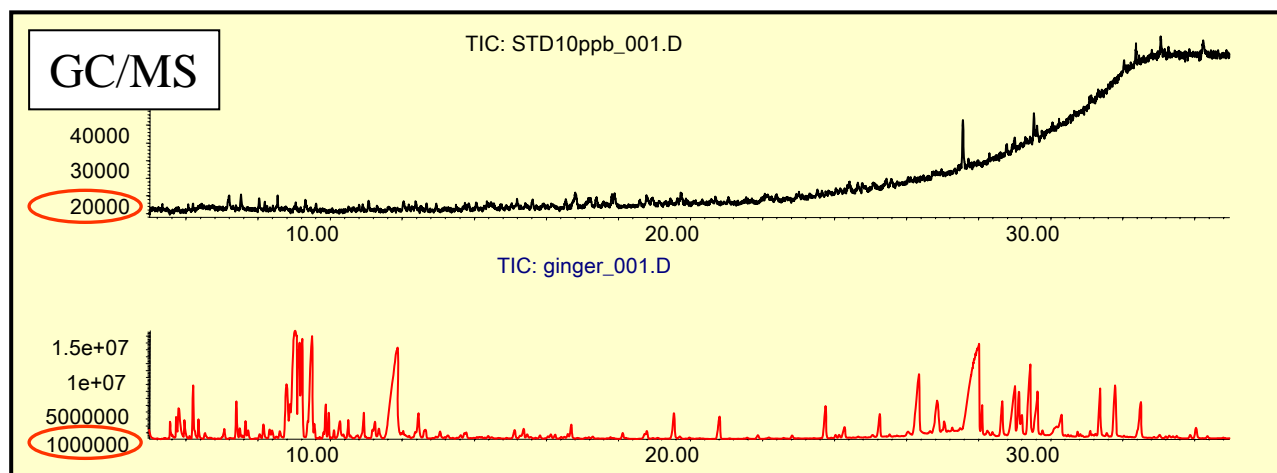


Broccoli Spiked With Method 614 Mix

Dual Gate subtraction can also be used to remove interferences.

