

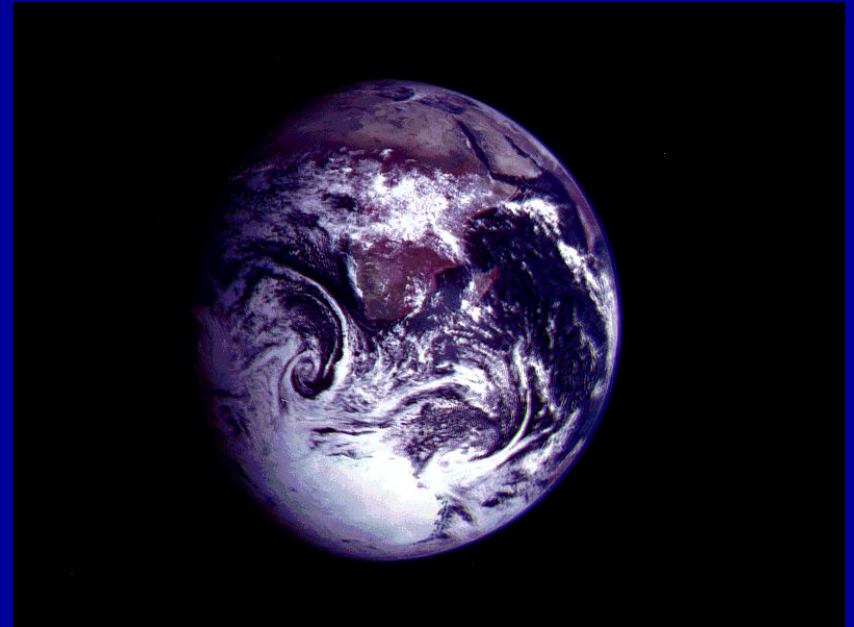
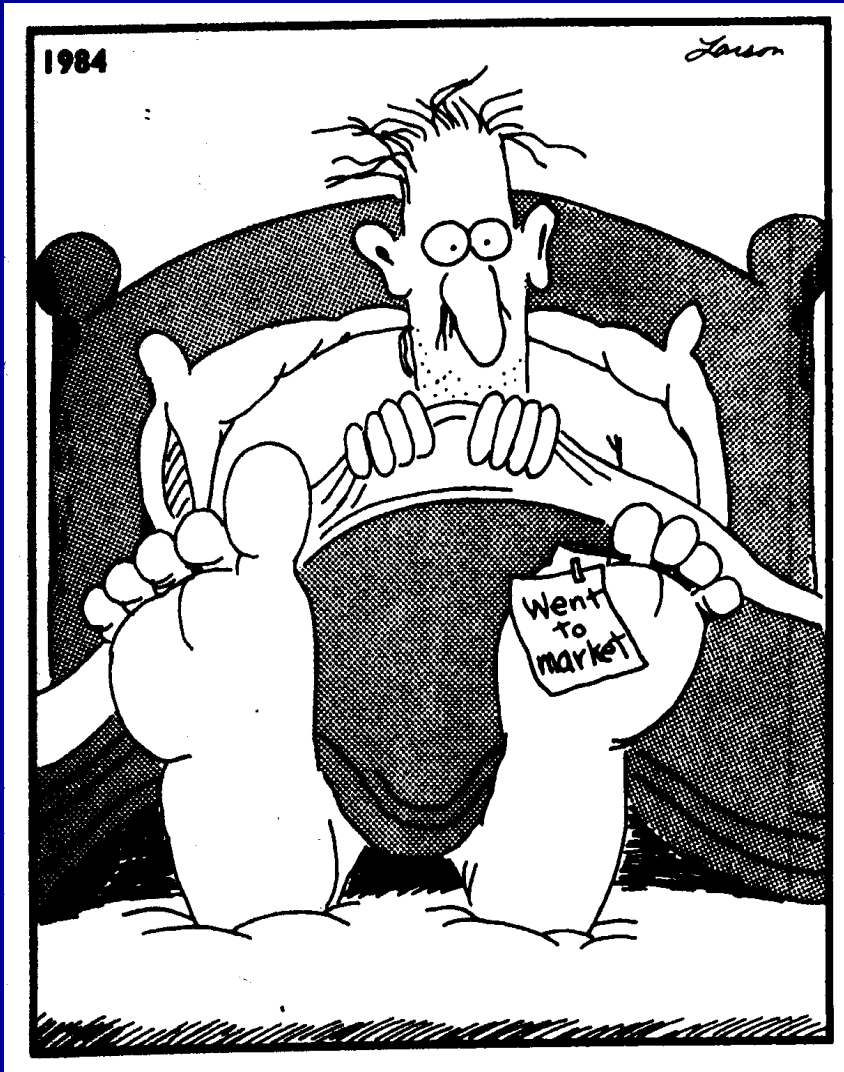


Methyl Bromide: A Tool for MRL Management

USDA-ARS-SJVASC Crop Protection & Quality Unit



Future Agriculture Consumer Safety Demands...



