

Personal Chemical Exposure Program

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Getting It Straight About Pesticide Use In Citrus

Drift is the biggest regulatory issue in California Pest Management

Aggregate exposure assessment can help resolve the issue

The

NOTICE OF PROPOSED ACTION, GROUNDS THEREFORE, AND OF OPPORTUNITY TO BE HEARD

will read something like this example

Put your name here violated Section 12973 of the Food and Agricultural Code by using any pesticide in conflict with the registered labeling which was delivered with the “pesticide.

The label states (see Directions for Use):

Do not apply this product in a way that will contact workers or other persons, either directly or through drift.”

*You (or your agent) can't do it!
(even on your best day)*

The Laws of the Conservation of Matter

No application procedure is 100% efficient

Drift is off-site pesticide air levels from application

Most pesticides are applied through the air

Other application procedures put pesticide into the air
because of their vapor pressure

Air levels (contact) are potential human exposures

Estimated Daily Inhalation Pesticide Exposure Rates and Child to Adult Index^a

	No Observed Adverse Effect Level ^b	Air Level ^c	Body Weight ^d	Breathing Rate	Index 4/3
	1	2	3	4	5
			kg	m ³ /d	
Child	mg/kg-d	mg/m ³	7.6	4.5	0.6
Adult	mg/kg-d	mg/m ³	70♂	29.6	0.4

^a Kids breath more than adults per body weight

^b Low Observed Adverse Effect Levels are toxicologically more appropriate when default uncertainty factors of 10x10x10 (actually 10ⁿ) are applied to NOAEL

^c Drift is short-term event; time-weighted averages require new monitoring strategies

^d Most adults who apply pesticides weigh more than 154 pounds.
Need current estimates.

The Reality of Pesticide Regulation

“Regulatory discretion” is not a substitute for just law.

How little is OK?

Set acceptable exposure levels that recognize health risk and environmental quality

Food tolerances

ASTEEM=Acceptable Short Term Environmental Exposure Measures (hypothetical)

The views of US EPA, PAN, EDF, Media, California Agriculture, Growers, Registrants and Cal-EPA are **NOT** the same.

Food Tolerances

- Permitted residue levels based upon good agricultural practices
- Safe for consumption
 - Adults (fruits and veges: 0.1% bw/day)
 - Teens
 - Children
- $DOSE = consumption \times conc_{residue}$

Fruit juice						
Dosage by Age (years)						
Percentile	2-5	6-11	12-19	20-39	40-59	60 and over
50 th	250	260	480	490	370	250
90 th	610	690	1100	1100	980	750
95 th	750 ml	760 ml	1800 ml	1500 ml	1500 ml	970 ml
Body Weight ^a	5 kg	8 kg	62 kg (16 y)	70 kg	70 kg	70 kg
@95 th	150	95	29	21	21	14
Uncertainty	7.1x	4.5x	1.4x	1.0	1.0	0.7x

Fruit juice

(ml; 30 ml = 1 oz)

Consumption by Age

Percentile	2-5	6-11	12-19	20-39	40-59	60 and over
50 th	250	260	480	490	370	250
90 th	610	690	1100	1100	980	750
95 th	750	760	1800	1500	1500	970

Characterize Drift: [Conc. x time] in *pre-approved risk assessment framework*

- Drift dose = $conc_{DRIFT} \times time_{DRIFT}$

Then,

develop an *aggregate exposure estimate (FQPA 1996)*

- Water dose = $2L/d \times conc_{WATER}$
- Air dose = $Breaths/day \times volume/breath \times conc_{AIR}$
- Food dose₁ = $(fruits \ \& \ veges)/day \times conc_{tolerances}$
- Juice dose = $volume_{age \ specific} \times conc_{tolerances}$

What should the citrus industry do about drift, without further procrastination and hand-wringing?

“Do not apply this product in a way that will contact workers or other persons, either directly or through drift.”

The law (FIFRA) is already in place, so...

1. Continue to jaw-bone episodes of illegal drift.
2. Repeal the Law of Conservation of Matter.
3. Attend more meetings and join more task forces.
4. Support scientific study and regulatory review as proposed long ago by UC Riverside Personal Chemical Exposure Program and repeated here today.
(If this is your choice, contact ted@citrusresearch.org)
5. Do something new and exciting to resolve drift issues.
6. Wait to see what Cal-EPA will do.

Risk Assessment Framework

- Each of the the “conc” terms are different; but can get you to the same place: DOSE
- If “Dose determines a poison!”, then
“There is a safe level of everything!”
- *Citrus* can’t be a drift dodger much longer!
- It is time to do something, I think.

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