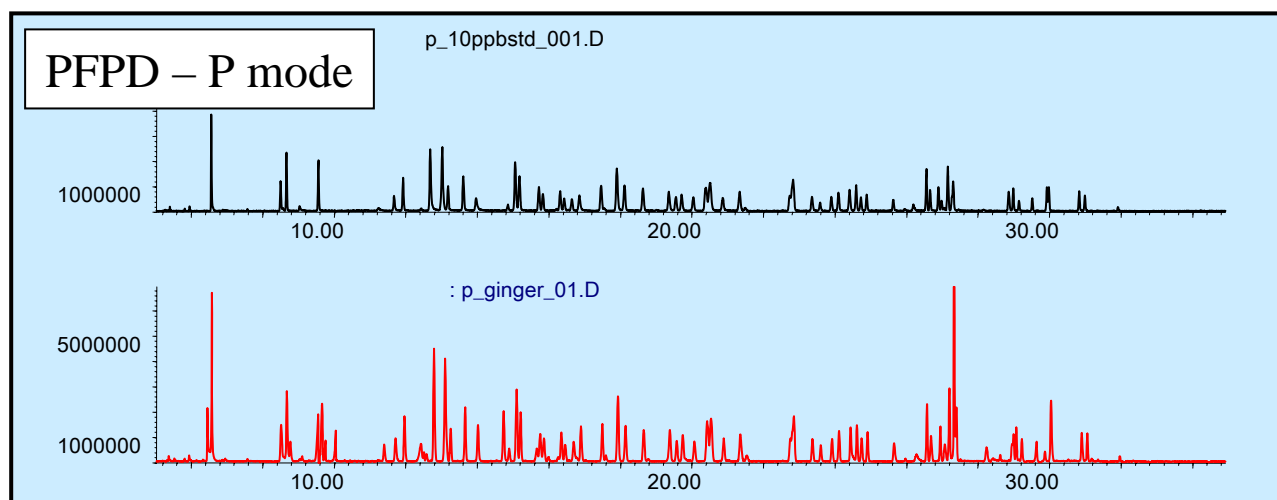


Ginger Extract With 10-ppb OP Pesticides



Std Mix
307 compounds
10 ppb

Ginger extract +
307 compounds
10 ppb

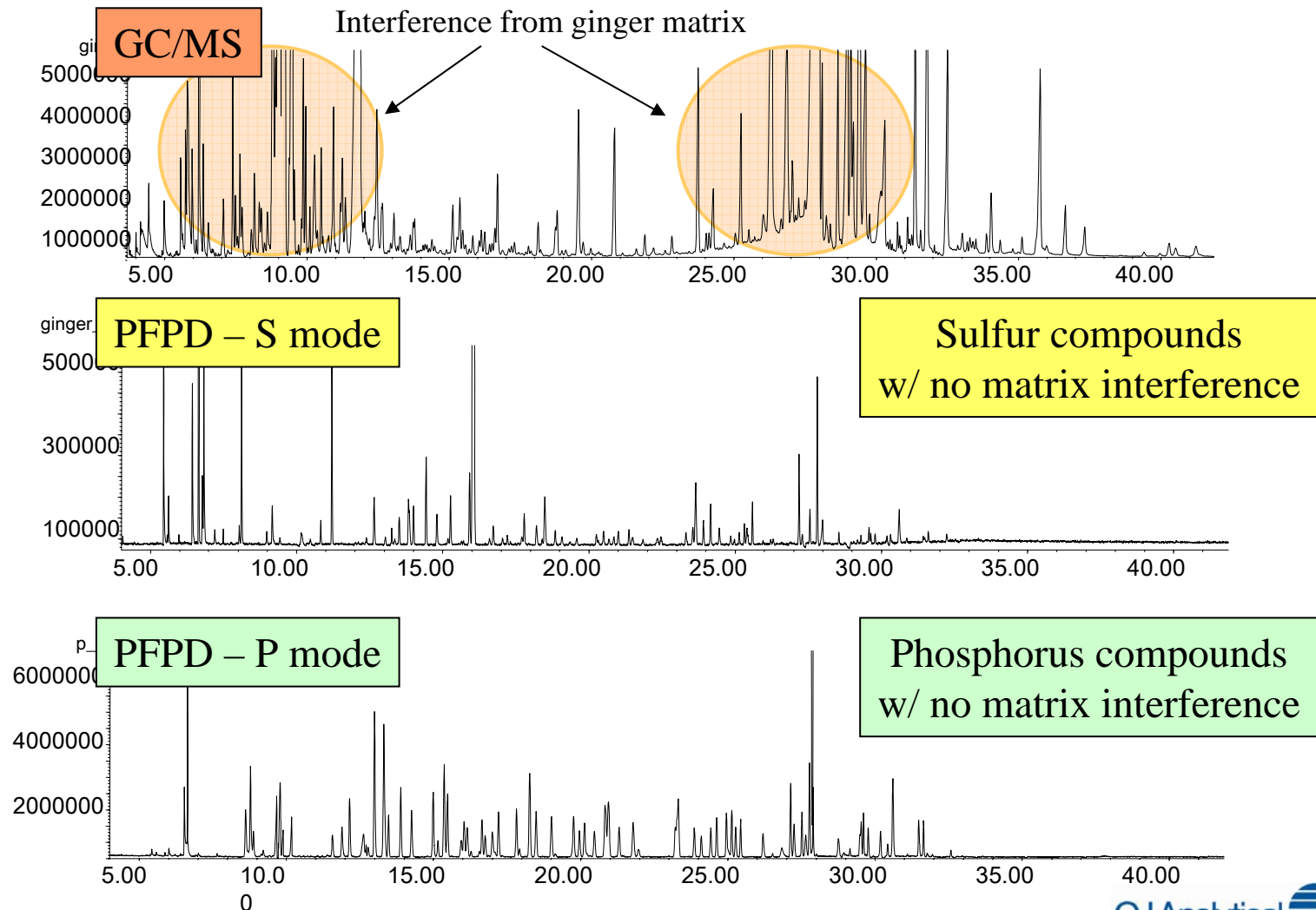


Std Mix