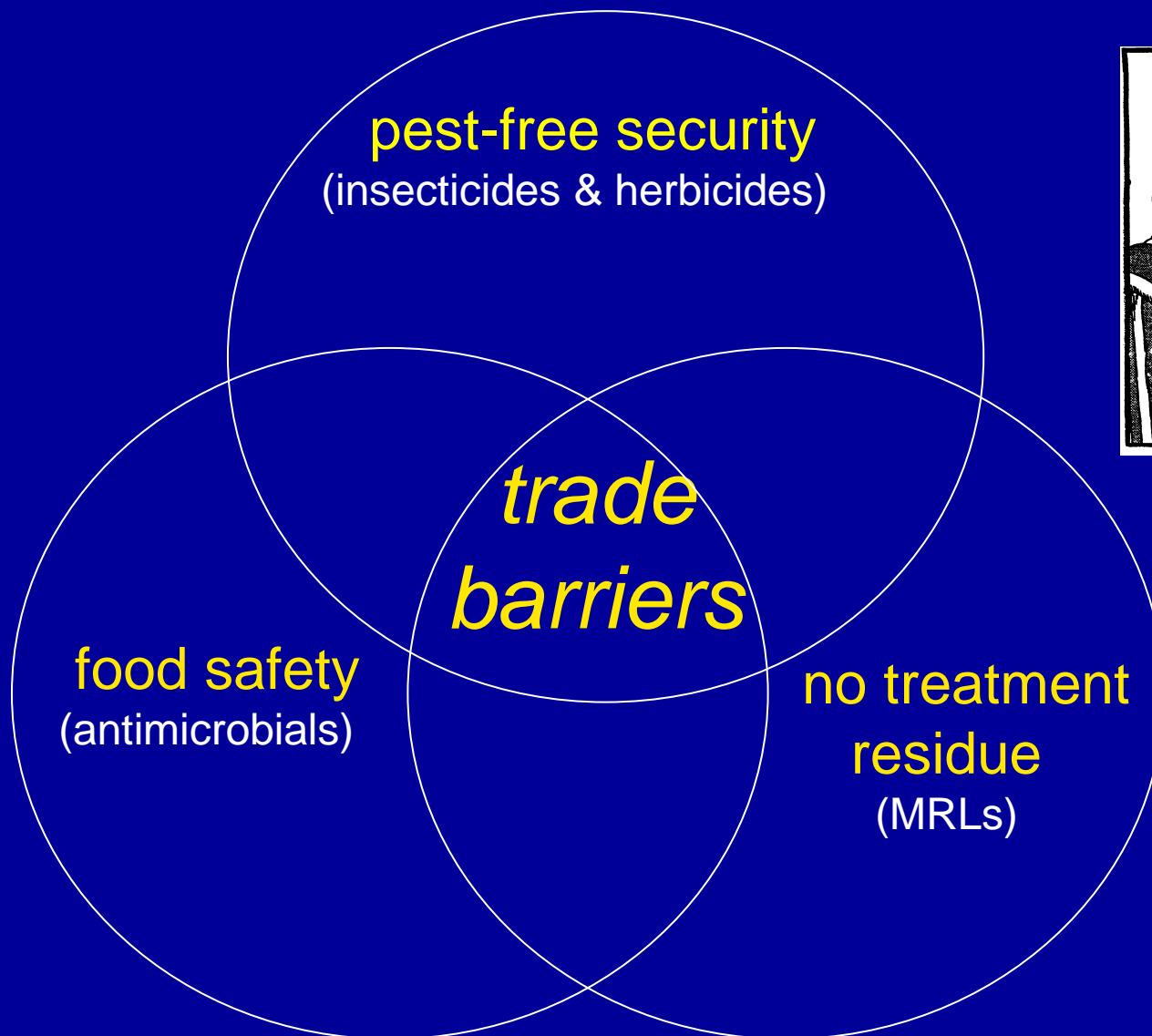
....for the Global Market

So many chemicals are needed

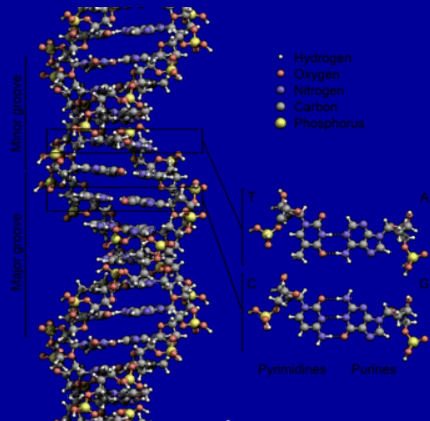
- What can you use?
- How much can you use?
- How much do you need?
- How long do they last?
- When to apply – rotate use?
- Does use impact global marketing?