307 compounds
10 ppb

Ginger extract +
307 compounds
10 ppb

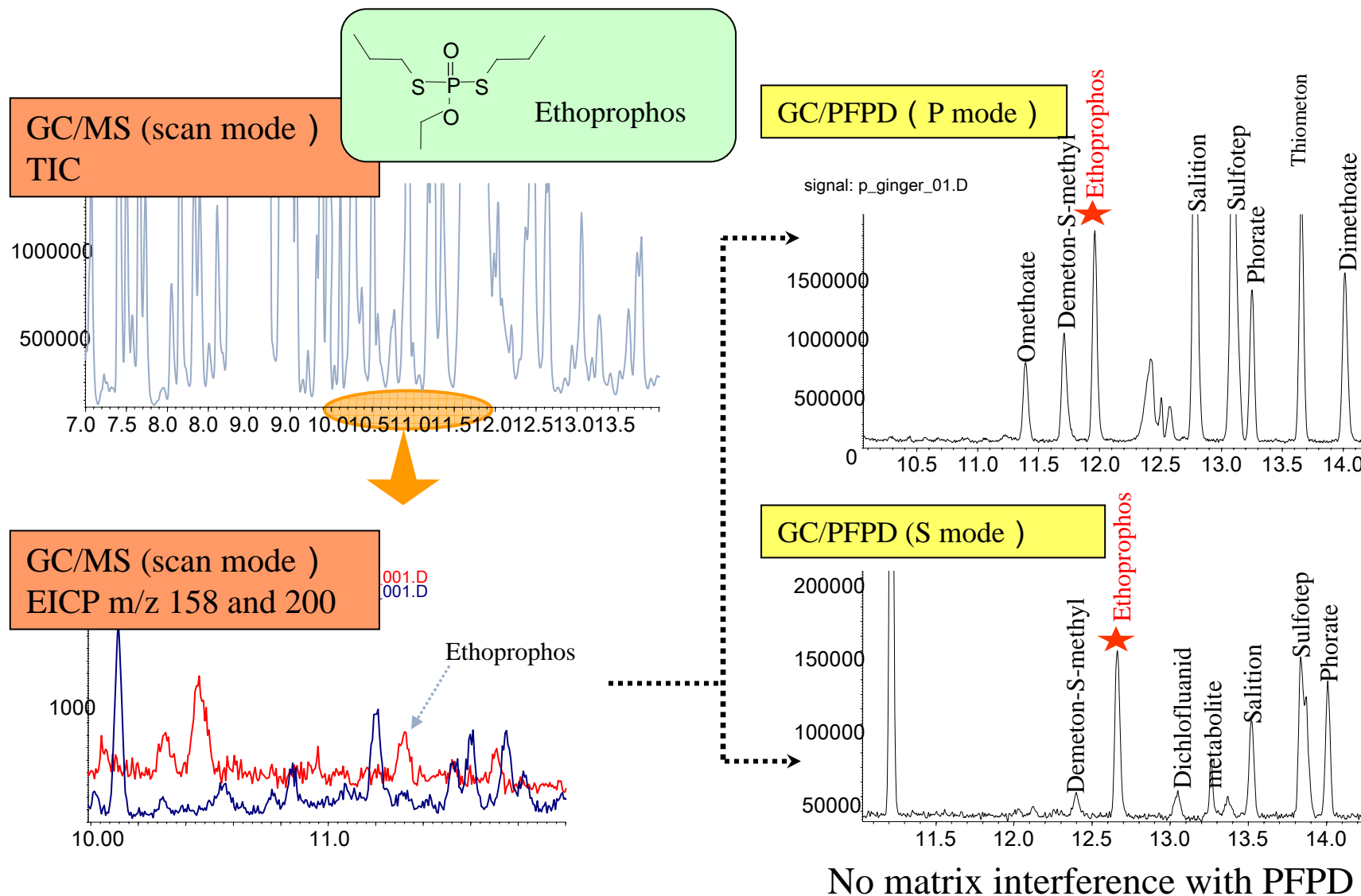
Courtesy of Kinryo Electric, Japan

Ginger Extract With 10-ppb OP Pesticides



Courtesy of Kinryo Electric, Japan