Agricultural (Postharvest) Conundrum – must use chemicals, but can't????



Opportunity to impact chemically-related trade barriers



PREPLANT



PRODUCTION



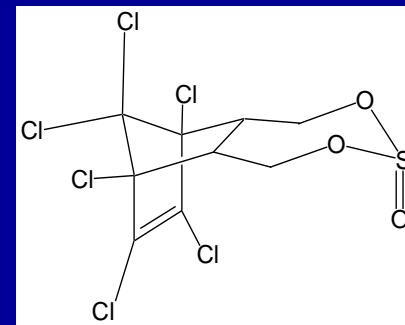
POSTHARVEST

start

finish

“SYSTEMS-BASED”

Postharvest Chemist – Primary Focus



- Break specialty crop trade barriers
 - pests (insects), microbes, residues
 - systems/processing-based
 - mathematical modeling
- QPS scenario & methyl bromide
 - low-emission fumigations
 - alternatives
 - PH₃, SF



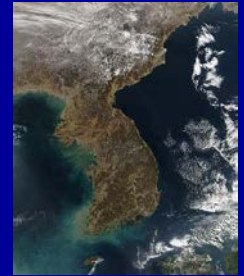
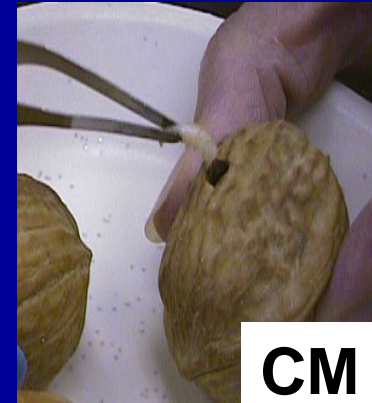
MB a tool for MRLs?

Contemporary case study:

Propylene oxide (PPO) sterilization of tree nuts



Tree nut insect control – pest free security



NOW

CM

Field pests



RFB



IMM

Storage pests



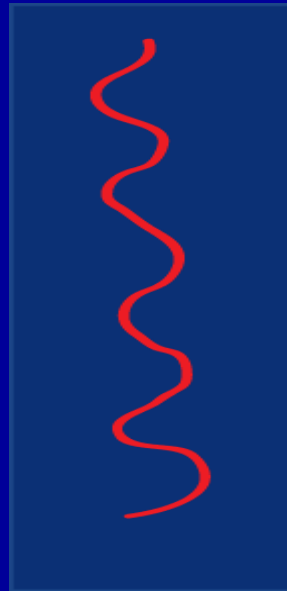
DFB

Two Types of Fumigation

(James G. Leesch)

operational logistics

- Stored Product
 - Residence time
 - Stored product pests
 - Reinfestation
 - Large chambers
 - Cont. Atmos. is a tool



- Field Disinfestations
 - Time constraint
 - Production pests
 - Stored product pests
 - High throughput
 - Small chambers

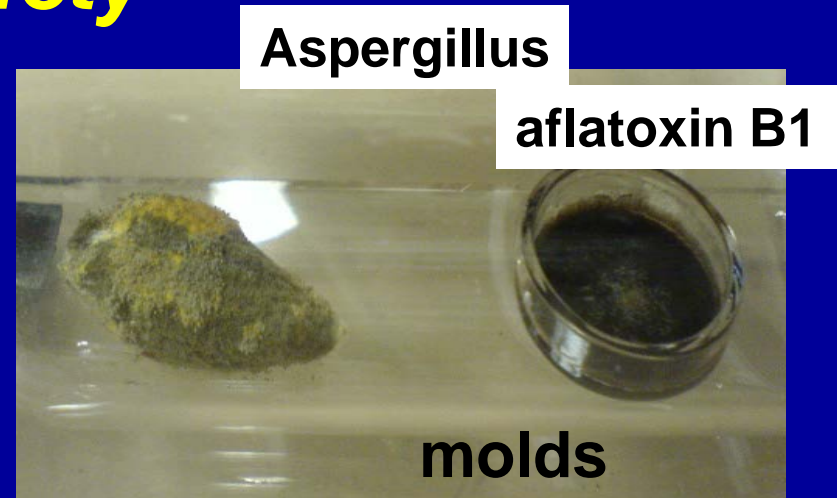


MB is critical!
CUEs now gone

Tree nut microbe control -food safety



aerobics

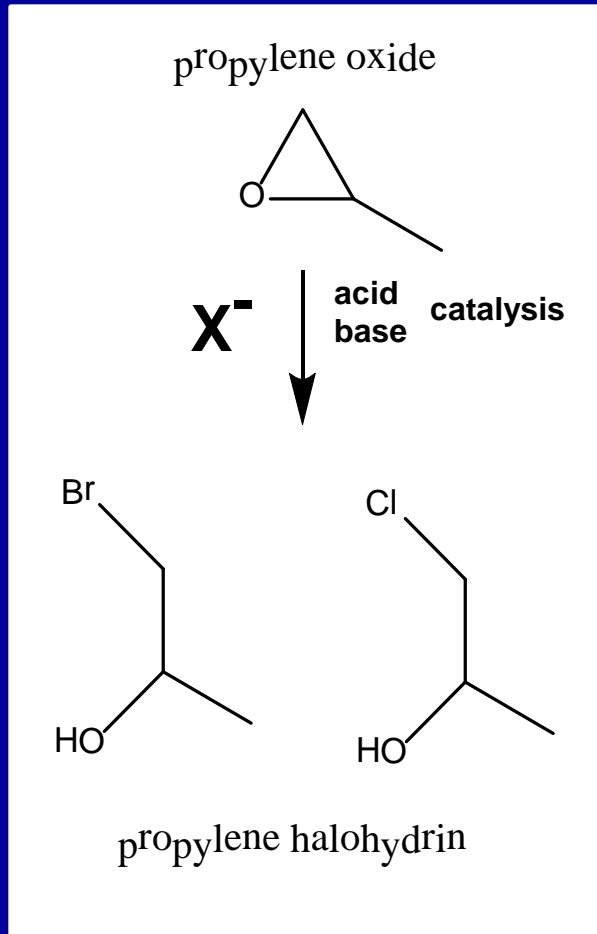


Propylene oxide (PPO) sterilization

- Dose by Log 6 control
 - 0.5 – 0.8 oz./ft³
(500-800 mg/L)
- 4-h Vacuum – 660mmHg
 - Infrastructural limits
- High temp, 105 F
 - Nut quality
- 300ppm food additive tolerance
 - tune residue below this level - incubate



Tree nut MRL issues -propylene halohydrins & EU



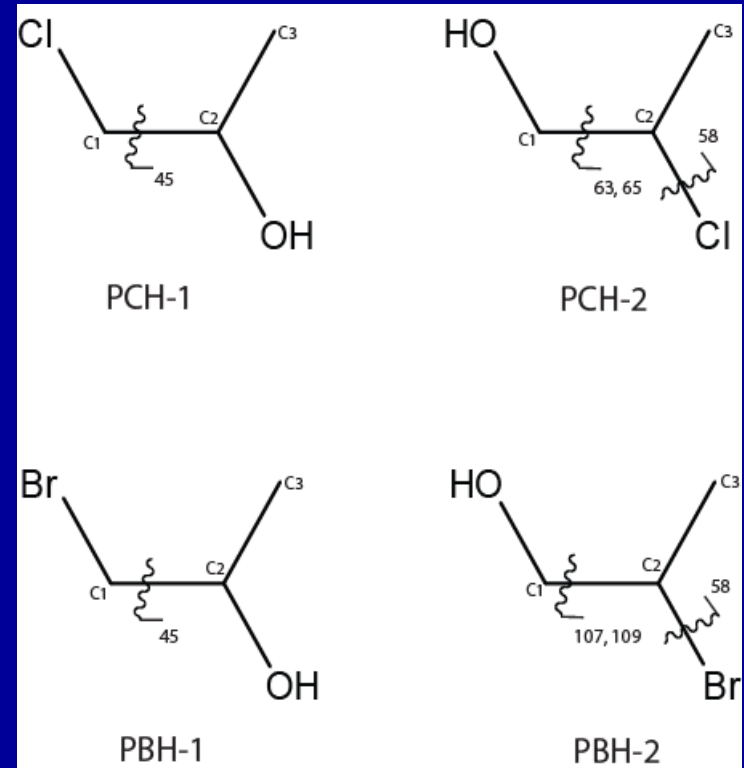
- Degradation products as MRLs
 - Limited data on PCH
 - No data on PBH
- Historic perspective for concern
 - MB, bromide quantification (Br-)
 - Ozonation of drinking water