Ginger Extract With 10-ppb OP Pesticides





S

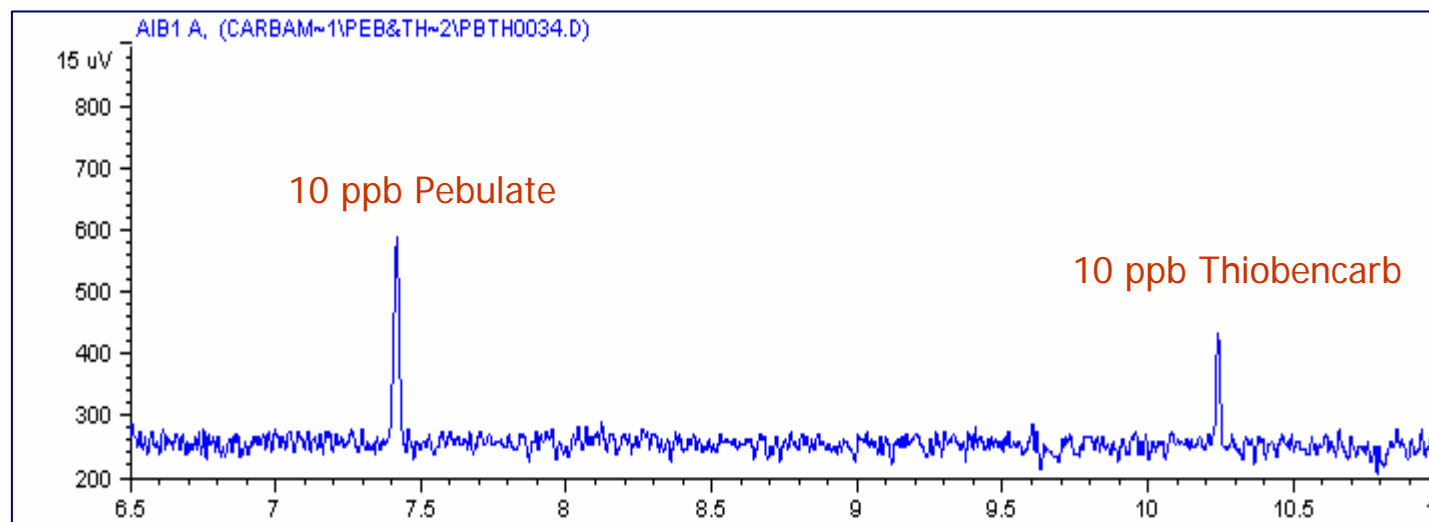
CI

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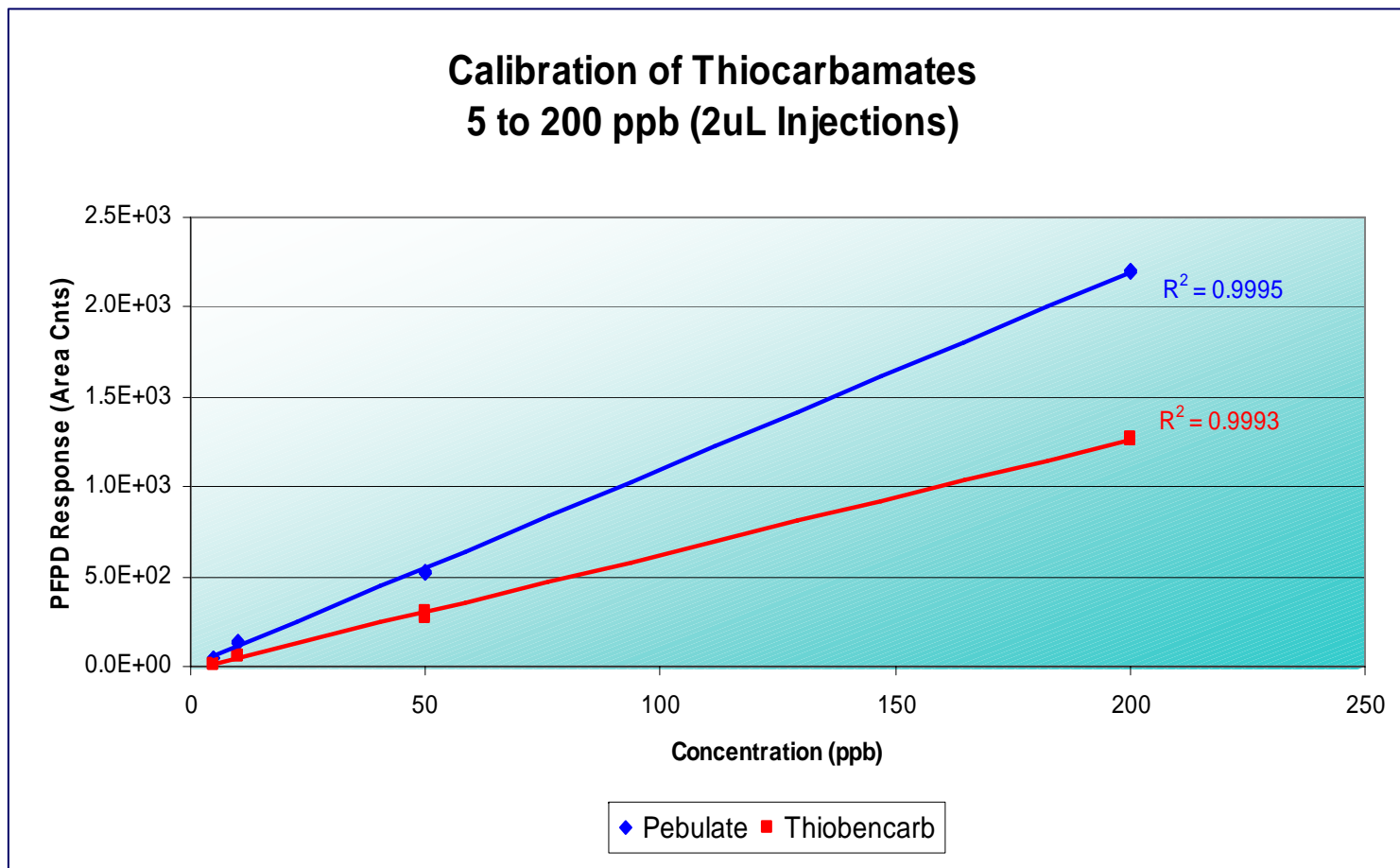
Carbamate Pesticides

10-ppb Pebulate & Thiobencarb

- 2- μ L injection; pulsed splitless mode
- Injector temperature 250°C
- HP-5 column, 30-m x 0.32-mm ID x 0.25- μ m film
- 60°C for 1 minute, 20°C /min to 300°C, hold 1 minute