Tree nut MRL – PPO issue -getting started



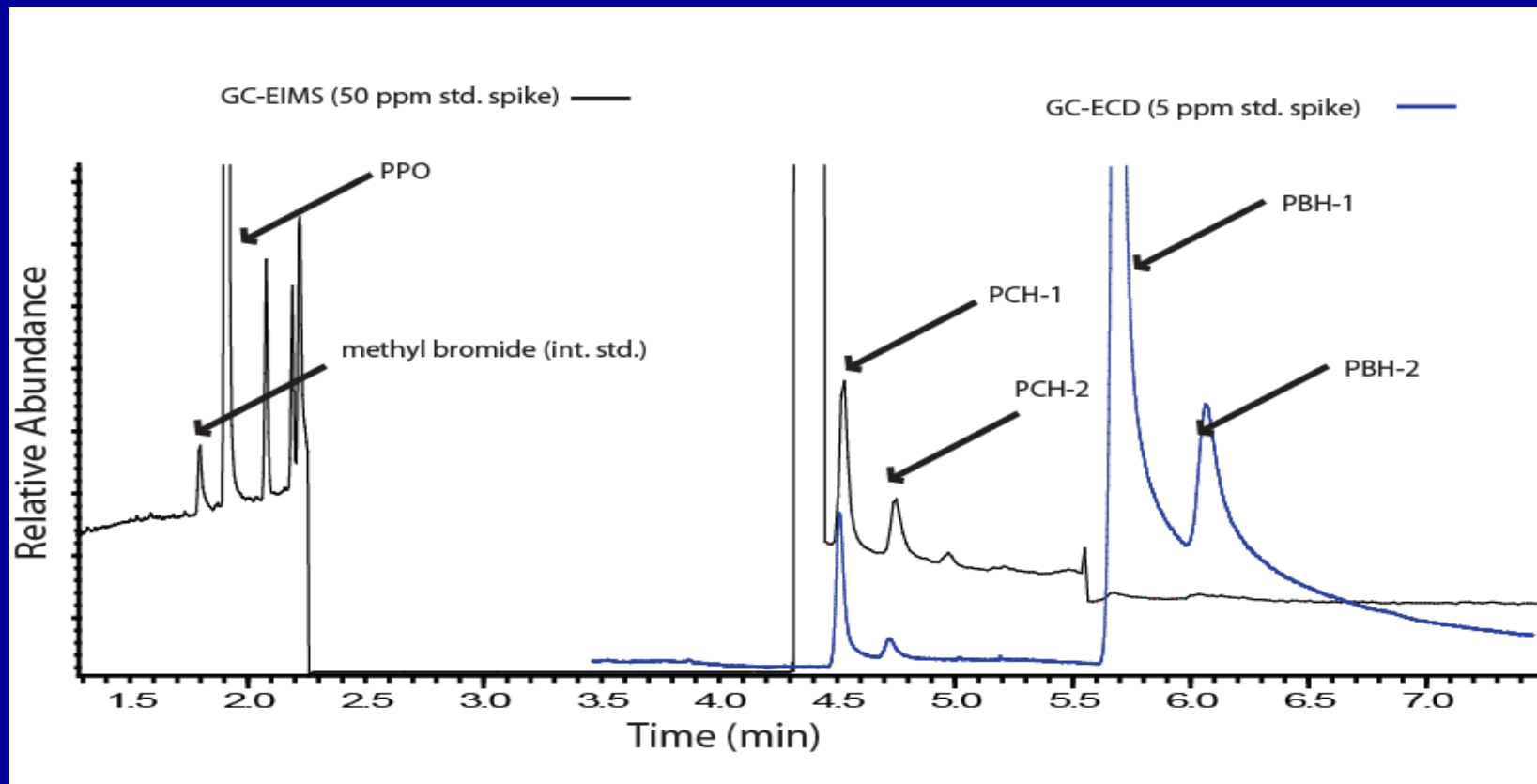
- Novel Methodology
 - Existing ASTA method no work
 - “Artificially” raises PCH and PBH
- Need isomeric resolution
 - Critically supports tox data



Tree nut MRL – PPO issue -getting started

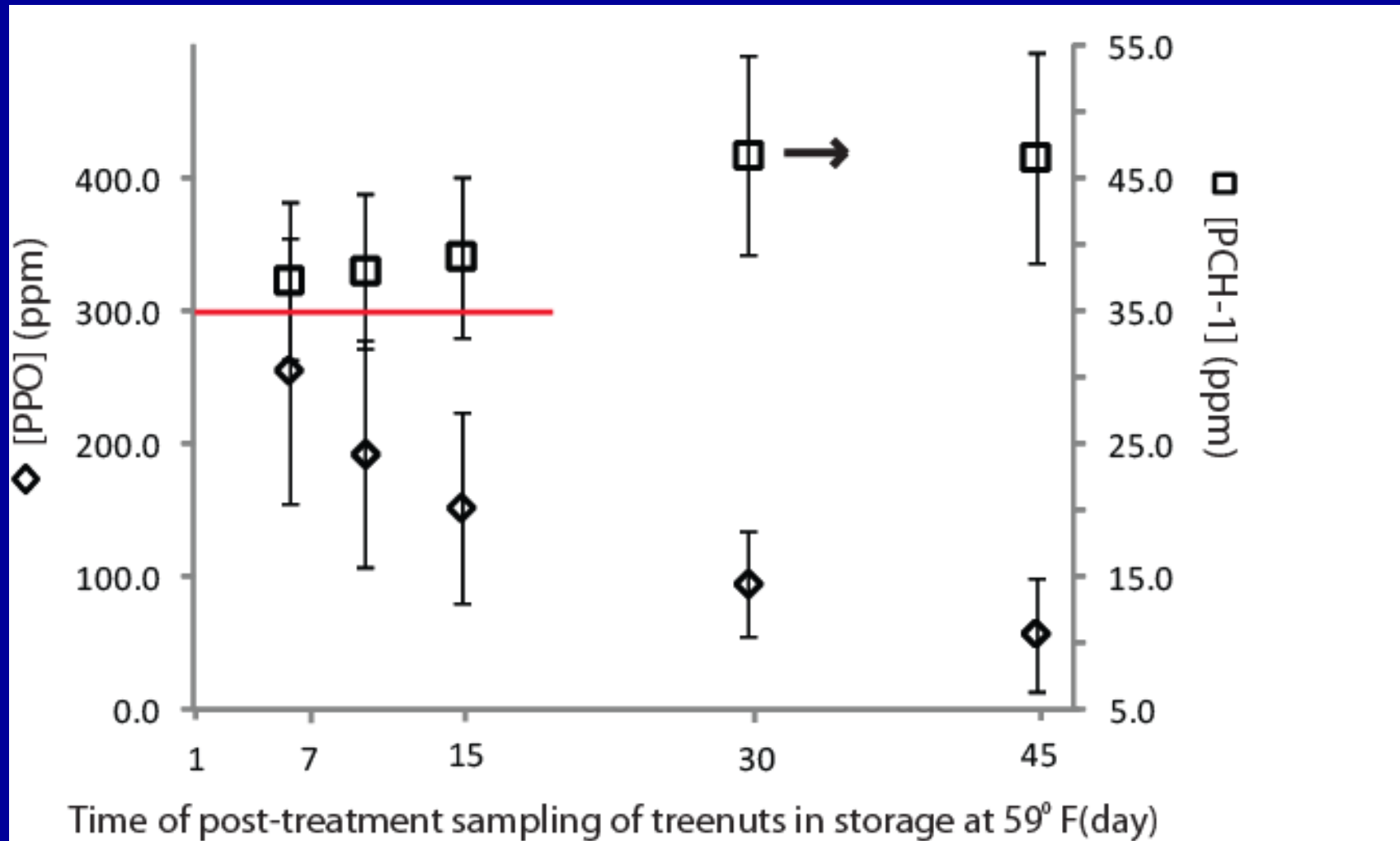


- Novel Methodology – GC Mass spectrometry



Needs to be optimized for the masses and published

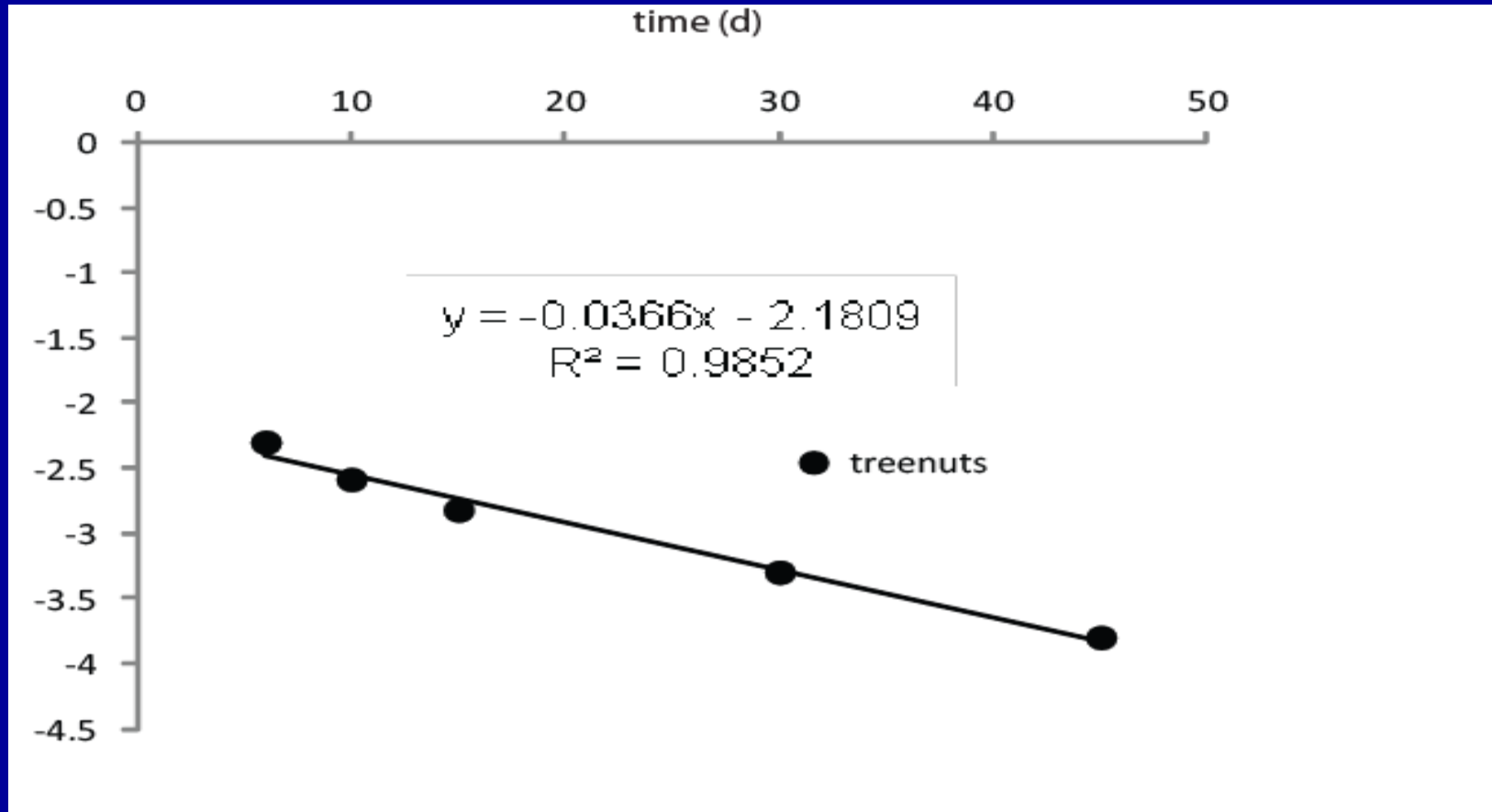
Tree nut MRL – PPO issue *-commercial trials complete*



The wait for the “benchmark” MRLs has started



Tree nut MRL – PPO issue *how will industry have to change off- gassing ???*