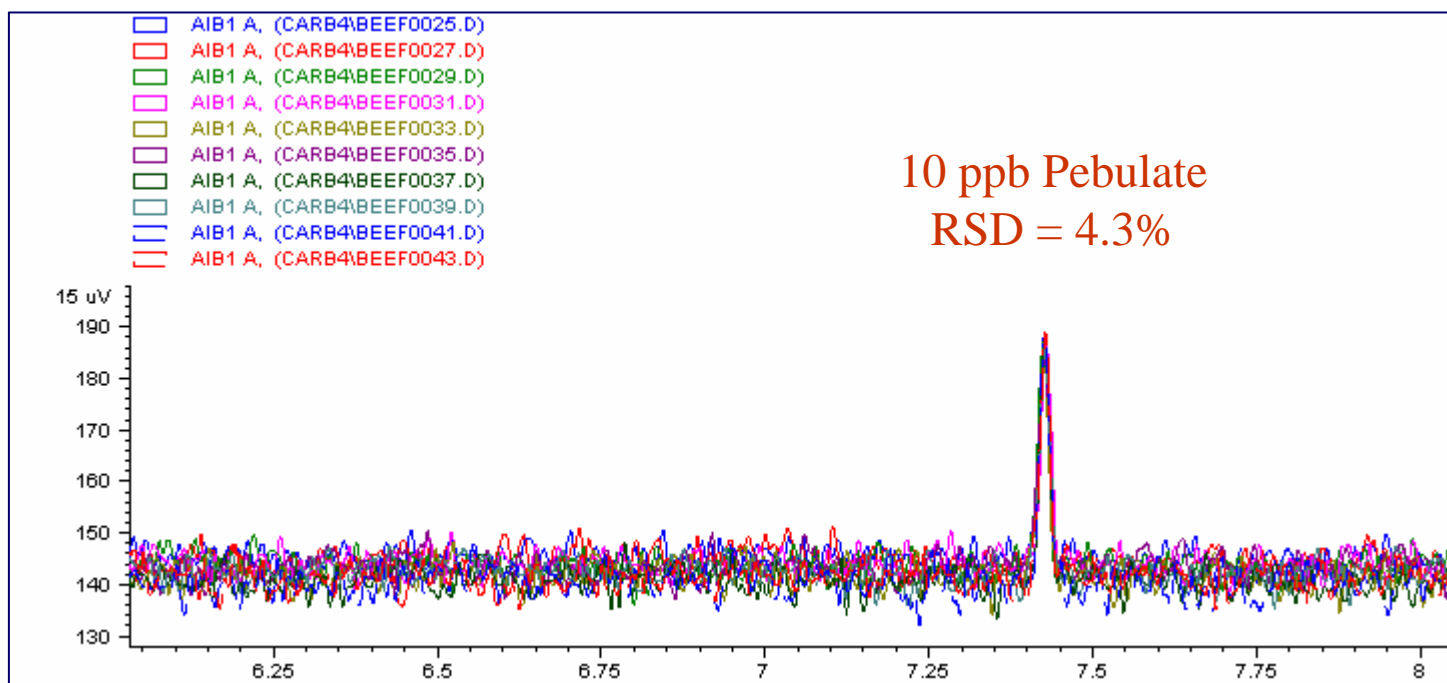


Calibration Curves 5 - 200 ppb



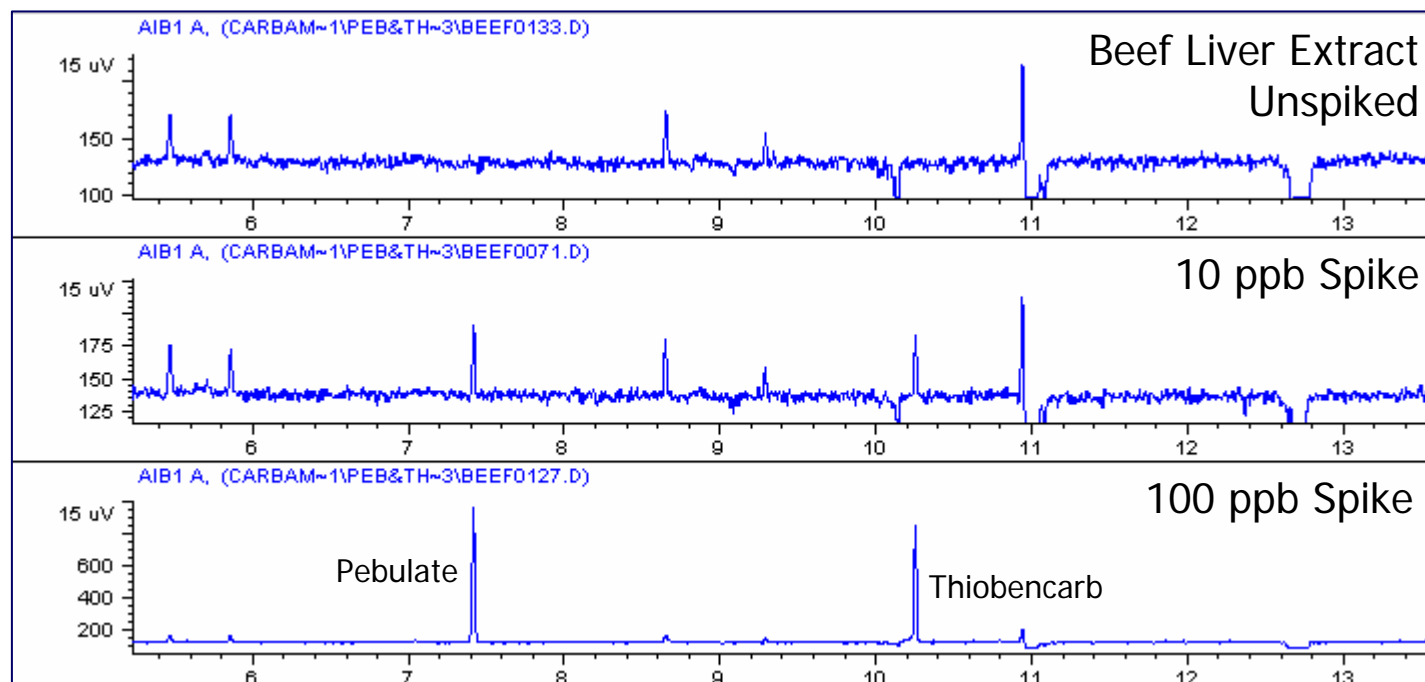
Repeatability at 10 ppb

- 10 ppb pebulate RSD = 4.3% (n=10)
- 10 ppb thiobencarb RSD = 6.9% (n=10)