Loss of PPO from tree nuts (days) at 60F



Tree nut MRL – PPO issue

What was the origin???

microbe	Fumigant			
	control	MB	PH3	SF
aerobic	4.7	2.4	4.2	4.9
mold	3.1	1.3	3.1	3.1

(log cfu mL⁻¹)

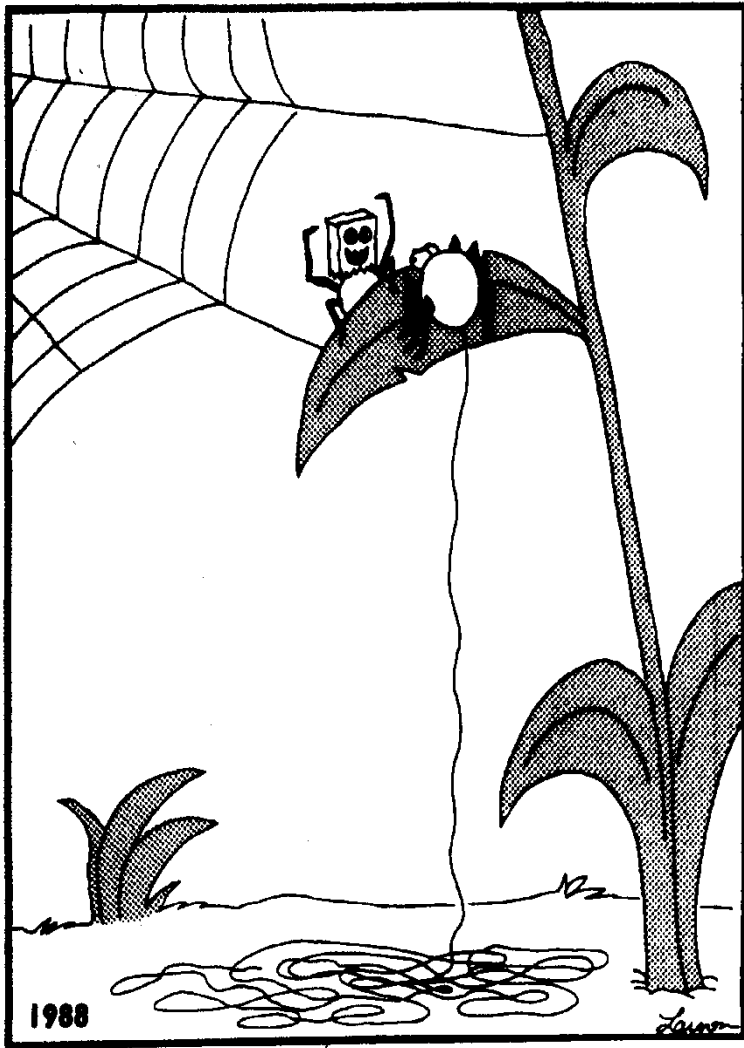
**“Prophylactic” MB fumigation worked against microbes
(true alternative should have this quality SF-PPO mix)**



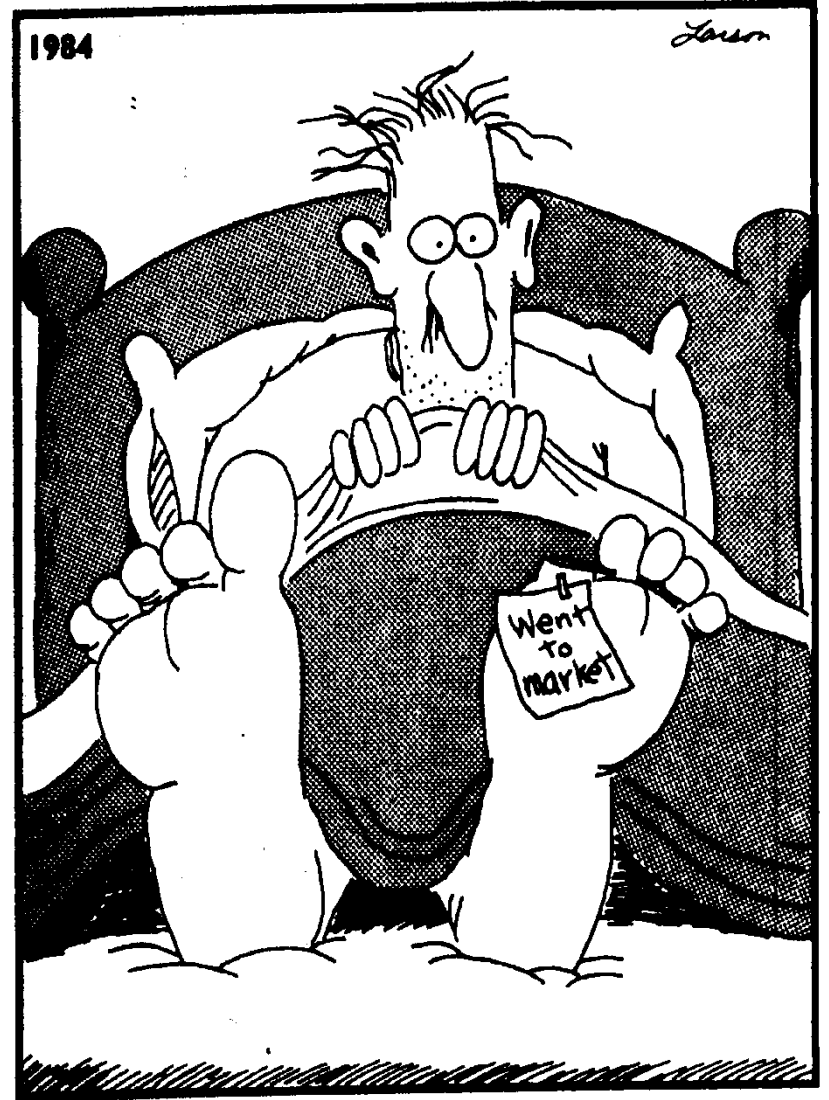
MB a tool for MRLs?

Yes, A critical chemical to mitigate!

- Preserve QPS use
 - Internationally agreed upon footer
- Eliminate atmospheric emissions
 - USDA-FAS funded project in Parlier, CA
 - Cost-effective, “green” deliverable ASAP
- Capture microbial activity on label (new use)
 - Chemtura support – move forward



"Hey, Bob ... did I scare you or what?"



THANK YOU