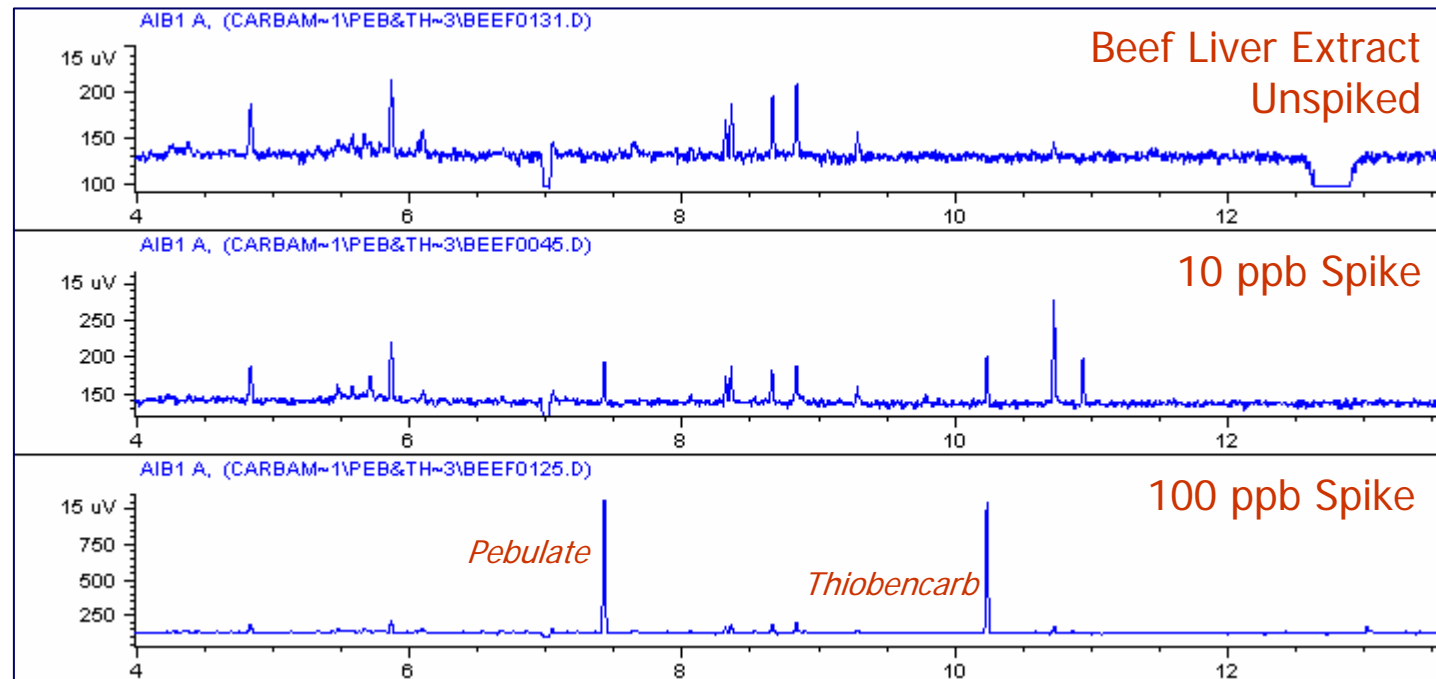
Carbamates in Beef Fat

- 2- μ L splitless injection – GC – PFPD
- Pebulate & Thiobencarb at 10 ppb or less



Carbamates in Beef Muscle

- 2- μ L splitless injection – GC – PFPD
- Pebulate & Thiobencarb at 10 ppb or less



Carbamates in Beef Liver

- 2- μ L splitless injection – GC – PFPD
- Pebulate & Thiobencarb at 10 ppb or less

